Legislative committees as information intermediaries: a unified theory of committee selection and amendment rules*

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Abstract
This paper offers an explanation to two widely discussed puzzles concerning the legislative process: why legislative bodies sometimes tie their own hands by delegating power to specialized committees, and why committees sometimes consist of preference outliers. We argue that these questions are interrelated. We consider a context in which the legislature has to collect information from a biased and strategic lobbyist, and show that the legislature can improve its payoff if instead of communicating with the lobbyist directly, appoints a biased committee as an intermediary. In case of using closed rule, a committee with preferences closer to the lobbyist induces more information transmission but more biased decision. In case of using open rule, a committee oppositely biased to the lobbyist can induce more information transmission. Comparing closed versus open rule yields the following findings: (i) for a lobbyist with small bias, it is optimal to use closed rule and a committee with perfectly aligned interests with the lobbyist; (ii) for intermediate biases it is optimal to use closed rule and a committee whose bias is strictly between the lobbyist and the floor; (iii) for large biases it is optimal to use open rule and a committee with opposite bias to the lobbyist. Consistent with existing empirical evidence, there is no simple relationship between the absolute bias of the committee and the procedural rule used.

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1 Introduction

Committees are an important part of the legislative process, drafting bill proposals to be voted on by the legislative body, among other functions. The United States Congress currently has around 200 committees and subcommittees. There is a considerable amount of research, both theoretical and empirical, analyzing the role of committees in legislation. This literature posed two intriguing puzzles concerning legislative decision-making.

The first one is why legislative bodies occasionally tie their own hands by implementing procedural rules that give agenda setting power to specialized committees. In particular, a growing number of amendments in the House are voted on using closed rule. This means that the committee’s proposal cannot be amended, and the floor can only decide on whether to accept the proposal as it is, or reject it, in which case a status quo outcome prevails. Other proposals are voted on using open rule, in which case the proposal can be amended by members of the floor.

The second question is why many committees consist of preference outliers (members of the legislation whose preferences are biased in some direction, relative to the median member of the legislature). There is an ongoing debate about the extent to which committees are biased. However, most scholars agree that at least some committees consist of preference outliers, and some argue that this is a feature of most committees.1 This is especially puzzling given that committees are delegated some power. Why does not the legislature appoint members to committees whose preferences are close to the median legislator? More broadly, why are committees used in the first place?

There are multiple theories of committees proposed in the literature, but none of them gives a satisfactory answer to all of the above questions. In this paper we argue that these questions are interrelated, and propose a unified theory of committee selection and procedural rules. Our model explains why it might be in the interest of the legislation to appoint biased committees, and why in some cases it is optimal to use closed rule, while in other cases to use open rule.

Our model belongs to the informational theories of legislative committees, started by the seminal paper of Gilligan and Krehbiel (1987; hereafter GK). These theories emphasize the role of committees in gathering specialized information and transmitting it to the legislative body.2 GK, using the commu-

1 Ray (1980), Weingast and Marshall (1988) and Dion and Huber (1996) present results indicating that many or most committees are outliers, while Krehbiel (1990, 1991) and Cox and McCubbins (1993) find that there is no convincing evidence that committees systematically consist of preference outliers. Poole and Rosenthal (1997) find a dramatic shift toward less representative committee contingents among democratic representatives after the 83rd House, concentrated on four committees: Agriculture, Armed Services, Veterans’ Affairs, and Education and Labor.

2 Other theories of legislative committees include: (i) the distributive benefits theory, which argues that the power granted to committees is private benefit (pork) to the corresponding members of the legislature; (ii) the majority-party cartel theory, which argues that committees help the ruling party achieve its goals; and (iii) the bicameral rivalry theory, according to which
nication model of Crawford and Sobel (1982; hereafter CS), point out that if a committee’s preferences differ from the median member of the floor, it does not want to transmit all the information truthfully to the floor. This can provide a rationale for using closed rule, since the latter serves as a commitment by the floor to accept proposals that are biased towards the committee’s preferences, inducing the committee to reveal more information truthfully. However, the model of GK does not explain why committees sometimes consist of preference outliers in the first place. If committee members shared the same preferences as the floor’s median, strategic information transmission would not be an issue, invalidating the argument for the use of closed rules.3

We address the above questions in a model that, as opposed to GK, assumes that committees gather information from strategic informants (experts, lobbyists), who are themselves interested in the policy outcome and might want to withhold valuable information. This is in line with how political scientists think of the legislative procedure in practice. Rothenberg (1989) and Hansen (1991) argue that rather than committees, originally interest groups possess the relevant information, and the first versions of new amendments are typically written by interest groups. Lowi, Ginsberg and Shepsle (2005) summarize this point in the following way:

“Interest groups also have substantial influence in setting the legislative agenda and in helping craft specific language in legislation. Today, sophisticated lobbyists win influence by providing information about policies to busy members of Congress. As one lobbyist noted, "You can’t get access without knowledge... I can go in to see [former Energy and Commerce Committee chair] John Dingell, but if I have nothing to offer or nothing to say, he’s not going to want to see me".” (p. 546)

Formally, we consider a strategic situation with three players: a lobbyist, a committee (a shortcut for the median member of the committee), and the floor (again, a shortcut for the median member of the floor). The game starts with the lobbyist observing the realization of a random variable that influences the preferences of all participants over policy outcomes. The lobbyist then sends a recommendation to the committee. We model communication in this stage of the game as cheap talk. Next, the committee sends an amendment to the floor. In case of open rule, this amendment is only a recommendation that does not restrict the policy outcomes that the floor can choose among. Hence, with open rule communication is modeled as cheap talk in this stage of the committees serve as hurdles in the legislative procedure that help legislators extract more rents from lobbyists. For a survey paper on the topic, see Groseclose and King (2001).

3 Gilligan and Krehbiel (1989), Austen-Smith (1993) and Krishna and Morgan (2001) investigate the possibility of heterogenous committees, whose members can send separate messages to the floor. Krishna and Morgan (2001) show that in case of oppositely biased committee members there exist equilibria in which the committee reveals full information to the floor. The plausability of such equilibria is questioned though in several papers, starting with Krehbiel (2001). Aside from this issue, it is still puzzling why the floor would appoint a heterogenous committee of biased members in the first place, and try to induce a relatively complicated truth telling equilibrium, instead of appointing a homogenous committee with the same preferences as the floor.
game, too. As opposed to this, in case of closed rule the floor can only choose between the policy outcome corresponding to the committee’s amendment and an exogenously given status quo. The game ends with the floor choosing a policy outcome from the set of outcomes allowed by the chosen procedural rule.

Our goal is to examine the above situation from an institutional design viewpoint. In particular, we assume that preceding the game the floor can choose both the preferences of the committee (select the committee) and the procedural rule that would be used to vote on the amendment. We investigate how these choices depend on the bias of the lobbyist, which we assume is commonly known. Note that this framework, among other possibilities, allows for the floor both to appoint a committee with the same preferences as itself (which is essentially equivalent to the floor directly communicating with the lobbyist), and to appoint a committee with the same preferences as the lobbyist (which in case of closed rule is essentially equivalent to delegating amendment power to the lobbyist).

We analyze this problem building on results from recent theoretical papers on cheap talk and delegation. In case of open rule, the game we consider is a mediated communication game of the type analyzed in Ambrus, Azevedo, and Kamada (2009; hereafter AAK) and Ivanov (2009). In case of closed rule, the game is equivalent to delegating decision power to the committee subject to a veto power, preceded by a round of cheap talk between the lobbyist and the floor, analyzed in Dessein (2002). Adopting results from the above papers immediately reveals that both in case of choosing closed rule, and in case of choosing open rule, the optimal committee might be biased relative to the floor.

For the case of closed rule, the intuition is that a lobbyist reveals more information to committees whose preferences are more similar to his than the floor’s, and who by using the agenda setting power granted by closed rule can effectively represent these preferences. This gives incentives for the floor to appoint a committee that is biased in the same direction as the lobbyist. For

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4 We follow GK in assuming that the floor can ex ante commit to a procedural rule. In practice, the Rules Committee decides what procedural rule to use after the committee submitted the proposal. However, as GK discusses, given that the Rules Committee makes procedural decisions repeatedly with high frequency, reputational concerns are thought to make it possible for the Rules Committee to act according to a precommitted rule of behavior that is ex ante optimal for the floor. GK points out that this is also consistent with empirical evidence on the composition and decisions of the Rules Committee (see also Groseclose and King (2001)).

5 The tradeoff between delegation and communication is also examined in a technically distinct framework by Aghion and Tirole (1997).

6 These findings are at odds with those in Li (2007), which is the first paper we are aware of that introduces a strategic outside expert into the legislative decision-making framework. Li (2007) only analyzes the case of open rule, and only considers pure strategy equilibria. As a consequence, he finds that committees cannot facilitate better information transmission, and hence the assumption of strategic outside experts does not lead to a theory of committees. As opposed to this, we show that committees can enhance information transmission both in the case of closed and open rules (in the latter case when one allows for mixed strategies).

7 Kydd (2003) makes the counterpart of this point in the context of mediating conflict resolution: he claims that a party involved in the conflict is more likely to believe a piece of information from a mediator if the latter is “on his side.” As opposed to this, in our model, in case of closed rule, what matters is how close the committee’s interests to the lobbyist
example, if drafting a bill on bank regulation requires inside information from investment banks, the chosen committee under closed rule would be (at least partially) aligned with Wall Street’s interests.

In the case of open rule, as AAK and Ivanov (2009) show, there can be mixed equilibria of the cheap talk game with a biased committee serving as an intermediary that are better for the floor than all equilibria of a direct communication game between the lobbyist and the floor. The intuition behind this result is that the noise introduced by the unpredictable behavior of the committee eases the incentive constraints of the lobbyist, inducing him to reveal more information. For this to be the case, the committee has to be biased in the opposite direction to the lobbyist. The absolute value of the optimal committee bias in this case is decreasing in the lobbyist’s bias. For example, if drafting a bill on emission regulation required information from car manufacturers, the chosen committee under open rule may consist of environmentalists with interests opposite to the industry.

We find that our theory offers a rich set of predictions regarding the optimal procedure for the floor. When the lobbyist’s interests do not differ much from the floor’s, the optimal committee has perfectly aligned interests with the lobbyist, and closed rule is used. When the lobbyist’s bias becomes larger but not too large, closed rule remains optimal, but the optimal committee has preferences strictly between the lobbyist’s and the floor’s. Finally, the predictions are reversed when the lobbyist’s bias is large enough. In that case, the floor wants to use open rule, and a committee biased against the lobbyist.

Our results might shed some light on the mixed empirical findings on the relationship between committee bias and whether open or closed rule is used. In a series of papers, Dion and Huber (1996,1997) and Krehbiel (1997a,b) offer mixed evidence, with the former papers finding that more biased committees are more likely to be associated with closed rule, and the latter finding the opposite. This is consistent with our finding that there is no simple relationship between absolute value of the committee bias and the rule chosen. The optimality of either closed or open rule is compatible with either small or large committee bias. (the original source of information) are, not how close they are to the floor (the ultimate recipient). Clearly, the important difference between our model and Kydd’s is that in the latter the information transmission from the original source of information to the mediator is unmodeled.

AAK also point out that the same outcomes can be obtained in pure strategy equilibrium when there is a small amount of uncertainty regarding the intermediary’s (in our case, the committee’s) preferences.

An alternative modeling approach would be assuming that acquiring information requires effort on the part of committee members. Both Gerardi and Yariv (2008) and Che and Kartik (2009) point out that in settings with costly information acquisition, bias can increase incentives to gather information. In our model there are no information acquisition costs, instead we focus on the strategic aspects of acquiring information. Nevertheless, the resulting trade-offs are similar: the committee being better informed but more biased. The above papers do not investigate the interplay between open vs. closed rule (cheap talk vs. delegation) and the bias of the committee (agent). Hence, it is an open question whether a model of costly information acquisition could provide a theory of committee bias and amendment rules that is in line with the empirical observations.
However, testing the relatively complex predictions that our model provides in this aspect would require more precise data on the preferences of committee members and interest groups than what existing empirical research used.

One simple prediction of our model is that when the procedural rule is endogenously selected, the optimal committee is never more biased in absolute terms than the lobbyist. Moreover, it is strictly less biased unless the lobbyist’s bias is small. This is consistent with the finding of Poole and Rosenthal (1997) that lobbyists tend to be more extreme advocates of policy issues than committee members.

We also investigate two modifications of our basic model. The first one is motivated by the fact that in practice, because of the large number of bills processed by the floor, it is impossible to select a different committee for every bill. Hence, while it is still plausible to create committee assignments such that a given committee interacts with lobbyists of similar biases, it is not generally feasible to tailor the committee for a given bill. We show that the qualitative conclusions of the model are similar when the committee’s bias is exogenously given, and only the procedural rule can be selected by the floor. In particular, the parameter region where closed rule is optimal corresponds to cases when the lobbyist’s bias is not too large, and the committee’s bias is in the same direction as the lobbyist’s. Moreover, for closed rule to be optimal, the committee cannot be too biased relative to the lobbyist.

Second, we extend the model by allowing the floor to ex ante choose the status quo outcome as well, besides the committee and the procedural rule. In practice this would be very difficult in most cases. Besides the time and capacity constraints prohibiting the floor taking up the same bill twice (first to change the status quo outcome and then to process the ultimate bill), the gatekeeping power of committees could delay or prevent amendments to change the status quo reaching the floor and voted on. Despite this, we find this analysis an interesting theoretical exercise, since it has implications on future institutional design. We show that with such endogenously chosen status quo, using closed rule and a committee with exactly the same bias as the lobbyist’s, the floor can achieve the best outcome implementable through constrained delegation, characterized in Goltsman et al. (2009). Hence, in this context closed rule is always (at least weakly) better than open rule. Moreover, the constrained optimal outcome is implemented in a particularly simple way: the endogenously selected status quo puts a cap on the policies that the committee can choose among. In particular, it is consistent with equilibrium if the floor turns down proposals for policies higher than the status quo, and accepts proposals below it.

In the main text we focus on the popular uniform-quadratic specification of the model (that is, when the state is distributed uniformly, and all players have quadratic loss functions). Under this setting we are able to characterize the optimal institution given any lobbyist preference. In the Appendix we show how some of the qualitative conclusions generalize to a broader set of specifications.
2 Model

We consider a multi-stage game of legislative decision-making with three players: a lobbyist, a committee and the floor. The outcome of the game is a policy action \( x \in \mathbb{R} \). The players’ preferences over available policy actions depend on an ex ante unknown state of the world \( \theta \in [0, 1] \).

The payoffs of the floor, the committee, and the lobbyist are given by \(-l(x - \theta), -l(x - \theta - b_C), \text{ and } -l(x - \theta - b_L)\). We assume that \( l \) attains its minimum value of 0 at point 0. Following standard terminology, we refer to \( l \) as the loss function. Note that given \( \theta \), the floor’s optimal policy is \( \theta \), while the optimal policies of the lobbyist and the committee are given by \( \theta + b_L \) and \( \theta + b_C \). We refer to \( b_L \) and \( b_C \) as the biases of the lobbyist and the committee. Without loss of generality we assume \( b_L \geq 0 \) (the case of a negatively biased lobbyist is perfectly symmetric).

Throughout the main text we restrict attention to the case when \( \theta \sim U([0, 1]) \) and \( l(y) = y^2 \) (this specification is introduced by CS and often referred to as the uniform-quadratic specification). In the Appendix we investigate how the qualitative conclusions we derive extend to more general specifications.

We assume that the distribution of the state and the preferences of players are common knowledge.

The game starts with an ex ante stage (stage 0), in which the floor selects \( b_C \) and the procedural rule, which can be either open or closed.\(^{10} \)

After the ex ante stage, the choices of the floor become commonly known.

In stage 1, the lobbyist observes the realization of \( \theta \), and sends a private message \( m \in \mathbb{R} \) to the committee. This message does not directly influence the payoffs and does not change the available actions of players at later stages of the game. Hence, communication between the lobbyist and the committee is assumed to be cheap talk. In real life the message can correspond to a draft proposal written by the lobbyist.

In stage 2 the committee sends a proposal (amendment) \( p \in \mathbb{R} \) to the floor.

Finally, in stage 3 the floor chooses a policy action \( x \in \mathbb{R} \). The set of possible choices of the floor in stage 3 depends on the procedural rule chosen in the ex ante stage. In case of open rule, the floor in stage 3 can select any policy action in \( \mathbb{R} \). Hence, in this case the communication between the committee and the floor is cheap talk, too. However, in case of closed rule the floor can only choose between \( p \), the policy action corresponding to the proposal, and \( s \in \mathbb{R} \), an exogenously given status quo policy commonly known from the beginning of the game.

The sequence of moves in the model is depicted on Figure 1.

\(^{10} \) The specification implies that the floor can appoint an optimal committee, given the exogenously given parameters. We modify this assumption in Subsection 4.1.
The solution concept we use throughout the paper is perfect Bayesian Nash equilibrium, as defined in AAK.\textsuperscript{11} From now on we simply refer to it as equilibrium. Moreover, following GK and Morgan and Krishna (2001), we assume that in any subgame following the floor’s stage 0 choices, the equilibrium most preferred by the floor prevails.

For analytical convenience, we assume that the status quo policy is so bad that irrespective of the realized state, the floor always accepts the committee’s proposal in case of closed rule. A sufficient condition for this is that \( l(s - \theta) > l(x - \theta) \), for all \( x \in [0, 1 + b_L] \) and all \( \theta \in [0, 1] \). For analyzing a modification of the model when the floor might reject certain proposals along the equilibrium path, see Subsection 4.2.

Finally, we let \( b_{cl}^C \), \( b_{op}^C \), and \( b_{es}^C \) be the optimal choices of the committee bias in the equilibrium under closed rule, under open rule, and under endogenously selected procedural rule, respectively.

3 Optimal committee and rule selection

We first characterize the optimal committee bias given each of the procedural rules, and then turn attention to selecting the optimal procedural rule.

3.1 Optimal Committee with Closed Rule

GK and Dessein (2002) investigate the problem whether an uninformed principal wants to delegate decision power to an informed but biased agent, or just communicate with the agent and retain the decision right.\textsuperscript{12} They show that delegating decision power can benefit the principal (in our case, the floor), even though it introduces a systematic bias in the policy choice. The intuition is that delegation facilitates more information transmission from the informed party.

\textsuperscript{11}There is no standard definition of perfect Bayesian Nash equilibrium in continuous settings. AAK, besides the usual requirements of sequential rationality and consistency of beliefs, poses an additional weak consistency requirement for beliefs along equilibrium paths that occur with probability 0.

\textsuperscript{12}See also Krishna and Morgan (2001).
Dessein (2002) also extends the above analysis to the case when the principal can delegate decision power to an intermediary, which is exactly the continuation game in our model that results if the floor chose closed rule. The trade-off for the floor in this case is clear: appointing a committee with preferences closer to the lobbyist increases information transmission, at the expense of introducing more bias in the policy choice. The optimal committee bias, as a function of the lobbyist’s bias, is described in the following proposition, and depicted in Figure 3 (see Subsection 3.3).

**Proposition 1.** (Proposition 5 Dessein (2002)) Under closed rule, the floor always elects a committee with bias $b_C^c \in [0, b_L]$. Furthermore,

- If $0 \leq b_L \leq \bar{b} = 1/6$, the optimal committee is fully aligned with the lobbyist’s interests: $b_C^c = b_L$.

- If $\bar{b} < b_L < \tilde{b} = 1/\sqrt{8}$, the optimal committee has a bias strictly between the floor’s and the lobbyist’s: $b_C^c \in (0, b_L)$.

- If $b_L > \tilde{b}$, the optimal committee is fully aligned with the floor’s interests: $b_C^c = 0$.

To provide intuition for this result, note that under the assumption that the floor always accepts the committee’s proposal, equilibria of this game can be computed as in a direct communication game between the lobbyist with bias $b_L$, and the committee with bias $b_C^c$. The set of possible equilibria of the latter game is well known from CS. In particular, in any equilibrium, the resulting policy choice has an average bias $b_C^c$. The floor’s expected payoff is given by

$$U_F = -[(b_C^c)^2 + l_{CS}(|b_C^c - b_L|)],$$

where $l_{CS}(z)$ is just the loss of the receiver in the most informative equilibrium of the game in CS when the absolute value of the sender’s bias is $z$. As shown in CS:

$$l_{CS}(z) = \frac{1}{12N^2} + \frac{z^2(N^2 - 1)}{3} \quad \text{with} \quad N = \left\lceil \frac{\sqrt{1 + 2/z} - 1}{2} \right\rceil,$$

(1)

where $N$ denotes the size of the partition associated with the most informative equilibrium.

Because the function $l_{CS}$ is increasing (as shown in CS), the floor always elects a committee with bias between its own and the lobbyist’s: $b_C^c \in [0, b_L]$.

Proposition 1 establishes that, if the lobbyist’s bias is small enough, the floor chooses a committee that is fully aligned with the lobbyist’s interests. The reason that for small enough lobbyist bias the floor chooses a committee with fully aligned interests with the lobbyist is that for small values of $b_L$, the loss from biasing the decision by the complete delegation, $b_L^2$, is second order. But the loss from imperfect information transmission in the CS model is first order.
in the bias.\textsuperscript{13} Hence, for small enough $b_L$ it is optimal to induce the lobbyist to fully reveal its information.

For intermediate values of $b_L$, the proposition establishes that the optimal committee has preferences strictly between the lobbyist’s and the floor’s. So in this range the optimal choice trades off making somewhat biased decisions to improve information transmission, but does not fully align the interest of the committee with the lobbyist. The optimal committee bias is highly nonmonotonic in this interval (see Figure 3 in Subsection 3.3).

Finally, the proposition says that for large enough values of the lobbyist’s bias, the optimal committee is fully aligned with the floor. If the bias of the committee necessary to induce information transmission from the lobbyist is too high, the floor would rather give up on eliciting information and induce an uninformed policy choice through an unbiased committee.

3.2 Optimal committee with open rule

Under open rule, committees serve as intermediaries in the communication between the floor and the lobbyist. As AAK and Ivanov (2009) show, such intermediation can improve information transmission between the sender and the receiver of messages, even in a pure cheap talk context. The reason is that there can be mixed equilibria in which the mixing behavior of the intermediary introduces noise into communication in a way that induces the sender to transfer more information.

Figure 2 illustrates such an equilibrium when $b_L = \frac{3}{10}$ and the floor selects a committee with $b_C = -\frac{2}{15}$. In this case the lobbyist’s bias is so large that the only equilibrium in a direct communication game between the lobbyist and the floor would be the noninformative one. In particular, there is no equilibrium with two partition cells, as for any such partition there would be states in the lower cell at which the lobbyist would rather induce the action corresponding to the higher cell than the one corresponding to the lower cell. However, in a game with intermediated communication through a committee with the above bias, there exists a two-cell equilibrium. In this equilibrium the committee sends a “low” proposal after receiving a “low” message from the lobbyist, but mixes between the “low” and “high” proposals after receiving a “high” message from the lobbyist. This behavior raises the action chosen by the floor following a “low” proposal, as with some probability it is sent in high states as well, making the “low” message more attractive for the upward-biased lobbyist. This eases the incentive constraints of the lobbyist in revealing information, and facilitates the informative equilibrium illustrated in the figure.\textsuperscript{14}

\textsuperscript{13}From the formula in (1), $1/N^2 = 2b + O(b^2) = O(b)$, and

\[
I_{CS}(b) = \frac{1}{12N^2} + \frac{b^2N^2 - b^2}{3} = \frac{1}{6}b + \frac{b/2 - b^2}{3} + O(b^2) = b/3 + O(b^2) = O(b).
\]

\textsuperscript{14}This intuition is similar to why nonstrategic noise can improve information transmission, as in Blume et al. (2007).
Here, we are interested in equilibrium with the committee’s bias being chosen optimally. As shown in Goltsman et al. (2009), $b_L \geq 1/2$ implies that there does not exist any mechanism which induces the lobbyist to transmit information. This in particular implies that no strategic committee could induce information transmission, and irrespective of the choice of committee the floor’s expected loss is $\frac{1}{12}$, corresponding to a babbling equilibrium (choosing action $x = \frac{1}{2}$ in every state). For biases smaller than this, Ivanov (2009) shows that the loss with an optimal intermediary is the same as when using a nonstrategic mediator as in Goltsman et al. (2009), thereby deriving the maximum ex ante payoff that the floor can achieve when using open rule. In particular, for almost every $b_L \in (0, \frac{1}{2})$ there exists a value of $b_C$ which facilitates an equilibrium that is strictly better for the floor than any equilibrium without appointing a committee (equivalently, when appointing a nonbiased committee). Moreover, the maximum ex ante payoff with open rule can be achieved by appointing a committee with bias between $-2b_L$ and 0, that is in the opposite direction to the lobbyist (see Figure 3 in Subsection 3.3).15

We will use the following proposition derived in Ivanov (2009).

**Proposition 2.** (Ivanov 2009) **Under open rule, and $b_L \leq 1/2$, the floor’s minimum loss with an endogenously selected committee is**

$$l_{OR}^* = b_L(1 - b_L)/3,$$

15Because there is no known general characterization of mixed equilibria in intermediated communication games, it is unknown whether the optimal committee bias is unique in the whole range $b_L \in (0, \frac{1}{2})$. However, in the next subsection we show that in the region where open rule is optimal, the optimal committee bias is indeed unique, and in the opposite direction to the lobbyist’s bias.
and it can be attained with a committee with bias $b_C^{op} \in (-2b_L, 0]$.

We note that the result that appointing a biased committee can be optimal for the floor crucially relies on allowing for mixed strategies in the communication game. As AAK show, if one restricts attention to pure strategy equilibria, a biased committee cannot improve on appointing an unbiased one. This raises the question of the plausibility of equilibria that increase the floor’s welfare using a biased committee. However, as pointed out in AAK, in the spirit of Harsányi (1973) these equilibria can be arbitrarily approximated by pure strategy equilibria of games in which there is a small amount of uncertainty regarding the committee’s actual bias.\textsuperscript{16} In these equilibria the committee almost always strictly prefers one equilibrium proposal to any of the other ones, and acts in a deterministic manner. But from the point of view of the floor, the committee’s strategy seems to be random. In a similar way, the mixed equilibria we consider can also be approximated by pure strategy equilibria of games in which the committee also receives a (weak) private signal, besides gathering information by talking to the lobbyist. The intuition is the same: the private signal can tilt a committee close to being indifferent between two equilibrium proposals, to either direction.

3.3 Optimal procedural rule

We are now in a position to derive the optimal choice of procedural rule and committee bias, given the bias of the lobbyist. As remarked earlier, the loss from closed rule is of second order when $b_L$ is small, while Proposition 2 implies that the loss in case of open rule is of first order. So closed rule is preferred for small values of $b_L$. This pattern is reversed for large values of $b_L$. When the lobbyist is very biased, it is not in the interest of the floor to commit to following the committee’s recommendation, and open rule is employed.

The following proposition collates the results from Subsections 3.1 and 3.2, and summarizes the optimal stage 0 choices of the floor, as a function of the lobbyist’s bias.

\textbf{Proposition 3.} The optimal choices of the floor are given by:

- For $b_L \leq \tilde{b} = 1/6$, using closed rule and a committee with interests fully aligned with the lobbyist: $b_C^* = b_L$.

- For $\tilde{b} < b_L < \tilde{b} = \frac{2+\sqrt{3}/2}{10}$, using closed rule and a committee with interests strictly between the lobbyist and the floor: $b_C^* \in (0, \tilde{b})$.

- For $\tilde{b} < b_L < 1/2$, using open rule and a committee with interests opposite to the lobbyist’s: $b_C^* = -(1 - 2b_L)/3 < 0$.

\textsuperscript{16}See the online supplementary note of AAK. For a cheap talk model in which there can be large uncertainty about a player’s preferences, see Li and Madarász (2008).
• For \( b_L \geq 1/2 \), either open rule with an arbitrary committee bias, or closed rule with an unbiased committee \( b^*_C = 0 \) are optimal. In either way, no information is transmitted to the floor.

Figure 3 shows how the optimal committee bias varies with \( b_L \). The dashed line above the horizontal axis depicts the optimal committee bias under closed rule \( (b^*_C)^c \), and the dashed line below the horizontal axis depicts an optimal committee bias under open rule \( (b^*_C)^o \). As remarked in the previous sections, the relative positions of lobbyist and committee bias are quite distinct under these two possibilities. Under closed rule the floor selects a committee that is biased toward the lobbyist. Furthermore, if \( b_L \) is small enough, the committee selected has fully aligned interests with the lobbyist. In stark contrast, under open rule the optimal committee is biased in the opposite direction relative to the lobbyist. Under both rules, the optimal committee bias is highly non-monotonic.

The solid line in Figure 3 depicts the optimal committee bias taking into account the endogeneity of the rule choice \( (b^*_C^e) \). We see that the switching from closed to open rule generates a rich pattern of optimal committee bias. For very low \( b_L \), closed rule is chosen, and the floor elects a fully captured committee. For biases in an intermediate range, closed rule is chosen, and the floor delegates power to a committee partially aligned with the lobbyist’s interests. But, when the divergence between the floor and the lobbyist is large, the floor switches to open rule, and to selecting a committee biased in the opposite direction relative to the lobbyist. For even higher biases the floor induces an uninformed but unbiased choice.17

The intuition behind this result is that when the lobbyist’s bias is small, under open rule even an optimally biased committee cannot improve the floor’s payoff substantively relative to direct communication, while using closed rule results in a first-order improvement in the floor’s payoff, even when taking into account the loss resulting from the bias introduced in the policy choice. For large enough levels of lobbyist bias, on the other hand, closed rule yields little or no improvement to the floor relative to direct communication, as improving information transmission would require appointing a substantially biased committee. In contrast, the optimal committee under open rule can increase the

17 It is not known whether this optimal bias is unique for \( b_L \) between \( b \) and \( \bar{b} \).

18 This can either be achieved through open rule or closed rule, in the latter case requiring an unbiased committee. If there is a small uncertainty regarding the bias of the committee, open rule becomes a strictly better choice for the floor.

19 There are two new results embedded in the above proposition, relative to Proposition 1. The first is deriving \( \bar{b} \), the value at which the optimal rule changes from closed to open rule. To obtain this critical value, we first conjecture that the optimum closed rule equilibrium near the threshold involves \( N = 2 \) messages (we verify this in the Appendix). Given this, it can be shown that the loss with closed rule is \( \frac{1}{4} + \frac{1}{2} b_L^2 \). But from Proposition 2, we have that the loss with the open rule is \( b_L (1 - b_L) / 3 \). Setting these two expressions equal yields the value of \( \bar{b} \) given in the proposition. The second result we prove in the proposition is that above the threshold \( \bar{b} \) the optimal committee bias is unique. This is established by showing that for such a large \( b_L \), the set of possible equilibria with any committee are restricted to the babbling equilibrium, and a mixed equilibrium with exactly two equilibrium actions. For any committee, there can be at most one equilibrium of the latter type. See the Appendix for the full proof.
floor’s payoff significantly for such large levels of committee bias. See Figure 4 for the comparison of losses under the two procedural rules and under direct communication between the lobbyist and the floor.

Figure 3: The optimal committee bias, under closed, open, and endogenously chosen rule

Figure 4: The floor’s expected losses with an optimally chosen committee
Proposition 3 implies that a committee close to the floor’s preference is consistent with both closed rule (when the lobbyist’s bias is very small) and open rule (when the lobbyist’s bias is very large). Similarly, a substantially biased committee is also consistent with both open and closed rule (when the lobbyist’s bias is in an intermediate range). These observations apply despite the fact that the optimal rule is monotonic in the magnitude of the lobbyist’s bias (but not in the endogenously selected committee bias).

4 Extensions of the analysis

This section considers two distinct extensions of the analysis provided in the previous section. First we consider the case when the committee’s bias is exogenously given. In the second extension we consider a modification of the model in the opposite direction, and assume that besides the committee bias and the procedural rule, the floor can also choose the status quo outcome in case of using closed rule.

4.1 Exogenous Committee Bias

So far the analysis assumed that the floor can select the optimal committee, given the bias of the relevant lobbyist. This essentially assumes that a separate ad-hoc committee is created to process each amendment. While this is a good approximation of how the legislative process worked in the early years of the Congress and the Senate in the United States (see Canon and Stewart (2001)), efficiency considerations led to a system where standing committees consisting of infrequently changing membership are responsible for proposing most amendments to the floor.

Our model is still a good approximation of the process if the jurisdiction of standing committees is specified in a way that all the relevant interest groups that a given committee consults have roughly the same bias. Nevertheless, the prevalence of standing committees in the legislative process makes it important to analyze the case when the committee bias is exogenously given, and ex ante the floor can only choose the procedural rule.

The first observation we make is that Proposition 1 implies that if \( b_L > \bar{b} = 1/\sqrt{N} \) then open rule is better than closed rule. This is because in this region choosing closed rule yields a payoff to the floor that is strictly worse than its payoff in babbling equilibrium, for any \( b_C \neq 0. \) Hence, closed rule cannot be optimal if the lobby’s bias is too large.

The second straightforward observation to make is that \( b_C > \left( \frac{1}{\sqrt{N}} \right)^2 \) implies that the loss of the floor from the biasedness of the committee’s decision in case of closed rule exceeds the informational loss in the babbling equilibrium.\(^{20}\) Hence, closed rule cannot be optimal if the committee’s bias is too large.

Third, the next proposition states that closed rule cannot be optimal if the committee is biased in the opposite direction to the lobbyist.

\(^{20}\) \( \frac{1}{\sqrt{N}} \) is the variance of \( \theta \) uniformly distributed over \([0,1]\).
Proposition 4. If $b_C < 0$ then open rule is strictly better for the floor than closed rule.

The intuition behind this result is easy to see: The floor’s payoff under open rule is the same as that under direct communication between the lobbyist and the floor, as shown in AAK. Since the committee’s interests are further away from the lobbyist than the floor’s, the committee’s payoff under closed rule is no more than this direct communication payoff of the floor. But the committee’s payoff is strictly greater than the floor’s payoff under closed rule, as the committee’s decision is biased.

The above result, together with the preceding two observations imply that the region in the $b_L \times b_C$ space where closed rule is better than open rule is contained in the box defined by the two axis and the lines $b_L = 1/\sqrt{8}$ and $b_C = \frac{1}{4\sqrt{3}}.$\textsuperscript{21}

Within this region we use numerical analysis to compare the floor’s payoff between using open and closed rule. For any $(b_L, b_C)$ pair, the floor’s ex ante payoff in case of using closed rule is easily computable, as the sum of $-b_C^2$ and the informational loss in the maximum partition direct communication equilibrium between the lobbyist and the committee. On the other hand, in general we cannot compute the floor’s ex ante payoff when using open rule, as the best equilibrium for intermediated communication is unknown for general $(b_L, b_C)$ pairs. However, it is possible to obtain bounds on the latter payoffs, leading to an incomplete characterization of the region where closed rule is better than open rule.

First, we observe that whenever the best pure strategy equilibrium under open rule - which is fully characterized in AAK - yields a higher payoff for the floor than its payoff under closed rule, the latter is clearly suboptimal. The set of $(b_L, b_C)$ pairs where this is the case is depicted on Figure 5 as the area marked with diagonal lines texture, outside the bounded region surrounded by curves OQ, QR, RS, and SO. We will refer to the remaining set of bias pairs (where the closed rule can be better than the open rule) as the OQRS region.

\textsuperscript{21}This is under the assumption that $b_L > 0$. There is a corresponding region in the half space defined by $b_L < 0$. 

16
Figure 5: Optimality of closed vs. open rule for different biases of the lobbyist and the committee

Second, both Proposition 7 of AAK and Lemma 4 of Ivanov (2009) imply that below the 45-degree line the best equilibrium under open rule is a pure strategy one. This implies that in the OQRS region closed rule is indeed better than open rule for all the points below the 45-degree line.

Third, the payoff of the floor when using open rule with a given committee bias is bounded from above by $-b_L(1-b_L)/3$, which is shown in Goltsman et al. (2008) to be the maximum payoff of the floor when using a nonstrategic intermediator to communicate with the lobbyist. Hence, when the latter is smaller than the payoff that can be attained by closed rule, it is surely suboptimal. This consideration establishes that in points enclosed by the dotted curve, closed rule is better than open rule.

Finally, AAK show that there is no mixed equilibrium with two possible actions induced in equilibrium if $b_C > b_L > 0.25$. The arguments can be extended to show that there is no nontrivial mixed equilibrium whatsoever in this region. As this extension is straightforward, we omit it from the current paper. This reasoning implies that at points in the OQRS region that are above the 45-degree line and to the right of the $b_L = 0.25$ line, closed rule is optimal.

The $(b_L, b_C)$ pairs for which the above arguments establish the optimality of closed rule are depicted as the shaded region. The small white region surrounded by curves OQ, QP, and PO represents the remaining set of $(b_L, b_C)$ pairs, at which the above arguments do not determine whether open or closed rule is better.

Summarizing the findings, the analysis reveals similar qualitative findings regarding optimal procedural rules as in the endogenous committee bias case:
closed rule is optimal if the bias of the lobbyist is not too large, and the committee’s bias is in the same direction as the lobbyist’s bias but not too biased relative to the latter.

4.2 Endogenously chosen status quo

In this subsection we consider the modification of the model presented in Section 2 in which the status quo outcome when closed rule is used is not exogenously given, but specified by the floor in the ex ante stage.

An upper bound on the payoff that the floor can attain using such a scheme is given by its payoff when an optimal arbitration rule is used in communication between the lobbyist and the floor.\footnote{The terminology arbitration rule is introduced in Goltsman et al. (2008). Other papers in the economics literature refer to it as a constrained delegation schedule without monetary transfers (see for example Holmstrom (1977), Melumad and Shibano (1991), Alonso and Matouschek (2008) and Kováč and Mylovanov (2009).} Arbitration implies that the floor can ex ante commit to a possibly stochastic policy choice after any possible message from the lobbyist. Any outcome that can be achieved in an equilibrium of a game in which the lobbyist communicates to the floor through some strategic committee, with either open or closed rule (even with an endogenously selected status quo) can be replicated as an outcome resulting from arbitration. Hence the optimal arbitration payoff for the floor is always at least weakly better than its optimal payoff in the games we consider.\footnote{The floor can potentially achieve an even higher payoff if it makes different proposals differentially costly for the committee, through bureaucratic procedural rules, as in Ambrus and Egorov (2009). We do not pursue this direction here.}

Goltsman et al. (2008) derive the optimal arbitration rule in our setting, and in particular show that it is deterministic. Let $y(\theta)$ be the policy choice induced by the optimal arbitration scheme at state $\theta$.

**Proposition 5.** (Theorem 1 Goltsman et al. (2008)) The optimal arbitration rule selects the preferred action of the lobbyist in the set $[0, \max\{1 - b_L, \frac{1}{2}\}]$.

Formally, it satisfies:

$$y(\theta) = \begin{cases} \max\{\theta + b_L, 1 - b_L\} & \text{if } b_L < \frac{1}{2} \\ \frac{1}{2} & \text{if } b_L \geq \frac{1}{2} \end{cases}, \quad \forall \theta \in [0, 1].$$

In words, the optimal arbitration rule is a simple one in which the floor imposes a cap on the set of achievable policy outcomes, and the lobbyist can induce any preferred action that is not higher than the cap.

The following proposition makes the observation that the above outcome is attainable in equilibrium in our game if the status quo outcome can be freely chosen by the floor.

**Proposition 6.** If the floor sets $b_C = b_L$ and selects closed rule with a status quo outcome $\max\{1 - b_L, \frac{1}{2}\}$ then there is an equilibrium in the continuation subgame in which: (i) the lobbyist reveals full information to the committee; (ii)
at states $\theta \in [0, \max\{1 - 2b_L, 0\}]$ the committee proposes $p = \theta + b_L$; (iii) at states $\theta \in [\max\{1 - 2b_L, 0\}, 1]$ the committee proposes $p = \max\{1 - b_L, \frac{1}{2}\}$; (iv) the floor accepts a proposal $p$ if and only if $\min\{b_L, \frac{1}{2}\} \leq p \leq \max\{1 - b_L, \frac{1}{2}\}$.

The profile in Proposition 6 is an equilibrium because given a proposal $p < \max\{1 - b_L, \frac{1}{2}\}$ and the resulting updated beliefs on the state, it is strictly optimal for the floor to accept the proposal than revert to the status quo. The resulting equilibrium achieves the same outcome as the one induced by the optimal arbitration rule in Proposition 5, hence selecting closed rule, setting $b_C = b_L$ and a status quo outcome $\max\{1 - b_L, \frac{1}{2}\}$ constitute a set of optimal choices for the floor.

Another equilibrium that achieves the same outcome and therefore the same payoff to the floor is that, when $b_L < 1/2$, at states $\theta \in (1 - 2b_L, 1]$ the committee’s proposal is $p = 1$, and the proposal gets rejected by the floor (otherwise strategies are as in the proposition). The intuition is clear: given the floor’s strategy the committee is indifferent between proposing the status quo policy and getting accepted, and proposing a higher policy and getting rejected. Hence, in this version of the game proposals can be rejected along the equilibrium path.

The important implication of the proposition is that with endogenously selected status quo, closed rule is always (at least weakly) better than open rule. This is a stark result. In particular, it is noteworthy that in the setting we examine, a very simple institutional design, closed rule with endogenously set status quo outcome, implements the optimal arbitration outcome.

However, in most cases the assumption that the status quo outcome can be endogenously selected is unrealistic. A procedure like that would involve first working out a proposal that changes the current status quo to the one that the floor finds it optimal to select ex ante. This would require creating a different (unbiased) committee than the one working out the final proposal, doubling the workload of the legislature, and lengthening the legislative procedure. Nevertheless, we regard the optimality of closed rule under endogenously set status quo as an intriguing theoretical result, with possible implications to future institutional design in legislatures.\footnote{An existing institutional channel that can potentially be used in implementing the above optimal arbitration outcome is discharge petitions. Any member of legislature may file such a petition calling for a measure to be brought out of a committee. When half of the House members (218) have signed the petition, the measure is taken away from the committee and considered on the floor. If the floor can commit to carry out such an action only if the committee proposal is above a cap corresponding to the ex ante optimal status quo outcome, the threat of discharge petition implements the optimal arbitration scheme. This possibility is consistent with the fact that discharge petition is often used as a threat, and that in the past three decades there have been an increase in both the use of closed rule and in the number of discharge petitions (see Burden (2005) and Theriault (2009)).}

5 Conclusion

The findings of this paper show that the relatively complicated patterns of committee biases and procedural rules observed in legislative decision-making
can be explained by a model in the tradition of the informational theories of committees. Namely, if the legislative process requires informational input from outside interest groups, it can be in the legislature’s interest to appoint a biased committee to communicate with the expert. The use of both open and closed rule can be optimal, depending on the interest group’s bias, and there is no monotonic relationship between the absolute bias of the committee and the procedural rule implemented. A testable new prediction of our model is that closed rule tends to be associated with committees biased in the same direction as the relevant interest groups the committee gathers information from, while open rule tends to be associated with committees that are either representative of the floor median, or biased in the opposite direction to the relevant interest groups.
6 Appendix I: Proofs of propositions

In Lemma 1 (which will be used to prove Proposition 3) and the proof of Proposition 3 below, we will use some terminology from AAK. In Proposition 5 (and in greater detail in Section 2 of the online supplementary note) of AAK it is shown that any equilibrium can be partitioned in a finite number of components, such that whenever the lobbyist announces a state in a component, the committee mixes only between adjacent actions in that component. We will denote a component with $K$ actions as a $K$-component.

**Lemma 1.** If $b_L > \bar{b}$ and $K \geq 4$, then there is no equilibrium with a $K$-component.

**Proof of Lemma 1.** Suppose in the contrary.

Let the boundaries of the interval partition of a component be $t_0, \ldots, t_K$, with $t_{k-1} < t_k$ for all $k = 1, \ldots, K$, where $t_0$ and $t_K$ are the endpoints of the component itself. Let the equilibrium actions be $x_1, \ldots, x_K$ with $x_{k-1} < x_k$ for all $k = 2, \ldots, K$.

First suppose $b_C > 0$. Then we know that $b_C > b_L$ from Proposition 6 of AAK. After messages $k = 1, \ldots, 3$, the committee is indifferent between $x_k \leq \frac{t_k + t_{k-1}}{2}$ and $x_{k+1}$. This implies that $x_{k+1} - x_k \geq 2b_C$ for every $k = 1, \ldots, 3$ (otherwise the committee would prefer the higher message of the two). Hence, $t_K - t_0 \geq 6b_C > 1$, a contradiction.

Next, suppose $b_C < 0$.

First, note that $t_2 - t_1 > b_L$. This is because at $t_1$ the lobbyist is indifferent between inducing $x_1$ and $x_2 > t_1$, which is inconsistent with $x_2 - t_1 < b_L$ (in this case he should strictly prefer $x_2$ to $x_1$). Second, note that $x_K - t_{K-1} > b_L$, otherwise at $t_{K-1}$ the committee would strictly prefer sending the highest message in the component). Third, note that $t_K - x_K > b_L$, since $x_K - t_{K-1} > b_L$ (as shown in the previous step) and because $x_K$ is the midpoint of $t_{K-1}$ and $t_K$. Fourth, note that $t_{K-1} + t_{K-2} - x_K - t_2 > |b_C|$, otherwise when receiving the second highest message, the committee would strictly prefer $x_{K-2}$ to $x_{K-1}$, contrary to the assumed equilibrium.

The above arguments establish that

$$t_K - t_0 > 3b_L + t_{K-1} - x_{K-2} > 3b_L + \frac{t_{K-1} + t_{K-2}}{2} - x_{K-2} > 3b_L + |b_C|. \tag{3}$$

Consider first $|b_C| \geq 0.04$. Then $b_L > 0.32$ and inequality (3) imply $t_K - t_0 > 1$, a contradiction.

Consider next $|b_C| < 0.04$. This implies $x_K - x_{K-1} = 2|b_C| < 0.08$. Then $x_K - t_{K-1} > b_L$ implies that $x_{K-1} - t_{K-1} > 0.24$, which implies $x_{K-1} - \frac{t_{K-1} + t_{K-2}}{2} > 0.24$. Then $t_{K-1} - x_{K-1} - x_{K-2} > 0.24 + 2|b_C|$, otherwise when receiving the second highest message, the committee would strictly prefer $x_{K-2}$ to $x_{K-1}$, contrary to the assumed equilibrium. Then inequality (3) leads to a contradiction. \qed
Proof of Proposition 3. This proposition builds on Propositions 1 and 2. Because \( \bar{b} = \frac{2 + \sqrt{72}}{10} < 1 / \sqrt{8} = \bar{b} \), the only things that remain to show are that (i) closed rule is optimal for \( b_L < \bar{b} \) and open rule for \( b_L > \bar{b} \); and (ii) for \( b_L > \bar{b} \) the optimal committee bias given open rule is unique.

First, we prove (i).

In the range \( b_L \in (0, 1/4) \), using closed rule with \( b_C = b_L \) gives a loss of \( b_L^2 \), which is strictly less than the loss with open rule given by equation (2), which is \( b_L(1 - b_L) / 3 \).

In the range \( b_L \in [1/4, \bar{b}) \), using closed rule with \( b_C = b_L / 2 \) results in a partition of size \( N = 2 \) and a loss of

\[
b_C^2 + |C_S(b_L - b_C)| = b_C^2 + \frac{1}{48} + (b_L - b_C)^2 = \frac{b_L^2}{2} + \frac{1}{48},
\]

which is also strictly less than \( b_L(1 - b_L) / 3 \).

Now we have to show that, in the range \( b_L \in (\bar{b}, 1/2) \), open rule is strictly better. Take \( b_L \) in this range, and assume by contradiction that there exists \( b_C \) in \([0, b_L]\) such that closed rule with a committee with bias \( b_C \) has a loss no more than \( b_L(1 - b_L) / 3 \). This in particular implies that \( b_C^2 \leq b_L(1 - b_L) / 3 \).

Rearranging, this implies

\[
b_L - b_C \geq \frac{4b_C^2 - b_L}{3(b_L + b_C)} \geq \frac{4b_C^2 - b_L}{6b_L} = \frac{2}{3}b_L - \frac{1}{6} > \frac{2}{3}(\bar{b} + 1/6 - \bar{b}) = 0.48.
\]

This and equation (1) imply that the number of partitions under closed rule equilibrium is \( N \leq 3 \). So we just have to check that, for the three cases \( N = 1, 2, \) and \( 3 \), there is no \( b_C \) such that closed rule is weakly better. We omit this straightforward step.

What remains to show is (ii), i.e. that for \( b_L \in (\bar{b}, 1/2) \) the optimal committee bias is unique. The idea of the proof is to show that the optimal equilibrium must have a very specific structure: the lobbyist’s partition has two possible messages, and a negatively biased committee only mixes when receiving the higher message. That is, the equilibrium partition is composed of a single 2-component. Then it is easy to explicitly describe equilibrium and calculate the unique optimal bias.

The first step in the proof is proving that in the given range, equilibria with any committee cannot have components with four or more actions. This is shown in Lemma 1 above.

Furthermore, in AAK Section 4.2.2 and online supplementary note Section 1.2 the authors completely characterize equilibria with a single 3-component, and in particular show that if \( |b_L| > 1/10 \) then there cannot be such equilibria. This result also implies that there cannot be any equilibrium with a 3-component, since the equilibrium play within such a component would correspond to a single 3-component equilibrium with a restricted state space corresponding to the component. Given such a state space, the AAK characterization implies that there cannot be an equilibrium consisting of a single
3-component. This concludes that for any committee, equilibria can at most have 2-components.

Equilibria with 2-components are easy to characterize. Consider a 2-component with endpoints $t_0, t_1, t_2$. By the characterization in Section 1.1 of the online supplementary note to AAK, we have that

$$t_2 - t_1 = 2(b_L - b_C).$$

Also, for $b_L > \bar{b}$, we have $b_C \leq 0$. So $t_2 - t_1 \geq 2\bar{b} > 0.64$. In particular, there can be no equilibria with two or more 2-components. Also, if an equilibrium has a 2-component with a 1-component on either the right or the left, the indifference condition of the lobbyist gives that one of these components has to have size at least $4b_L > 1$. So no equilibria with 1-components and 2-components exist.

Because CS show that no informative equilibria composed exclusively of 1-components exist, we have that the only possibility for a non-babbling equilibrium consists of a single 2-component. This case is fully characterized in Section 1.1 of the online supplementary note to AAK. In the case $b_C \geq 0$, a straightforward calculation shows that it is not possible to improve on direct communication. In the case $b_C < 0$, the component is partitioned by the point $t_1 = 1 - 2(b_L - b_C)$. Having this characterization of the equilibrium partition, one can simply calculate the loss of using a given committee bias $b_C$. It is given by

$$\frac{1}{3} + \Delta(1 + \Delta) + b_C(1 + 2\Delta),$$

where $\Delta = b_C - b_L$. This gives the unique value of the optimal bias $b_C = -\frac{(1 - 2b_L)}{3}$.

**Proof of Proposition 4.** First, notice that the floor’s payoff under closed rule is worse than the committee’s payoff by $b_C^2 > 0$. Hence, it suffices to show that the floor’s payoff under open rule is weakly greater than the committee’s payoff under closed rule. To see this, we show that the floor’s payoff in a pure strategy equilibrium under open rule is weakly greater than the committee’s payoff under closed rule.

Proposition 2 in AAK implies that a necessary and sufficient condition for a strategy profile to constitute a pure strategy equilibrium under open rule is that the lobbyist’s and the floor’s strategies correspond to an equilibrium in direct communication between them, and that two adjacent actions that are put positive probabilities have distance at least $2|b_C|$ between them. On the other hand, by the same proposition, a necessary and sufficient condition for a strategy profile to constitute an equilibrium under closed rule is that the lobbyist’s and the committee’s strategies correspond to an equilibrium in direct communication between them, and that two adjacent actions that are put positive probabilities have distance at least $2(b_L - b_C)$ between them. Since $2(b_L - b_C) > 2|b_C|$, the payoff that the committee achieves under closed rule can always be attained by the floor under open rule. Thus the proof is complete.
Proof of Proposition 6. The lobbyist plays an optimal strategy given the opponents’ strategies, since at states $\theta \in [0, \max\{1 - 2b_L, 0\}]$ it induces its ideal point, while at states $\theta \in (\max\{1 - 2b_L, 0\}, 1]$ it induces the outcome closest to its ideal point among the attainable outcomes. For exactly the same reason, the committee plays an optimal strategy given the opponents’ strategies. Given the status quo outcome and the other players’ strategies, the floor’s strategy is optimal after proposals $p \in [\min\{b_L, \frac{1}{2}\}, \max\{1 - b_L, \frac{1}{2}\}]$ because $\theta < p \leq s$ implies the floor whose bliss point is $\theta$ (at least weakly) prefers $p$ to $s$. Finally, rejecting the proposal after out of equilibrium proposals $p \not\in [\min\{b_L, \frac{1}{2}\}, \max\{1 - b_L, \frac{1}{2}\}]$ is supported by the belief that $\theta = 1 - b_L$.  □
7 Appendix II: generalizing results outside the uniform-quadratic specification

In this Appendix we depart from the assumptions maintained in the main text that $\theta$ is distributed uniformly, and that players have quadratic loss functions.

In particular, for the distribution of $\theta$ we only assume that its support is $[0, 1]$, and it has a density function $f$ that is $C^1$ and strictly positive over the support. For loss function $l$, we only assume that it is twice continuously differentiable and strictly convex, that it attains its minimum value of 0 at point 0, and that it is symmetric around 0. In short, from the class of preferences considered in CS, here we consider the ones in which all players have the same symmetric state-independent loss function.25 We maintain the (innocuous) assumption that $b_L \geq 0$.

Below we generalize some of our results in the main text on the optimal committee bias under closed and open rules.

For the optimal policy under closed rule, first we show that for small enough lobbyist bias it is still optimal to fully delegate decision power to the lobbyist. This result generalizes the first part of Proposition 5 of Dessein (2002) outside the uniform-quadratic specification.

**Proposition 7.** If $b_L$ is small enough, full delegation $(b_C = b_L)$ is optimal under the closed rule.

**Proof.** The difference between the loss from a committee with bias $b_C = b_L - z$, minus the one with bias $b_C = b_L$ is

$$\Delta l = l_{CS}(z) - [l(b_L) - l(b_L - z)].$$

We will show that for sufficiently small values of $b_L$ and any $0 < z \leq b_L$ this is strictly positive. Consider the function $l_{CS}$. We know that, in an equilibrium partition with $N$ elements, and the floor’s action $m(\theta)$ corresponding to the interval covering each state $\theta$, the loss is given by

$$l_{CS}(z) = \int_0^1 l(\theta - m(\theta))f(\theta)d\theta,$$

$$\geq f_0 \cdot \int_0^1 l(\theta - m(\theta))d\theta,$$

where $f_0 > 0$ is the minimum of $f$. Because of the convexity of $l$, this last

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25 We maintain the assumption that all players have the same loss function because it implies that selecting the optimal committee reduces to selecting the optimal $b_C \in \mathbb{R}$. Otherwise the floor would have to choose both the optimal bias and the optimal loss function of the committee (from some feasible set of loss functions), a substantially more difficult problem.
integral has to be at least as large as if the partition were uniform
\[
l_{CS}(z) \geq f_0N \cdot \int_{-1/2N}^{1/2N} l(\theta) d\theta
\]
\[
= f_0N \cdot \int_{-1/2N}^{1/2N} \left( \frac{l''(\theta)}{2} \theta^2 + O(\theta^3) \right) d\theta
\]
\[
= f_0l''(0) \frac{Z_1}{24N^2} + O\left( \frac{1}{N^3} \right).
\]

Now, because the loss function is symmetric, the recursion defining the equilibrium partition is exactly the same as in the uniform-quadratic specification of the CS model. In particular, equation (1) for the maximum value of \(N\) holds, and so \(1/N^2 \leq 2z + O(z^2)\).

Substituting back in the formula for \(\Delta l\), and using the strict convexity of the loss function we get
\[
\Delta l > f_0l''(0) z + O(z^{3/2}) - [l'(b_L) z + O(z^2)]
\]
\[
= \left[ f_0l''(0) \frac{1}{12} - l'(b_L) \right] z + O(z^{3/2}),
\]
which is strictly positive for all \(0 < z \leq b_L\) if \(b_L\) is small enough.

Next, we establish that under the same regularity condition that CS use to guarantee various monotonicity properties of the set of equilibria in their sender-receiver game, choosing \(b_C < 0\) is always suboptimal under closed rule.

Let \(y^{opt}_a\) be the committee’s equilibrium action under closed rule that corresponds to the cell \([\theta', \theta'']\) in the equilibrium partition. For a fixed \(b \in \mathbb{R}\) we call a sequence \(a = (a_0, ..., a_N)\) a forward solution if \(l(y^{opt}_{a_{i-1}} - a_i - b) = l(y^{opt}_{a_{i+1}} - a_i - b)\) for every \(i \in \{2, ..., N - 1\}\), and \(a_1 > a_0\).

**Assumption 1.** (Assumption (M) CS) For a given value of \(b\), if \(\hat{a}\) and \(\tilde{a}\) are two forward solutions with \(\hat{a}_0 = \tilde{a}_0\) and \(\hat{a}_1 > \tilde{a}_1\) then \(\hat{a}_i > \tilde{a}_i\) for all \(i \geq 2\).

**Proposition 8.** If Assumption 1 holds then, under closed rule, \(b_C < 0\) cannot be an optimal choice for the floor.

**Proof.** Suppose that \(b_C < 0\). We show that the floor would be better off by choosing the committee bias of 0. By CS, Assumption 1 implies that \(l_{CS}(b)\) is strictly increasing in \(b\). Notice that the floor’s loss from \(b_C = 0\) is \(l_{CS}(b_L)\), while the committee’s loss from \(b_C < 0\) is \(l_{CS}(b_L - b_C)\), which is strictly larger than \(l_{CS}(b_L)\) by the strict increasingness. Hence it suffices to show that the floor’s loss from choosing \(b_C < 0\) is no less than the committee’s loss at that \(b_C\). To
see this, fix $b_C < 0$ and a cell $[\theta', \theta'']$ in the equilibrium partition. Since the committee takes a best response, we have:

$$y_{\theta''} = \arg \min_y \int_{\theta'}^{\theta''} l(y - \theta - b_C) f(\theta) d\theta.$$ 

The first order condition is:

$$\int_{\theta'}^{\theta''} \frac{\partial l(y_{\theta''} - \theta - b_C)}{\partial y} f(\theta) d\theta = 0.$$

Hence, we must have:

$$\int_{\theta'}^{\theta''} \frac{\partial l(y_{\theta''} - \theta - b_C)}{\partial y} f(\theta) d\theta = \int_{\theta'}^{\theta''} \frac{\partial l([y_{\theta''} - \theta - b_C] + b_C)}{\partial y} f(\theta) d\theta > 0,$$

where the strict inequality comes from the strict convexity of $l$. Thus, conditional on the state lying in $[\theta', \theta'']$, the floor’s payoff is not maximized at $y_{\theta''}$. But notice that the maximized payoff would be exactly equal to the payoff that the committee receives conditional on the state lying in $[\theta', \theta'']$. Since this is true for all cells contained in $[0, 1]$, the floor’s payoff from choosing $b_C < 0$ is strictly smaller than the committee’s payoff at that $b_C$. This completes the proof. \qed

The optimal committee bias given open rule in this more general environment is an open question, but two qualitative results of AAK apply. The first one establishes that appointing a committee which is biased in the direction of the lobbyist but less so can never be better than appointing an unbiased committee (or, equivalently, the floor talking directly to the lobbyist).

**Proposition 9.** (Propositions 6 AAK) Under open rule, setting $b_C = 0$ is at least weakly better than setting $b_C \in (0, b_L]$.

The second proposition gives a sufficient condition for the optimal committee under open rule to have a nonzero bias. The sufficient condition covers cases in which in direct communication between the lobbyist and the floor babbling would be the only equilibrium, but there exists a committee with negative bias that facilitates nonzero information transmission.

Let $x_{b} = \arg \max_{a} \int_{a}^{b} -l(\theta - x)f(\theta) d\theta$. That is, $x_{b}$ is the floor’s equilibrium action under closed rule that corresponds to the cell $[a, b]$ in the equilibrium partition.

**Proposition 10.** (Proposition 7 AAK) If $l(-b_L) > l(x_{a} - a - b_L)$ for every $a \in [0, 1)$ and $b_L < x_{1}$ then $b_C = 0$ cannot be an optimal choice for the floor under open rule.
8 References


