Individual Accountability, Collective Decision-making

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Abstract

It is well known that a single elected decision maker who is more informed about policy than voters and wishes to act on their behalf nevertheless faces electoral incentives to pander by choosing a popular policy that voters incorrectly believe is in their best interest. Often in a representative democracy, however, important policy decisions are made by groups of politicians, each elected by a unique constituency—that is, legislatures. I use a formal model to explore politicians' incentives to pander when making policy decisions collectively. A legislature is "accountable" if no member can gain a private electoral benefit by manipulating the legislature into selecting a popular policy that is not in the best interest of voters. I show that only legislators in close contests for reelection face such electoral incentives. I find that fewer individual races are sufficiently close to incentivize this manipulation for large legislatures than small legislatures or executives because each member can claim less for a popular policy and share more for an unpopular policy. The addition of new members to a legislature can therefore make an unaccountable legislature accountable. However, if a new member represents a highly competitive district, an accountable legislature can be made unaccountable. I show that this is of little consequence for socially optimal policymaking if the original members can form an accountable majority coalition.

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"But one of the weightiest objections to a plurality in the executive...is that it tends to conceal faults and destroy responsibility....The circumstances which may have led to any national miscarriage or misfortune are sometimes so complicated that where there are a number of actors who may have had different degrees and kinds of agency, though we may clearly see upon the whole that there has been mismanagement, yet it may be impracticable to pronounce, to whose account the evil which may have been incurred is truly chargeable." *Alexander Hamilton, Federalist Paper 70*

"When occasions present themselves, in which the interests of the people are at variance with their inclinations, it is the duty of the persons whom they have appointed to be guardians of those interests." *Alexander Hamilton, Federalist Paper 71*

1 Introduction

In *Federalist 70*, Alexander Hamilton argues that individual elected decision-makers have stronger incentives to act in the public interest than members of a collective decision-making body because it is easier for the electorate to identify and punish an individual responsible for a mistake than it is to apportion appropriate blame among multiple decision-makers. Hamilton also observes in *Federalist 71* that the electorate's perceptions of what constitutes a mistake or success in the service of the public interest may be incorrect. It is the responsibility of a decision-maker, he argues, to act in the electorate's best interest even when this is at odds with their beliefs about what public actions are in their true interests.

It is well known that a single elected decision maker who is more informed about policy than voters and wishes to act on their behalf nevertheless faces electoral incentives to pander by choosing a popular policy that voters incorrectly believe is in their best interest (Canes-Wrone et al. 2001; Ashworth and Shotts 2010; Prat 2005). If these incentives are sufficiently strong, an executive succumbs to the temptation to pander and fails to exercise true leadership in the public interest as Hamilton proscribes in *Federalist 71*. Often in a representative democracy, however, public policy decisions are not made by executives but groups of elected politicians, namely, *legislatures*. The incentives to pander and the prospects for accountable policy-making are less understood for politicians in these collective decision-making environments where many policy decisions are actually made. In this setting, as Hamilton observes, it is more difficult for voters to identify an individual member's role in producing the collective decision than it is for her to apportion blame and reward when a single decision maker is responsible for choosing policy.

In this paper I use a formal model to examine to examine politicians' incentives to pander in legislatures. In a legislative setting, voters assess their representative's individual competence based on the collective policy decisions of the legislature. The electoral implications of the collective choice may be different for individual legislators based on local conditions. If effective problem solving requires that the legislature selects an unpopular policy, legislators in safe seats may be able and willing to weather voter dissatisfaction while those who face a stronger challenger in a primary or general election may be tempted to select a more popular policy to aid their individual prospects for reelection. An accountable legislature makes the right decision even if this means selecting a policy that voters believe is not in their best interest. If individual electoral incentives are sufficiently strong, accountable policy-making in legislatures can be undermined as some individual members attempt to manipulate the outcome of the collective decision for their own private electoral benefit.

I show that the tendency of a collective decision-making body to, in Hamilton's words, "conceal faults and destroy responsibility" can *weaken* legislators' incentives to promote popular policies when public problems call for unpopular solutions. In large legislatures, individual members have more blame to share for unpopular policies and less credit to claim for popular policies. In larger decision-making bodies then, voters are more forgiving of their representative for the legislature's unpopular decisions and less rewarding for its popular decisions. This reduces the electoral swing a legislator can obtain by manipulating the legislature to choose a popular policy and in this way aligns his electoral incentives with the public interest.

1.1 Overview of model

I adapt a familiar setup used to study pandering with a single decision-maker (Canes-Wrone et al. 2001; Ashworth and Shotts 2010) to build a theory of policy-making and pandering in legislatures. A group of n legislators must choose between one of two policies to address a problem facing their polity. In the face of an economic recession, for example, the legislature must choose whether to pursue a policy of stimulus or austerity. Legislators and voters all want to choose the best response to the problem which depends on a state of the world. In the recession example, everybody wants the economy to stabilize and improve and therefore wants the legislature to choose the policy that is most likely to bring about economic recovery. Legislators additionally value reelection.

One of the two policies is more popular than the other in the sense that it is more likely to be the best policy response to the problem. Voters and legislators may, for example, expect that stimulus is the proper response to recession. Legislators are more informed about what the right policy response is than voters but vary in terms of how informed they are. High ability legislators learn what the optimal policy choice is while low ability legislators only receive informative but imperfect signals about the optimal policy. Each legislator's ability and signal about the state of the world are private information. Legislators collectively choose policy by communicating with one another about their private information and then vote on which policy to enact. Voters observe the legislature's policy choice and with some probability also observe whether the policy does or does not solve the problem. Voters form beliefs about their representative's ability based on this and then choose between the incumbent and a challenger in an election. Voter beliefs about the ability of the challenger vary across districts and determine how close each race is. Voters elect whichever candidate they believe is of higher ability.

1.2 Preview of results

I refer to a legislature as *accountable* if in equilibrium it always selects the policy that is optimal given all of the available dispersed information that legislators individually possess. I analyze the model by showing the conditions under which an intuitively appealing accountability equilibrium exists. In this equilibrium, all legislators truthfully report their ability and signal to their colleagues. Each legislator then votes for the policy that they (correctly) believe is optimal. Voters then reelect their legislator if they are at least as likely to be of high ability than the challenger.

As in Canes-Wrone et al. (2001), I find that only politicians in close races for reelection face electoral incentives to induce the selection of the popular policy when the unpopular policy should be chosen. If voters do not learn whether the correct policy was selected prior to the election, these legislators lose if the unpopular policy is selected and win if the popular policy is selected. Individual electoral incentives to manipulate the outcome of legislative decision are therefore strongest when when voters are unlikely to learn whether the policy that the legislature selects is correct. This likelihood can be interpreted as the amount of time before the election. In this interpretation, accountability in legislatures is most difficult to sustain late in an electoral cycle as politicians in close races face strong incentives to manipulate the legislature's decision. In particular, these legislators want to induce the legislature to choose the popular policy by misrepresenting their ability or signal about the state of the world to their colleagues. Alternatively, probability of state revelation can be interpreted as varying by policy area. The effectiveness of a disaster relief policy, for example, is more easily observed in the short term than the effectiveness of a disaster prevention policy.

The strategic logic behind pandering in a collective choice setting hinges on the inferences voters draw about their representative's private information from the collectively chosen policy. In an accountable legislature, a group of low ability legislators chooses the unpopular policy if a sufficient number of the legislators receive the unpopular signal. Because low ability legislators are more likely than high ability legislators to observe an unpopular signal about the state of the world, voters form more favorable beliefs about their representative if the popular policy is chosen and the state is not revealed before the election. Some legislators face challengers such that they lose with the unpopular policy but win with the popular policy if the state remains hidden. These members in close races may benefit electorally from pandering if the probability of state revelation is low enough.

I show that as the legislature becomes larger, in each district fewer races are sufficiently close to incentivize pandering. That is, the set of challengers who run a close race against the incumbent legislator shrinks as the legislature grows. In arbitrarily large legislatures, the only legislators who want to pander are those who face challengers whose expected ability is the same as their own ex ante expected ability. This is because an individual's role in the collective outcome wanes in importance as a legislature becomes larger. The policy that the legislature selects thus becomes an increasingly weak signal about the incumbent's ability. Voter posterior beliefs about their legislator's ability collapse on their prior belief about his ability.

I also find that the probability of state revelation that deters legislators in close races from manipulating the legislative decision is unaffected by the size of the legislature. Low ability legislators who receive an unpopular signal have the option of truthfully reporting their ability but misrepresenting their signal. This lie only affects policy if all other members are of low ability and exactly one half of these other members receive each signal. In this case the probability that the group selects the wrong policy is constant in n and bounded away from one. I show that this lie is always weakly more valuable to a legislator than a more significant lie in which he reports he is of high ability and received the popular signal.

While the effect of legislature size on the voter beliefs that are critical to each individual legislator's electoral incentives is monotonic, its effect on accountability and legislative performance is more nuanced. The addition of new members may make an unaccountable legislature accountable by weakening the incentives of existing members to manipulate policy in the service of their private electoral interests. With each new legislator, however, comes an new local election. If new legislators represent highly competitive districts and find themselves in close races, the addition of legislators can undermine a legislature's accountability. The fact that accountability is undermined, however, only implies that the new expanded legislature cannot make full use of all available dispersed information. Original legislators can ignore the new members and vote as an accountable majority bloc. As long as a sufficiently low number of new members are added such that no member of the bloc is pivotal in the legislature, there exists an equilibrium in which the legislature chooses the correct policy with the same probability as before. Broadly, then, the model implies that a modest expansion of any legislature has a (weakly) positive influence on the quality of policymaking.

In addition to these main results, I find that several results from the single-decision-maker case obtain for legislatures as well. As legislators increasingly value reelection relative to selecting the optimal policy, those in close races want to pander for higher probabilities of state revelation. This is intuitive: legislators in close races have more to gain electorally from pandering and thus become willing to accept greater risk that voters see that the wrong policy is chosen. Even for arbitrarily large reelection benefits, however, there is always a sufficiently high probability of state revelation to prevent pandering from members in close races. Because pandering reduces the probability that the policy matches the state, if the state is revealed with near certainty, pandering reduces a legislator's probability of reelection. On the other hand, if legislators value policy sufficiently more than reelection, no legislator ever wants to pander because of its negative effect on the probability of state matching. These legislator preferences only affect accountability through the probability of state revelation at which members in close races can benefit from pandering. If a legislature is accountable, the actions of its members are independent of their preferences: all legislators cooperate and ensure that the best policy is selected given all of their private information. Therefore voter beliefs are unaffected by legislator preferences.

Additionally, as the popular policy becomes more popular (ex ante more likely to match the state), in each district more races become close. Voters expect that a group of low ability legislators is much more likely to choose the unpopular policy and therefore form less favorable beliefs about their representative if the legislature chooses the unpopular policy and the state remains hidden. Members in close races also want to pander for higher probabilities of state revelation. This is because their manipulation of policy becomes less distortionary. If a legislator effectively induces an accountable legislature to choose the popular policy when it would have otherwise selected the unpopular policy, the probability that the manipulation overturns an incorrect decision rises and the probability that it overturns a correct decision falls as the popular policy becomes ex ante more likely.

1.3 Related literature

The paper builds on a subset of the pandering literature in which politicians differ in ability but share the preferences of voters (Canes-Wrone et al. 2001; Prat 2005; Ashworth and Shotts 2010; Fox and Van Weelden 2012). The common-value setting in which voters select legislators on ability rather than preferences is substantively related to Adler and Wilkerson (2013) who consider how voters hold members of Congress accountable for their problem-solving abilities. This setting is distinct from a related literature on pandering that considers politicians who very in terms of their preferences (Morelli and Van Weelden 2013; Maskin and Tirole 2004; Fox and Shotts 2009; Maskin and Tirole 2019). It is undoubtedly the case that legislators also compete on ideology and voters select on their representatives' preferences. However, Adler and Wilkerson (2013, 4) observe that in Congress "preferences often take back seat to another concern—problem solving. On many issues, legislators seek common ground because they share common electoral incentives." The model takes this problem-solving perspective on legislatures. Its main result shows that even when legislators share common electoral incentives in the sense that Adler and Wilkinson use the term—incentives to provide defense, economic growth, or public health and safety—the problem-solving capacity of a legislature can be weakened by legislators' incentives to appear competent.

Much of the pandering literature and political agency literature more generally focuses on the interaction between a representative voter and a single decision maker.[1] Fewer studies consider this relationship when an elected decisionmaker is not wholly responsible for policy. These come in two varieties, those that consider a single elected politician and one or more unelected participants in the policymaking process and those that consider multiple elected politicians. The former group includes Ujhelyi (2014) who places an appointed bureaucrat between the politician and voter who is responsible for the actual implementation of a policy chosen by the politician. Also in this vein is Fox and Jordan (2011) who allow an elected politician to delegate decision making to a bureaucracy and Fox and Stephenson (2011) who introduce an unelected judge who can veto an elected politician's decision prior to an election. In the second category, Fox and Van Weelden (2010) and Buisseret (2016) consider a setup in which a pair of elected politicians, a proposer and veto player, make policy jointly prior to an election. This paper provides an additional contribution to this latter category.

Another related literature studies group decision making when members have career concerns (Ottaviani and Sorensen 2001; Levy 2007; Visser and Swank 2007; Gersbach and Hahn 2008, 2012; Fehrler and Hughes 2018). Levy (2007) and Visser and Swank (2007) are particularly relevant. Both papers examine how preexisting policy biases shape the incentives of group members. Levy (2007) primarily focuses on how transparency and committee voting rules influence the incentives of committee members to select policies that are advantaged by public opinion biases. In non-transparent committees, members tend to vote for the ex ante popular policy. This is a consequence of the fact that when group selects the unpopular policy in equilibrium, an outside observer believes it is more likely that a member voted for the unpopular policy. Because higher quality members receive better signals of the state and one state is more likely than the other, this inference in harmful to the member's reputation. A similar mechanism creates incentives for members to pander in my model. An important feature of Levy's model is different than the one presented here. Levy does not allow commu-

[1] For reviews of this literature see Duggan and Martinelli (2017) and Ashworth (2012).

nication between members before they vote on policy. Members' voting strategies take into account the voting rule and condition on their vote being pivotal. Accordingly, committee voting rules are critical to the models results and a focus of analysis. In my model, members communicate before voting. In the equilibria I consider, committee members fully exchange information and unanimously vote for the more likely policy. This makes both transparency and all but unanimity voting rules inconsequential for my results.

Visser and Swank (2007) allow committee members to communicate prior to voting on the policy to implement. In their model, member types are known by other committee members. In my model member types are private information. This provides members with a larger set of actions with which to manipulate the group's decision. Members can not only lie about the content of their private signal but also its quality. Interestingly, my results show that this larger menu is inconsequential. The least distortionary lie in which members honestly report their ability but lie about their signal is profitable for the highest probabilities of state revelation.

2 Model

A group of $n \geq 3$ (odd) legislators select policy on behalf of n representative voters.[2] The legislators choose policy in two stages. Members first communicate with one another about which policy they should select. After this communication stage the members vote on which policy to enact. All legislators then stand for reelection. Each legislator desires reelection and therefore wants the voter he represents to believe that he is of high ability. Voters observe the policy that the legislature selects and with some probability learn whether the legislators chose the optimal policy. One policy is ex ante more likely to be optimal. Consequently, if voters do not learn whether the chosen policy is correct before the election they believe (correctly) that the unpopular policy is more likely to be chosen by a group of low ability

[2] I follow convention in the principal-agent literature and refer to the legislators with male pronouns and the voters with female pronouns.

legislators than a group of high ability legislators. This creates an electoral incentive for some legislators to induce the group to select the popular policy when they should select the alternative. My objective is to understand the conditions under which the legislators always choose the policy that is in the best interest of voters.

2.1 Policy process

The legislature chooses between two policies, 0 and 1. The legislators collectively choose policy, denoted y, by voting once and simultaneously. Each member casts a vote for a policy, $v_i \in \{0, 1\}$, and the policy that receives a simple majority of votes is enacted.[3] Legislators are policy motivated. Their payoff from the policy they select, y, depends on a state of the world $\omega \in \{0, 1\}$. If $y = \omega$, legislators earn a payoff of $\alpha > 0$. If $y \neq \omega$, they earn a policy payoff normalized to zero.

2.2 Uncertainty about the state of the world

The state $\omega = 0$ is the more likely state of the world. Formally, $Pr(\omega = 0) = \pi > 1/2$, which is common knowledge. Legislators are better informed about the state of the world than voters. At the start of the game, each legislator receives a private independent signal about the state of the world, $s_i \in S = \{0, 1\}$. How informative this signal is to a legislator depends on his ability, $\theta_i \in \Theta = \{H, L\}$. A "high ability" legislator learns the state with probability one: $Pr(s_i = \omega|\theta_i = H) = 1$. A "low ability" legislator receives an informative but imperfect signal:

$$Pr(s_i = \omega|\theta_i = L) = q \in (\pi, 1)$$

The assumption that $q > \pi$ ensures that a low ability member's signal is privately informative:

$$Pr(\omega = 1|s_i = 1, \theta_i = L) = \frac{(1-\pi)q}{(1-\pi)q + (1-q)\pi} > \frac{1}{2}$$

[3] Results are unchanged for all but unanimity voting rules. See Supplemental Appendix.

The probability of observing a signal that matches the state is independent of the state.

Each legislator is of high ability with probability 1/2 which is common knowledge. I refer to the ability and signal pair (θ_i, s_i) as a legislator's *type*. Legislators know their own type but not the type of any other legislator.[4] After learning their type, members communicate once and simultaneously by sending a message $m_i \in \Theta \times S$ about their type to their colleagues.[5] Each member observes all messages. Let $m \in (\Theta \times S)^n$ denote the n-tuple of messages. Let m_{-i} denote the $n-1$ messages from his colleagues that legislator i observes. Given the messages and his own private information about his type, each legislator updates his beliefs about the state of the world, denoted

$$\zeta_i(\theta_i, s_i, m) = Pr(\omega = 0 | \theta_i, s_i, m)$$

2.3 Uncertainty about the ability of legislators

Legislators' beliefs about the state of the world are derived from their beliefs about the type of all legislators. Let $\Psi \subset (\Theta \times S)^n$ denote the set of all possible type realizations and let ψ represent a member of this set.[6] Each member's beliefs given m and his private information are represented by a probability measure on Ψ, η_i. It will be useful in defining and analyzing equilibrium to let $\Psi^c = (\Theta \times S)^n \setminus \Psi$ be the set of all type permutations that cannot be realized. This is the set of all n-tuples for which there is at least one member of type $(H, 1)$ and at least one of type $(H, 0)$. It will also be useful to let ψ_i denote the i-th element of ψ and ψ_{-i} refer to the $n-1$ elements of ψ other than i.

Voters do not know the type of any legislator. All voters observe y before the election. Voters also never observe m and do not observe either the individual votes of legislators or

[4] In a Supplemental Appendix, I consider a different information structure in which legislators know each others' ability but not their signal. I show that if the equilibrium I consider in the main model exists, then an analogous equilibrium for all players exists with this alternative information structure.

[5] Simultaneous communication assumes that members prepare their speeches to their colleagues in advance and allows herding problems to be ignored (Visser and Swank 2007, 339).

[6] Formally, $\Psi = (\Theta \times S \setminus (H, 1))^n \cup (\Theta \times S \setminus (H, 0))^n$.

the vote totals.[7] With probability ρ, the state is revealed to all players prior to the election. Let I denote a random variable that equals ω with probability ρ and $\emptyset$ with probability $1-\rho$. An information set for the voters can be expressed now as a pair (y, I). Let Φ denote the set of six information sets and let ϕ denote an element of this set. At each possible information set, each voter forms beliefs about the probability that her representative is a high ability type, $\mu_i(\phi)$.[8]

2.4 Elections and electoral incentives

Each legislator stands for reelection against a challenger who is of high ability with probability k_i which is common knowledge. Each of the n voters observe (y, I) and update beliefs about their representative's type. If $\mu_i(\phi) \geq k_i$, the incumbent legislator wins the election and earns an electoral payoff of $\beta > 0$. Otherwise he earns and electoral payoff of 0.[9] Each legislator's overall payoff (at information set ϕ) is therefore given by

$$u_i = \begin{cases} \alpha + \beta & \text{if} \quad y = \omega,\ \mu_i(\phi) \geq k_i \\ \alpha & \text{if} \quad y = \omega,\ \mu_i(\phi) < k_i \\ \beta & \text{if} \quad y \neq \omega,\ \mu_i(\phi) \geq k_i \\ 0 & \text{if} \quad y \neq \omega,\ \mu_i(\phi) < k_i \end{cases}$$

2.5 Sequence of play

The sequence of play is as follows:

1) Nature selects the state, ω, and legislator types, ψ.

[7] The results of the model are unchanged if voters observe individual votes or vote totals. I address this in the Discussion.

[8] This belief is derived from her beliefs over the set of all possible ability and signal realizations which are represented by a probability measure on Ψ. To economize on notation, I characterize voter beliefs only up to beliefs about their representative's type.

[9] I do not explicitly model voters' payoffs or their voting strategy. They are passive players whose beliefs are directly tied to their representative's payoff. The results of the model are unchanged but the analysis less parsimonious if their voting strategies are included.

2) Each legislator observes his type, (θ_i, s_i), and sends a message, m_i.

3) Each legislator observes all messages, m, and casts a vote v_i for which policy to enact.

4) Nature reveals the state with probability ρ.

5) Each voter observes (y, I) and updates her beliefs

6) Payoffs are realized and the game ends.

2.6 Strategies

The solution concept is weak sequential equilibrium which combines sequential rationality with the requirement that beliefs be updated according to Bayes' rule wherever possible.[10]

A pure strategy for a legislator consists of a voting strategy and a messaging strategy. A voting strategy is a mapping from a legislator's type, (θ_i, s_i), and the messages sent in the communication stage of the game, m, into the policy space:

$$\tilde{v}_i : (\Theta \times S)^{n+1} \to \{0, 1\}$$

where $\tilde{v}_i(\theta_i, s_i, m) = 0$ denotes that legislator i of type (θ_i, s_i) votes for policy 0 if the set of messages sent is m. A messaging strategy is a mapping from a legislator's type into the individual type space,

$$\tilde{m}_i : \Theta \times S \to \Theta \times S$$

For example, $\tilde{m}_i(L, 0) = (L, 1)$ denotes that member i sends the message $m_i = (L, 1)$ if he is of type $(L, 0)$.

2.7 Accountability

I am interested in identifying the conditions under which the legislature always chooses the policy that is in the best interest of voters. Informally, I say that a legislature is accountable

[10]The more familiar concept of perfect Bayesian equilibrium requires that players observe each others' actions. In this game voters do not observe the messages that legislators send to their colleagues.

to voters if in equilibrium it always selects the policy that is optimal given the totality of the dispersed information that the members of the legislature possess. This definition is analogous to the definition of accountability in Ashworth and Shotts (2010) and of "true leadership" in Canes-Wrone et al. (2001).

Definition 1 (Accountability) *An equilibrium displays accountability if and only if for all $\psi \in \Psi$, $y = 0$ if and only if $Pr(\omega = 0|\psi) > 1/2$.*

2.8 Perfect accountability equilibrium

I define a particular type of equilibrium that displays accountability which I refer to as a *perfect accountability equilibrium* (PAE). This equilibrium is analogous to the equilibrium of the same name in Ashworth and Shotts (2010). In a PAE, all legislators truthfully report their type to their colleagues. All legislators then vote for the policy they believe is most likely to match the state. Because all available information is revealed to all members in equilibrium, all legislators have the same posterior belief about the optimal policy.

Definition 2 (Perfect Accountability Equilibrium) *The following is a perfect accountability equilibrium:*

Legislators truthfully report their type:

$$\tilde{m}_i^*(\theta_i, s_i) = (\theta_i, s_i) \quad \textit{for all} \quad i$$

Legislators vote for the policy they believe is most likely to match the state:

$$\tilde{v}_i^*(\theta_i, s_i, m) = 0 \quad \textit{if and only if} \quad \zeta_i(\theta_i, s_i, m) \geq 1/2 \quad \textit{for all} \quad i$$

Voters' beliefs satisfy Bayes' rule with

$$0 = \mu_i(1,0) = \mu_i(0,1) < \mu_i(1,\emptyset) < 1/2 < \mu_i(0,\emptyset) < \mu_i(0,0) = \mu_i(1,1) < 1$$

For any $m \in \Psi$,

$$\eta_i(\psi) = \begin{cases} 1 & \text{if} \quad \psi_{-i} = m_{-i} \quad \text{and} \quad \psi_i = (\theta_i, m_i) \\ 0 & \text{otherwise} \end{cases}$$

For any $m \in \Psi^c$, $\eta_i(\psi) > 0$ if and only if $\psi_j = (H, 1)$ for all legislators with $m_j = (H, 1)$.

A PAE clearly displays accountability. In equilibrium all legislators learn ψ and form correct beliefs about which state is more likely. They then vote unanimously to implement the optimal policy given all possible available information.

2.8.1 Voter beliefs

In a PAE, all six information sets for the voters are reached with positive probability. If there is at least one high ability member of the legislature, the correct policy is always selected. If there are no high ability legislators, the incorrect policy is chosen with positive probability. Whether the legislature is right or wrong, Nature determines if the state is revealed prior to the election. Bayes' rule can therefore always be used to update voter beliefs.

In a PAE, policy fails to match the state if and only if all members are of low ability. Therefore $\mu_i(1, 0) = \mu_i(0, 1) = 0$ for all voters. If voters learn that the policy and state match, they know that there is either at least one high ability member in the legislature or all legislators are low ability but happened to choose the correct policy. In a group of n low ability legislators, state ω is more likely if and only if there are at least $(n + 1)/2$ signals $s_i = \omega$. If the voter believes that the right policy was selected by a group of low ability legislators, she infers that at least $(n + 1)/2$ of the legislators received a signal that matches the chosen policy. Because the probability distribution of correct signals is independent of the state, for all i,[11]

$$\mu_i(0,0) = \mu_i(1,1) = \frac{1}{1 + Pr(y = \omega | \theta_i = L)}$$

As n rises, both posteriors decrease and approach 1/2. The probability that the state matches the policy if a voter's representative is of high ability is always one. The probability that the state matches the policy if the legislator is of low ability, on the other hand, is increasing in n and approaches one in the limit. This operates through two channels. First, the probability that at least one other member is a high ability legislator approaches one. Second, the probability that a legislature made up of entirely of low ability members makes the right decision approaches one. Seeing the state matches policy for a large group tells a voter relatively little because she expects this outcome for a large group regardless of her representative's ability. In a small group, she expects the correct policy to be chosen with a lower probability if her representative is of low ability than if he is of high ability because there are fewer potential high ability members to pick up the slack for her representative and less information available to the legislature in the event that all members are of low ability.

Now consider the information set $(0, \emptyset)$ where the legislature selects $y = 0$ and the state is not revealed. Voters know that if their representative is of high ability, the legislature chooses $y = 0$ with probability π. This yields

$$\mu_i(0, \emptyset) = \frac{\pi}{\pi + Pr(y = 0 | \theta_i = L)}$$

If their legislator is of low ability, then three circumstances can bring about $y = 0$. With probability $(1 - 1/2^{n-1})$ there is at least one high ability legislator among the $n - 1$ other members. In this case $y = 0$ with probability π. With probability $1/2^{n-1}$ all legislators are low ability. In this case either $\omega = 0$ and the legislators chose correctly or $\omega = 1$ and they chose wrong. Because $\pi > 1/2$, a group of low ability legislators chooses $y = 0$

[11]Complete expressions for these beliefs are provided in the Appendix.

less often and $y = 1$ more often than a group with a high ability legislators. It follows that $Pr(y = \omega|\theta_i = L) < \pi$. Therefore $\mu_i(0, \emptyset) > 1/2$ and $\mu_i(1, \emptyset) < 1/2$. Moreover, $\mu_i(0, \emptyset) < \mu_i(0, 0) = \mu_i(1, 1)$. This is a consequence of the fact that the voter's uncertainty when the state is not revealed allows for the possibility that the policy and state do not match. This only occurs if all members are low ability. Finally, note that like $\mu_i(0, 0)$ and $\mu_i(1, 1)$, $\mu_i(0, \emptyset)$ is decreasing in n and approaches $1/2$. As n rises, voters increasingly expect that the right policy will be chosen even if all representatives are of low ability. Therefore $y = 1$ becomes weaker evidence that the legislature selected the wrong policy.

2.8.2 Legislator beliefs

In the communication stage of the policy-making process, any message that corresponds to a possible realization of n types occurs with positive probability in equilibrium. On the equilibrium path, all legislators are truthful and Bayes' rule implies that all legislators believe that $\psi = m$ with probability one. If a legislator lies, the resulting set of messages may still be one that is achieved with positive probability in equilibrium. By Bayes' rule, any legislator who does not lie believes that $\psi = m$ with probability one. Legislators who break from equilibrium in the messaging stage have free beliefs in the voting stage. In principle the lying legislator could believe one or more of his colleagues is also lying or even believe that he is of a different type than he believed prior to deviating from equilibrium. I impose the following mild restriction in this case on a deviant legislator's beliefs: the legislator believes his fellow legislators are telling the truth and that he is of the type that he observed at the start of the game.

A lie in the communication stage may also result in a message that cannot represent the true realization of n types– i.e. $m \in \Psi^c$. In this case at least one legislator sends $m_i = (H, 1)$ and at least one legislator sends $m_j = (H, 0)$. I impose the following requirement on legislator beliefs at any such information set. Each legislator believes that the legislator who sends the message $m_i = (H, 1)$ is of type $(H, 1)$ with probability one. This implies that all legislators believe that the state is 1 with probability one. These off-path beliefs are the most reasonable because any type who falsely reports that he is type $(H, 1)$ strictly harms himself relative to equilibrium. All lies strictly lower the probability that the correct policy is chosen. The only way a lie can be profitable is if it provides electoral gain. Therefore any profitable lie must make the popular policy more likely. If a legislator lies that he is type $(H, 1)$, this makes the *unpopular* policy more likely. Therefore whenever legislators know that someone is lying, they believe the colleague who sent $(H, 1)$.[12]

2.9 Interpretation

The model can be interpreted in the following way. Members of Congress must decide on a policy to respond to a problem such as a foreign policy crisis or an economic recession. In the case of a foreign policy crisis, they may have to decide whether to declare war against another state or not. Faced with an economic recession, they must choose whether to respond with economic stimulus or austerity. Members agree on what a solution looks like. They all want national security and a healthy economy. They are uncertain, however, about which policy will best solve the problem the country faces. That is, they are uncertain about the state of the world. Moreover, all legislators and voters believe ex ante that one response is most likely correct. Prevailing sentiments about macroeconomics may, for example, hold that stimulus is the right response to economic downturn. Experience may caution the members of a society against military action in times of foreign policy crisis.

All members of Congress and their staffs research and form individual beliefs about which policy is correct. The draw from the type space represents this process. Some legislators are quite successful at investigating which policy is correct and find very strong evidence that one course of action is better than the other. These are the high ability types. Others receive less decisive information from their investigation. These are the low ability types. After consulting with their staffs and conducting their own research, the legislators all meet

[12] I formalize this argument in the Supplemental Appendix.

to discuss what policy should be implemented and then vote to select the policy.

Once policy has been implemented, with some probability it is revealed whether the legislature chose the correct response before the election. Suppose Congress chooses to implement a stimulus package. If the economy continues to deteriorate upon the implementation of the package, voters learn that this was the wrong policy. If Congress chooses to declare a war and this results in a quick resolution to a foreign policy crisis, voters learn that the correct policy was selected. Voters may instead remain uncertain about the effect of policy prior to the election. This can happen if the policy is chosen late in the Congressional term and there is not enough time to observe whether the problem has been resolved. The probability of state resolution can be interpreted as the amount of time before the election (Canes-Wrone et al. 2001).

Finally, each member of Congress stands for reelection. Prior to choosing policy, each legislator is aware of whether he is running against a strong challenger or a weak challenger. The expected ability of his opponent represents how close the race is. Voters seek to elect high ability politicians so that future problems can be effectively resolved.

3 Analysis

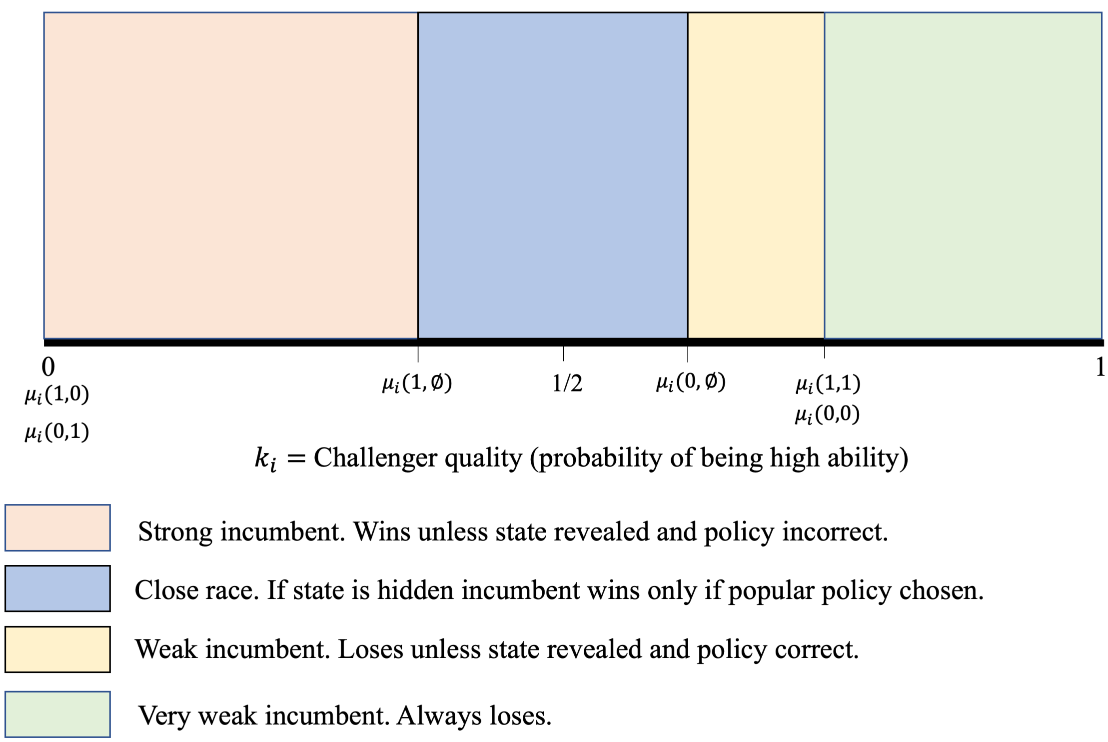
The focus of my analysis is on the conditions under which no legislator has an incentive to pander by manipulating the decision of the legislature. I aim to understand which legislators want to pander and how changes in the model's parameters affect their incentives to do so. My main results consider the effect of n on accountability and, relatedly, the quality of policymaking where "quality of policymaking" refers to the ex ante probability that policy matches the state in equilibrium. I proceed by identifying the conditions under which a PAE exists.

3.1 Existence of PAE

To establish when a PAE exists, first note that no individual legislator can influence the outcome of the legislature's decision in the voting stage. All members share the same correct beliefs about the probable state of the world and vote for the policy that is most likely to match the state given those beliefs. Accordingly no legislator is ever pivotal. Any manipulation of the legislature's policy choice for electoral gain must take place at the communication stage of the policy-making process.

To identify the legislators who face potential incentives to pander, consider the set of possible challengers that a legislator may face. As in Canes-Wrone et al. (2001) and Ashworth and Shotts (2010), there are four classes of legislators, distinguished by the expected ability of challenger that they run against. Figure 1 depicts these.

Figure 1: Competitiveness of elections



The first class of legislators face weak challengers: $k_i \leq \mu_i(1,\emptyset)$. These legislators are defeated if and only if it is revealed that the state does not match policy. Consequently they never have any incentive to manipulate the outcome of the vote when all other players play PAE strategies as the probability of state matching is maximized in a PAE. The second class of legislators face moderately strong challengers: $k_i \in (\mu_i(0,\emptyset), \mu_i(0,0)]$. These legislators win their elections if and only if it is revealed that the state matches the signal. Like the members who face weak challengers, they too have aligned electoral and policy incentives and never gain from manipulating policy. The third class of legislators face very strong challengers: $k_i > \mu_i(1,1) = \mu_i(0,0)$. Even if it is revealed that the state matches policy, these legislators are defeated. Their best hope is to maximize their policy payoff in the first period and therefore have no incentive to manipulate the legislature's decision.

The final class of legislators are those in close races: $k_i \in (\mu_i(1,\emptyset), \mu_i(0,\emptyset)]$. If the state remains hidden before the election, these legislators win if $y = 0$ and lose if $y = 1$. Legislators in close races therefore may be tempted to induce the legislature to choose the popular policy in the service of their private electoral interests.

Unlike an executive who can pander directly by choosing policy unilaterally, a legislator in a close race who wants the popular policy to be selected must convince his colleagues to vote for the popular policy. To do this, a legislator falsely reports his type so that for certain realizations of his colleagues types, his false message makes the other legislators believe the popular state is more likely where a true message makes them believe the unpopular state is more likely. Five varieties of lie can raise the probability that the popular policy is selected relative to equilibrium in this way. First, a $(L,1)$ type can report $(H,0)$. This lie affects policy if all others are low ability and one half or more receive the unpopular signal. Second, a $(L,1)$ type can report $(L,0)$. This lie is effective if all others are low ability and exactly one half of the other legislators receive each signal. Third, a $(L,0)$ type can lie about the strength of his signal and report $(H,0)$. This affects policy if all others are low ability and strictly more than one half receive the unpopular signal. Finally, a $(H,1)$ type can report either $(L,0)$ or $(H,0)$. The former is effective if no other members are high ability and one half or more receive the popular signal. The latter is effective if no other members are high ability.

Whenever a lie affects policy, it results in the selection of the policy that is less likely to match the state given all available information. Lies therefore always imporse strictly positive policy cost relative to equilibrium on a legislator. If the state remains hidden, a lie result in reelection in cases where a legislator would lose in equilibrium. If the state is revealed, lies have the opposite effect because the lie reduces the probability that the chosen policy is correct. It follows that for ρ sufficiently low, there is an electoral benefit to lying. This benefit disappears and becomes a cost for ρ sufficiently high. Only for low values of ρ then can electoral benefits of lying be sufficiently high to overcome the policy cost of a lie. Each variety of lie admits a critical value of ρ where the expected electoral benefit of the lie equals the expected electoral cost. For any ρ beneath this, it is strictly beneficial to lie and for any ρ above, it is strictly harmful.

I show in the Appendix that of all five potential lies, the minimally distorting lie by the $(L, 1)$ type that he is a $(L, 0)$ type is advantageous for the highest probability of state revelation. This lie is more harmful than helpful if and only if

$$\rho \geq \bar{\rho} \equiv \frac{\beta - \alpha(1 - 2Pr(y = 0|\psi_i = (L, 1)))}{2\beta Pr(y = 1|\psi_i = (L, 1))}$$

It is now straightforward to identify the conditions under which a PAE exists. If there is at least one legislator in a close race and $\rho \geq \bar{\rho}$, then no type of legislator in a close race can gain from pandering. Because members who are not in close races always want to maximize the probability that the policy matches the state, $\rho \geq \bar{\rho}$ is sufficient for a PAE to exist. For the same reason, if there are no legislators in close races, then a PAE exists regardless of the value of ρ. On the other hand, if there is at least one member in a close race and $\rho < \bar{\rho}$, then there is at least one type of legislator who can strictly benefit from manipulating the legislature's decision.

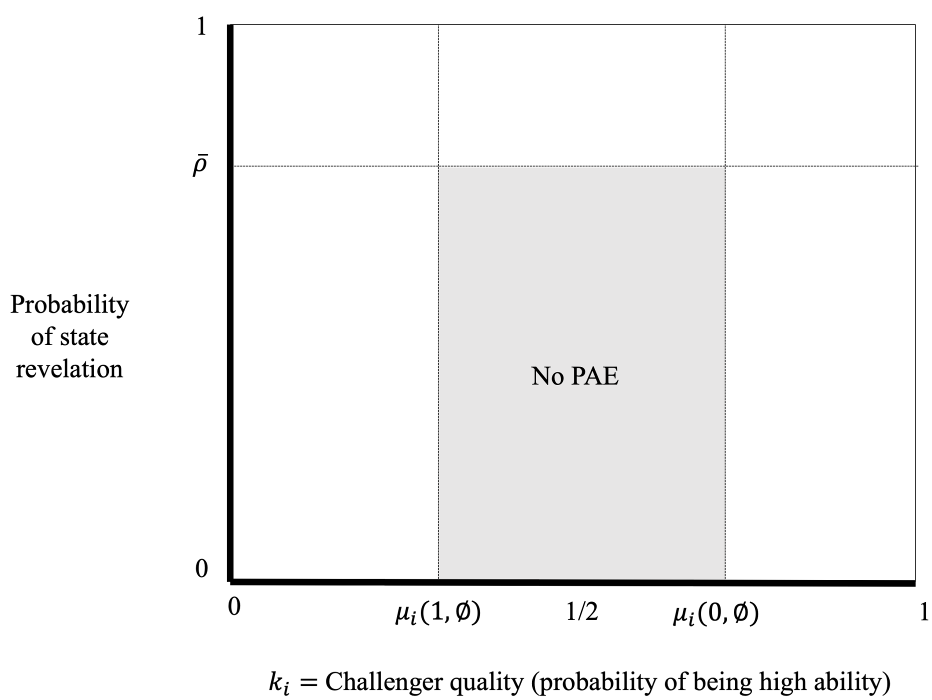
Proposition 1 *A perfect accountability equilibrium exists if and only if at least one of the* *following conditions is true:*

i) No legislator is in a close race: $k_i \notin (\mu_i(1, \emptyset), \mu_i(0, \emptyset)]$ *for all* i*.*

ii) The probability of state revelation is sufficiently high: $\rho \geq \bar{\rho}$*.*

Figure 2 illustrates Proposition 1. Challenger quality and voter beliefs about incumbent legislators are represented on the horizontal axis and the probability of state revelation is represented on the vertical axis. A PAE exists everywhere except the gray area in the center where at least one challenger is between $\mu_i(1, \emptyset)$ and $\mu_i(0, \emptyset)$ and the probability of state revelation is below $\bar{\rho}$.

Figure 2: Perfect accountability equilibrium



Proposition 1 implies that legislatures should be expected to be more accountable early in electoral cycles and in policy areas in which the effectiveness of policy is easily observed in a relatively short period of time. This implies, for example, that it is easier for a legislature to be accountable in response to a natural disaster shortly after inauguration than in response to a financial crisis on the eve of an election. Moreover, it is easier for a legislature made up of representatives in safe seats to be accountable than a legislator with many members from highly competitive districts. These conditions are analogous to those that support executive accountability (Canes-Wrone et al. 2001). The following three sections comprise the core of my analysis in which I use these conditions to compare small legislatures to large legislatures and legislatures to executives.

3.2 Accountability in small and large legislatures

The size of a decision-making body affects the cutpoints that determine whether a PAE exists or not. As n rises, voter posterior beliefs monotonically collapse on the prior probability that an incumbent legislator is of high quality. As the legislature becomes larger, its decisions become less informative about any one individual legislator's role in the determination of policy and therefore less informative about his ability. Any individual incumbent member whose private signal agrees with the prior is more likely to be of high ability than low ability. In a small group, an individual member's signal is more likely to be consequential for the group's decision than in a large group. Thus for small n, $y = 0$ provides strong evidence that a member's signal agrees with the prior and therefore that the legislator is of high ability. As n rises and an individual member's signal becomes less consequential for the group's choice, y becomes increasingly less informative of the legislator's signal and therefore less informative of his ability. By symmetry, $y = 1$ provides the voter with evidence that the member's signal disagrees with the prior and that the incumbent is of low ability. As n rises, the strength of this evidence wanes.

This convergence of beliefs towards 1/2 has clear electoral consequences in a PAE. Individual legislators face incentives to pander for a smaller interval of challengers as n rises because legislative decisions (endogenously) provide voters with less information about their representative. Members in districts with stronger challengers, $k_i > 1/2$, face a worsening electoral environment. Voters who initially took $\phi = (0, \emptyset)$ as sufficient evidence of ability to warrant reelection now demand evidence that $y = \omega$. A race that was once close enough for the legislator to manipulate his reelection prospects by pandering becomes insufficiently close for this tactic to work. In the larger legislature, there is less credit for him to claim for a popular policy. For members facing weaker challengers, $k_i < 1/2$, the rise in n is electorally beneficial. Here members worry that $\phi = (1, \emptyset)$ provides evidence to voters that their representative received an ex ante unlikely signal and are therefore of low ability. As the individual member's contribution to the group's decision declines, voters become less confident that their member contributed to an unpopular policy decision. With more blame to spread around for an unpopular policy, the legislator no longer faces incentives to induce the selection of a popular policy.

It will ease exposition in the my analysis to adopt the following language to describe the collapse (or expansion) of $(\mu_i(1, \emptyset), \mu_i(0, \emptyset)]$. Close races are defined as those in which a legislator faces a challenger in the interval. As n rises and the interval collapses, it is intuitive that there are fewer challengers who run a close race against the incumbent. If the interval shrinks, I say that "fewer races are close in each district."[13]

Unlike voter beliefs, the size of the legislature has no effect on $\bar{\rho}$. Recall that $\bar{\rho}$ is determined by the expected payoff to the $(L, 1)$ type from falsely reporting that he is $(L, 0)$. This lie only affects policy in a group of low ability legislators if exactly one half of the other legislators receive each signal. Therefore in the event that the lie changes policy, the signals that his colleagues received provide no additional information to him about the state of the world than his private signal. Because the probability that a legislator receives a correct signal about the state is independent of n, his expected payoff from telling a small lie is constant in n. If $\bar{\rho} > 0$, then even in arbitrarily large legislatures, legislators in close race want to manipulate the legislature's decision if the probability of state revelation is sufficiently low.

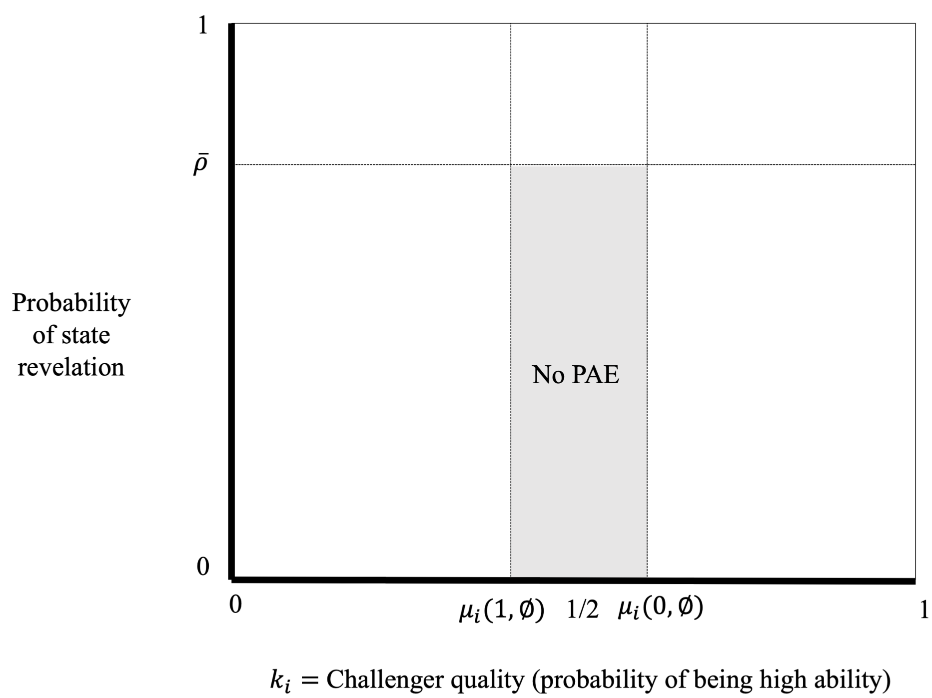
Proposition 2 *As the legislature becomes larger, fewer races are close in each district. Legislators in close races in a legislature of any size want to pander for the same probabilities*

[13] Note that this does not mean that for a given set of n challengers, fewer of the n races are close. It refers only to the size of the interval of challengers for which a race is defined as close.

of state revelation.

Figure 3 illustrates Proposition 2. As n rises, the set of k_i for which a legislator can gain from pandering collapses. The critical probability of state revelation necessary to prevent pandering, $\bar{\rho}$, remains constant. Compared to a benchmark legislature in Figure 2, the gray area in which a PAE does not exist in Figure 3 for large n is smaller.

Figure 3: Perfect accountability equilibrium for large n



3.3 Legislative expansion

The result in Proposition 2 allows me to analyze the implications of expanding a legislature by adding new members. As n rises, each legislator wants to pander for a smaller set of k_i. Members in previously existing competitive districts face weaker incentives to pander. The larger legislature allows more blame to be shared for unpopular policies and less credit to be claimed for popular policies.

When a new member is added to the legislature, he brings with him a new challenger. The addition of new members who are not in close races can bring a PAE into existence, as original members face weaker incentives to pander.

Depending on how close the new k_i is to 1/2, however, the addition of a new member may cause a PAE to cease to exist. If districts in the existing legislature are uncompetitive such that no members face the temptation to manipulate policy for personal gain, adding new members from competitive districts can undermine accountability.

What are the implications of such an expansion for the legislature's capacity to solve problems? Consider an initial n-member accountable legislature. Members of this legislature honestly report their types to their colleagues and always select the best policy given all possible information that can be learned about the state. Now assume l new members are added such that for all l members, $k_i = 1/2$. These new members always want to manipulate the legislature's decision for sufficiently low probabilities of state revelation. For ρ sufficiently low, Propositions 1 and2 imply that there is no equilibrium in which all legislators are truthful and vote for the best policy with the best information. That is, the legislature can no longer exploit all available information to choose the optimal policy. Original members, however, should understand that their new colleagues want to mislead them. A reasonable response from the original members in such a situation would be to ignore the new legislators and continue making policy as before with their original colleagues as a bloc. As long as the original members make up a majority in the new legislature, the original member bloc can continue sharing all information truthfully, believing each other, and implementing the consensus optimal policy through a unanimous vote. Under these strategies, the new legislature makes policy decisions based on the same amount of information as the old legislature and selects the optimal policy with the same ex ante probability. Proposition 3 establishes that an equilibrium in which old members play these strategies exists for any modest addition of new members to an accountable legislature. While the addition of new members can undermine the ability of the legislature to use all available information, it does not destroy its ability to fully exploit existing sources information.

Proposition 3 *If $n-3$ or fewer new legislators are added to an accountable legislature, an equilibrium exists in which the new legislature chooses the correct policy with the same probability as the original accountable legislature.*

Proposition 3 applies to expansions of an accountable legislature in which the original n challengers, k_i, do not change when l new members (and challengers) are added. In this sense there is no "redistricting" when the legislature is expanded. A new state or territory is added to a country, new districts within the territory created, and representatives from these admitted to the legislature with no reworking of the existing members' districts. The historic expansion of the U.S. Senate fits this mode of expansion, as Article One of the Constitution provides that each state will have two senators. The expansion of the House of Representatives over its history, by contrast, is characterized by continual reapportionment and redistricting. Proposition 3 does not apply in this case. If the original legislature is accountable and redistricting makes some of the original legislators' districts sufficiently competitive (even after expansion), then the original legislators can no longer form an accountable bloc within the new legislature. Unlike modest expansions without redistricting, modest expansions with redistricting are not guaranteed to admit an equilibrium in which the probability of problem solving by the new legislature is as high it was in the original legislature.

3.4 Executives vs. Legislatures

The result in Proposition 2 applies for legislatures with $n \geq 3$ members. Separate analysis is required to compare a single decision-maker to a legislature. Consider an equilibrium analogous to a PAE with a single decision-maker. The single decision-maker in this equilibrium always chooses the policy that matches his signal. Because the optimal policy is always selected given all available information voters form beliefs about the executive in fundamentally the same way as they do a legislator in a PAE. Voters have more precise information about the signal that an executive received and therefore his type from observing (y, I) than they do about any legislator. The result in Proposition 2 with respect to voter beliefs and close races therefore applies to all $n \geq 1$. Few races are close in each district in a three-member legislature than are close in an executive's district.

The result with respect to $\bar{\rho}$ carries over as well. Unlike the legislators, the executive can manipulate policy directly. If he is of type $(L, 1)$, he has the same posterior beliefs about ω as a type $(L, 1)$ legislator who conditions on one half of the other legislators receiving each signal. As shown above, a small lie affects policy only in this event. The $(L, 1)$ legislator's relative payoff from a small lie is therefore equivalent to the executives' relative payoff from choosing $y = 0$. Therefore the probability of state revelation must exceed ρ_L to prevent a type $(L, 1)$ executive in a close race from pandering.

Proposition 4 *Fewer races are close in each district for any legislature than are close in an executive's district. An executive in a close race wants to pander for the same probabilities of state revelation as any legislator in a close race.*

It is worth noting that the result in Proposition 3 does not apply to the expansion of decision-making bodies from one politician to multiple. Consider a single accountable executive. Now minimally expand the decision-making body from a single executive to a committee by adding two additional politicians. Unlike the original members of an accountable legislature, an originally accountable executive cannot unilaterally form a majority bloc within the committee and continue making policy decisions as before. It is therefore not guaranteed that an equilibrium exists in which the probability that the committee choses the correct policy is weakly higher the probability that the original executive selects the correct policy.

3.5 Policy bias and accountability

The main results of the model concern the size of an elected decision-making body. Additional analysis establishes that the effects of policy bias and legislator preferences on accountability identified in the single-decision-maker case obtain for legislatures as well.

I first show how preexisting policy bias, π, affects the cutpoints that determine whether or not a PAE exists. Recall that voters interpret $y = 1$ as evidence that their representative is of low ability because low ability legislators are more likely than high ability legislators to receive a 1 signal. This is because $\omega = 0$ is ex ante more likely: $\pi > 1/2$. As π rises, low ability legislators become even more likely than high ability legislators to receive a 1 signal. Therefore $y = 1$ becomes stronger evidence that a voter's representative is of low ability. It follows that as π rises, the interval of races for which legislators can gain from pandering is expanding.

Legislators also become more confident that a lie overturns a wrong decision rather than a correct decision. This reduces the policy cost of lying and raises the electoral benefit by lowering the probability that voters observe an incorrect decision if the state is revealed. Legislators in close races can therefore gain from lying for higher values of ρ as π increases.

Proposition 5 *As π rises, in each district more races become close and legislators in close races want to pander for higher probabilities of state revelation.*

This result implies that legislatures should be most accountable when responding to policy problems for which there is no strong consensus on the proper solution. If the prior policy bias corresponds to the share of citizens who prefer one policy over the other, then insofar as members of a polity form preferences on the basis of their beliefs about how best to solve social problems, greater division is better for accountability. Legislatures may also be expected to be more accountable when addressing problems that a polity has not previously encountered if strong policy biases develop over time through experience.

3.6 Legislator motivation and accountability

I now consider how α and β affect the cutpoints that determine whether or not a PAE exists. Members' actions in a PAE do not depend on their payoff from policy, α, or reelection, β. A voter's beliefs in a PAE therefore do not depend on α or β.

For legislators in close races, any electoral benefit that can be gained from pandering comes at a cost of lowering the probability that the correct policy is chosen. As α rises, this cost becomes more severe. It follows that as legislators value policy more, the probability of state revelation necessary to prevent pandering is decreasing. Greater policy cost from pandering requires more certainty that voters do not learn that the legislature selected the wrong policy. For α sufficiently high, no legislator in a close race can ever gain enough electorally to make up for this policy loss. In this case no legislator attempts to manipulate the group's decision even if the state is guaranteed to remain hidden before the election.

As the value of reelection rises, the electoral benefit of pandering in the event that the state remains hidden rises. At the same time, the electoral cost of pandering in the event that the state is revealed also rises. At the critical value of ρ where a legislator in a close race is indifferent between lying and telling the truth, the expected electoral benefit of pandering exceeds the expected electoral cost because there is always a positive policy cost to pandering. A rise in β at $\bar{\rho}$ therefore makes a legislator no longer indifferent between lying and telling the truth. The payoff to lying now strictly exceeds that from telling the truth. A higher probability of state revelation is necessary to raise the electoral cost of pandering and make the legislator indifferent again. It follows that $\bar{\rho}$ is increasing in β. Legislators in close races are willing to pander earlier in the election cycle as their reelection concerns grow.

Proposition 6 *As legislators become more policy motivated, those in close races want to pander later in the election cycle: $\bar{\rho}$ is decreasing in α. As legislators become more motivated by reelection, those in close races want to pander earlier in the election cycle: $\bar{\rho}$ is increasing in β.*

It is worth noting that the limit of $\bar{\rho}$ as α or β become arbitrarily large is a result of the legislators strongly favoring either policy or reelection such that the other concern becomes nearly irrelevant. It follows that $\bar{\rho}$ approaches the same value for α arbitrarily small as it does for β arbitrarily large and vice versa. If α is significantly larger than β, legislators are strictly policy-oriented and never want to pander by manipulating the legislature's decision. If β is much larger than α, legislators are strictly reelection-seeking. Legislators in close races want to pander if ρ is sufficiently low. In particular, if ρ is less than one half these legislators always gain electorally from pandering. At the same time there is also a sufficiently high probability of state revelation to prevent pandering even by strict reelection-seekers. If ρ becomes too high, pandering becomes electorally harmful as the probability of getting away with it vanishes.

Proposition 7 *Strictly policy-motivated legislators never want to pander:*

$$\lim_{\alpha \to \infty} \bar{\rho} = \lim_{\beta \to 0^+} \bar{\rho} = 0$$

Strictly reelection-seeking legislators want to pander if ρ is sufficiently low. In particular, they always want to pander if $\rho \leq \frac{1}{2}$. There is always some value of $\rho < 1$ such that they do not want to pander:

$$\lim_{\beta \to \infty} \bar{\rho} = \lim_{\alpha \to 0^+} \bar{\rho} \in (\frac{1}{2}, 1)$$

Variation in legislators' electoral versus policy preferences may arise from several sources. The nature of the problem or crisis that demands policy attention may be sufficiently immediate and dire that preferences for its resolution outweigh electoral concerns. It may, for example, be less difficult to sustain accountable policy-making in response to a foreign attack on the homeland than to overfishing in a public lake. Additionally, institutional features of the legislature can affect relative preferences. Some legislatures may develop an organizational culture that prides the collective reputation of the legislature. Term limits, by extinguishing any hope of reelection altogether, may focus legislator attention solely on policy. Limited financial compensation or prestige from office may also temper reelection motives. In this way the model implies that it may be more reasonable to expect that legislators in the New Hampshire General Court, where members earn a yearly salary of 100 dollars, face weaker incentives to pander than members of the California State Assembly where members earn an annual salary of over 100,000 dollars and exert influence over one of the largest economies in the world.

4 Discussion

4.1 Transparency

I have assumed that voters only observe y and not the individual votes of their legislators. This excessively unrealistic assumption is made only for ease of analysis unessential to my results.[14] If the vote is made transparent, in a PAE only two profiles of votes can be observed with positive probability. All members unanimously vote for either 0 or 1 depending on which maximizes the probability of state matching given ψ. Voters learn no more about ψ from observing individual votes than they do from observing just the outcome. Given equilibrium voting strategies, lies in the communication stage also result in unanimous votes. Deviation and equilibrium payoffs in the communication stage are therefore identical in a model with transparency to those in the model without transparency. All that needs to be considered is whether any legislator can gain by voting for the opposite policy as his colleagues in the voting stage. All that is required to rule out deviant voting behavior is off-path voter beliefs that do not reward legislators who vote differently than the rest of the legislature. There is little if any rationale within the model to expect voters to reward such behavior, as no

[14] If individual votes are hidden from voters, there are only six information sets to analyze. If the results of the vote in the legislature are transparent, this greatly multiplies the number of possible information sets.

beliefs are ruled out by standard equilibrium refinements.[15]

This logic extends to *any* equilibrium that displays accountability. Accountability requires all information to be shared and the optimal policy selected given all available information. There can, therefore, exist equilibria when a PAE exists in which a large but non-unanimous majority votes for the optimal policy while others vote for the opposite. Because the optimal policy is always selected, there is no electoral rationale for such equilibrium legislative voting behavior. Voters use the policy decision to make inferences about their representative's contribution in the communication stage. Their own member's vote provides no additional information. In no equilibrium that displays accountability can an individual escape individual judgment based on the collective decision. This rules out equilibria (that display accountability) in which members in close races agree to share their information with the legislature and in exchange are allowed to performatively vote against an unpopular policy to get reelected.

4.2 Majority Party Caucuses

A subtle reinterpretation of the model broadens its application, suggests further implications, and better illustrates this inability of individual members to participate in accountable policymaking while protecting themselves electorally. Rather than interpreting the n legislators as the entire legislature, let these legislators be the members of a majority party caucus. Following the logic of Proposition 3, these legislators can ignore the opposition party and implement policies on their own. This reinterpretation expands the scope of issue areas that the model applies to, allowing it to capture policy areas in which there is intraparty consensus on the existence of a problem but no interparty consensus. Parties may for example disagree fundamentally about whether inequality or access to health care are problems that need to be addressed by the government. In this case the common-value setup of the model does not apply to the entire legislature but does apply to a majority caucus attempting to

[15]D1 and the intuitive criterion.

resolve a problem that it and its members' constituents identify.

In this interpretation, individual members of an accountable caucus are judged not on the basis of their floor votes but on the policy that the majority party caucus selects. If the members of the party caucus share information truthfully in order to select the best policy to address a perceived problem, no member of the party caucus can save himself by voting against the party on an unpopular bill. Such was the fate of 17 of 30 House Democrats who voted against the Affordable Care Act in 2010 in their reelection bids.

Interpreting the n legislators as a majority party caucus suggests a further implication of an expansion in the size of the decision-making group. Party majorities typically expand from election to election by bringing in legislators from more competitive districts. In terms of the model, a rise in n should tend to add members in close races. Proposition 3 is therefore of particular relevance in an application of the model to party caucuses. New members may not contribute to the quality of majority policymaking but need not do harm. This applies to any magnitude of increase in the majority's membership for a legislature of a fixed size, as the original caucus by definition forms a majority bloc in the new legislature.

4.3 Selection

Whether an entire legislature or a majority party caucus, an accountable group of decision-makers always maximizes the probability that the appropriate policy is selected to address a public problem. In a single period of legislation, which the model focuses on, accountability equilibria are clearly normatively desirable. They are maximally effective at optimizing policy today. It is less clear how effective an accountability equilibrium is at selecting politicians who will choose optimal policies tomorrow. Consider a case in which $n-1$ representatives are low ability and face weak challengers while the remaining representative is high ability and faces a close race. If ρ is sufficiently high, a PAE exists and the optimal policy is selected with probability one. If the unpopular policy is optimal and the state is not revealed, the legislature loses its only high ability member and retains all of its low ability members. In this case a PAE does a remarkably poor job of selecting capable incumbents. While beyond the scope of this paper, selection is a natural avenue for further analysis of the model.

5 Conclusion

In *Federalist 70*, Alexander Hamilton expressed fear that members of a large collective decision-making body would have weaker incentives to act in the public interest than a single decision-maker because blame for an action deemed imprudent by the electorate could be placed on other members. In this paper I have shown that under certain conditions, what Hamilton recognized as a weakness of multiple decision-makers can in fact be a strength. If voters are less informed about what policies are in their interest than those who they appoint to make decisions on their behalf, they may improperly punish those responsible for unpopular policies and improperly reward those responsible for popular policies. In this setting, the sharing of blame enables members of large legislatures to bear the electoral consequences of unpopular policies where executives or members of small legislatures cannot.

While this is a virtue of large legislatures, the model does not imply that larger legislatures necessarily choose better policies than small legislatures or that expanding existing legislatures will necessarily improve their capacity to solve public problems. Whether any individual legislature can be accountable or not depends on the specific policy area, point in the election cycle, and the competitiveness of each member's race for reelection. Modest expansions of accountable legislatures without redistricting should not harm a legislature's ability to choose the best policies but significant expansions or redistricting can.

The model provides a strong basis for several extensions. One in particular is worth noting. A central feature of the model is the communication stage in which all members deliberate prior to voting on the policy to enact. In the contemporary U.S. Congress where the number of problems to address is large and members' time scarce, careful deliberation on every issue may be untenable. A natural extension would consider a setup in which members either do not communicate at all or deliberate only with a few members of the legislature. If members do not share the same beliefs about the best solution to the problem, the individual votes of the legislators may communicate useful information to voters about their representatives that they do not in the the model with full deliberation.

6 Appendix

6.1 Voter beliefs in a PAE

To explicitly state voter beliefs in a PAE, let $F(x; n, w)$ be the cdf of the binomial distribution which returns the probability of less than or equal to x successes in n trials given probability of success of w. The cumulative distribution of 0 signals in a legislature with n low ability members is then $F(x; n, q)$ if $\omega = 0$ and $F(x; n, 1-q)$ if $\omega = 1$.

If $\omega = 0$, at least one half of members receive the correct signal with probability $1 - F(\frac{n-1}{2}; n, q)$. If $\omega = 1$, at least one half of members receive the correct signal with probability $F(\frac{n-1}{2}; n, 1-q)$. Ex ante, at least one half of members receives the correct signal with probability

$$\pi(1 - F(\frac{n-1}{2}; n, q)) + (1-\pi)F(\frac{n+1}{2}; n, 1-q)$$

Note that $(1 - F(\frac{n-1}{2}; n, q)) = F(\frac{n+1}{2}; n, 1-q)$ for n odd. This becomes

$$F(\frac{n+1}{2}; n, 1-q) \equiv F^R$$

where R denotes *right*. Define $F^W \equiv 1 - F(\frac{n+1}{2}; n, 1-q) = F(\frac{n-1}{2}; n, q)$ similarly where W connotes *wrong*.

In a PAE, policy fails to match the state if and only if all members are low types. Therefore for $\phi = (1, 0)$ and $\phi = (0, 1)$, for all voters $\mu_i(1, 0) = \mu_i(0, 1) = 0$. If the state is revealed and $y = \omega$, then by Bayes' rule

$$\mu_i(0,0) = \mu_i(1,1) = \frac{Pr(y=\omega|\theta_i = H)}{Pr(y=\omega|\theta_i = H) + Pr(y=\omega|\theta_i = L)}$$

$$= \frac{1}{1 + (1 - \frac{1}{2^{n-1}}) + \frac{1}{2^{n-1}} F^R} = \frac{1}{2 - \frac{1}{2^{n-1}}(1 - F^R)}$$

If the state is not revealed, then if $y = 0$,

$$\mu_i(0,\emptyset) = \frac{\pi}{\pi + (1 - \frac{1}{2^{n-1}})\pi + \frac{1}{2^{n-1}}[\pi F(\frac{n+1}{2}; n, 1-q) + (1-\pi)F(\frac{n-1}{2}; n, q)]}$$

$$= \frac{\pi}{\pi + (1 - \frac{1}{2^{n-1}})\pi + \frac{1}{2^{n-1}}[\pi F^R + (1-\pi)F^W]}$$

If $y = 1$,

$$\mu_i(1,\emptyset) = \frac{1-\pi}{1 - \pi + (1 - \frac{1}{2^{n-1}})(1-\pi) + \frac{1}{2^{n-1}}[\pi F(\frac{n-1}{2}; n, q) + (1-\pi)F(\frac{n+1}{2}; n, 1-q)]}$$

$$= \frac{1-\pi}{1 - \pi + (1 - \frac{1}{2^{n-1}})(1-\pi) + \frac{1}{2^{n-1}}[\pi F^W + (1-\pi)F^R]}$$

Comparing and simplifying terms reveals that $\mu_i(1,\emptyset) < \mu_i(0,\emptyset)$ if and only if $(1-\pi) < \pi$ which is true by assumption. It follows that $\mu_i(0,\emptyset) > \frac{1}{2}$. Comparing and simplifying reveals that $\mu_i(0,\emptyset) < \mu_i(0,0)$ if and only if $0 < (1-\pi)F^W$ which is true because $q \in (\pi, 1)$ and $\pi \in (\frac{1}{2}, 1)$.

6.2 Properties of voter beliefs

The following lemma will be useful for identifying the properties of $\mu_i(0,\emptyset)$.

Lemma 1 *$F(\frac{n}{2}, n, 1-q)$ is strictly increasing and $F(\frac{n}{2}, n, q)$ strictly decreasing in n even with $\lim_{n\to\infty} F(\frac{n}{2}, n, q) = 0$ and $\lim_{n\to\infty} F(\frac{n}{2}, n, 1-q) = 1$.*

$F(\frac{n-1}{2}, n, 1-q)$ is strictly increasing and $F(\frac{n-1}{2}, n, q)$ strictly decreasing in n odd with $\lim_{n\to\infty} F(\frac{n-1}{2}, n, q) = 0$ and $\lim_{n\to\infty} F(\frac{n-1}{2}, n, 1-q) = 1$.

Proof: $F(\frac{n}{2}, n, 1-q)$ is strictly increasing in even n if for an arbitrary even n,

$$F(\frac{n+2}{2}, n+2, 1-q) - F(\frac{n}{2}, n, 1-q) > 0$$

This inequality can be rewritten as

$$\sum_{i=0}^{\frac{n+2}{2}} \binom{n+2}{i}(1-q)^i q^{n+2-i} - \sum_{i=0}^{\frac{n}{2}} \binom{n}{i}(1-q)^i q^{n-i} > 0$$

Because $q > (1-q)$,

$$\binom{n+2}{j}(1-q)^j q^{n+2-j} > \binom{n}{j}(1-q)^j q^{n-j}$$

for all $j \in \{1, 2, ..., \frac{n}{2}\}$. Trivially,

$$\binom{n+2}{\frac{n+2}{2}}(1-q)^{\frac{n+2}{2}} q^{\frac{n+2}{2}} > 0$$

Therefore the inequality holds for an arbitrary even n and $F(\frac{n}{2}, n, 1-q)$ is increasing in n. An analogous proof establishes monotonicity for the other terms.

To establish the limit of each term, note that it is a property of the binomial cdf that $\lim_{n\to\infty} F(xn, n, w)$ is 1 if $x < w$ and 0 if $x > w$. Because $q > 1/2$, for n even $(\frac{n}{2})n = \frac{1}{2} < q$. For n odd, $\frac{n-1}{2}n < 1/2$. $\square$

The next lemma characterizes how changes in the model's parameters affect $\mu_i(0, \emptyset)$.

Lemma 2 *$\mu_i(0, \emptyset)$ is decreasing in n, increasing in π, and constant in α and β.*

Proof:

It is trivial that $\mu_i(0, \emptyset)$ is constant in α and β. The effect of π follows immediately from

$$\frac{\partial \mu_i(0, \emptyset)}{\partial \pi} = \frac{1 - F^R}{2^{n-1}(\pi + (1 - \frac{1}{2^{n-1}})\pi + \frac{1}{2^{n-1}}[\pi F^R + (1-\pi)F^W])^2} > 0$$

From Lemma 1, F^R is strictly increasing in n and F^W is strictly decreasing. Because $\pi > (1-\pi)$, $\pi F^R + (1-\pi)F^W$ is increasing in n. By the properties of the binomial distribution, F^R is less than 1. Therefore $\pi F^R + (1-\pi)F^W < \pi$. It follows that the denominator is strictly increasing in n. Because $\frac{1}{2^{n-1}}$ approaches zero in the limit, the limit of the denominator is 2π. This establishes that $\mu_i(0,\emptyset)$ is strictly decreasing with $\lim_{n\to\infty} \mu_i(0,\emptyset) = 1/2$ and that $\mu_i(1,\emptyset) = 1 - \mu_i(1,\emptyset)$ is strictly increasing in n with a limit of 1/2. $\square$

6.3 Proofs of Propositions

6.3.1 Proof of Proposition 1

I establish in the main text that (i) legislator strategies in the voting stage are sequentially rational given their beliefs (ii) legislators facing challengers outside of the interval $(\mu_i(1,\emptyset), \mu_i(0,\emptyset)]$ cannot profitably lie about their type and (iii) $(H,0)$ types on this interval can never gain by lying. To complete the proof, I derive the conditions under which the three remaining types in close races cannot profitably deviate from equilibrium in the communication stage. In particular, I show that $\rho \geq \bar{\rho}$ is sufficient to deter any legislator in a close race from lying. The proof proceeds as follows. First I derive $\bar{\rho}$ which corresponds to the critical value of state revelation to prevent the $(L,1)$ type from reporting $m_i = (L,0)$. In a Lemma, I establish that $\bar{\rho}$ is constant in n. I then derive two analogous probabilities sufficient to deter the $(L,1)$ and $(L,0)$ types from reporting $m_i = (H,0)$. Next, I find the critical probabilities of state revelation that prevent any lie by the $(H,1)$ type. Having characterized all five critical probabilities, I then show that $\bar{\rho}$ is the maximum of these. I first show that this is true for the probabilities that deter lies by the $(H,1)$ type. I then prove a Lemma that states that the two other remaining thresholds are strictly decreasing in n. Finally, I show that both probabilities are less than or equal to $\bar{\rho}$ for $n = 3$. The Lemma then implies that these are less than $\bar{\rho}$.

Let $\gamma(0) \equiv Pr(\omega = 0|\theta_i = L, s_i = 0)$ and $\gamma(1) \equiv Pr(\omega = 0|\theta_i = L, s_i = 1)$. The type

$(L,1)$ legislator earns an equilibrium payoff of

$$(1-\frac{1}{2^{n-1}})\alpha+(\frac{1}{2^{n-1}})\alpha[\gamma(1)(1-F(\frac{n-1}{2},n-1,q))+(1-\gamma(1))F(\frac{n-1}{2},n-1,1-q)]+$$

$$(1-\frac{1}{2^{n-1}})\beta[\gamma(1)+(1-\gamma(1))\rho]$$

$$+(\frac{1}{2^{n-1}})\beta[\gamma(1)(1-F(\frac{n-1}{2},n-1,q))+(1-\gamma(1))(F(\frac{n-1}{2},n-1,1-q)\rho+(1-F(\frac{n-1}{2},n-1,1-q))(1-\rho))]$$

The first term is the policy payoff if at least one other member is of high ability, α, multiplied by the probability that at least one other member is a high type. The second term is the expected policy payoff if all other members are of low ability multiplied by the probability that all members are of low ability. The third and fourth terms are analogous to the first and second for the legislator's expected equilibrium electoral payoff.

If the type $(L,1)$ legislator sends message $m_i=(L,0)$, his expected payoff is

$$(1-\frac{1}{2^{n-1}})\alpha+(1-\frac{1}{2^{n-1}})\beta[\gamma(1)+\rho(1-\gamma(1))]$$

$$+\frac{\alpha}{2^{n-1}}[\gamma(1)(1-F(\frac{n-3}{2},n-1,q))+(1-\gamma(1))F(\frac{n-3}{2},n-1,1-q)]$$

$$+\frac{\beta}{2^{n-1}}[\gamma(1)(1-F(\frac{n-3}{2},n-1,q))+(1-\gamma(1))(F(\frac{n-3}{2},n-1,1-q)\rho+(1-F(\frac{n-3}{2},n-1,1-q))(1-\rho))]$$

This is less than or equal to his equilibrium payoff if and only if

$$\rho\geq\bar{\rho}\equiv\frac{\beta-\alpha(1-2\gamma(1))}{2\beta(1-\gamma(1))}$$

The following Lemma establishes the properties of $\bar{\rho}$.

Lemma 3 *$\bar{\rho}$ is constant in n, decreasing in α, and increasing in π and β.* $\lim_{\alpha\to\infty}\bar{\rho}=\lim_{\beta\to 0^+}\bar{\rho}=-\infty$. $\lim_{\alpha\to 0^+}\bar{\rho}=\lim_{\beta\to\infty}\bar{\rho}\in(\frac{1}{2},0)$.

Proof: It is trivial that $\bar{\rho}$ is constant in n.

Because $\gamma(1)<1/2$, $\bar{\rho}$ is strictly decreasing in α with $\lim_{\alpha\to\infty}\bar{\rho}=-\infty$.

The first derivative show that $\bar{\rho}$ is increasing in β:

$$\frac{\partial\bar{\rho}}{\partial\beta} = \frac{\alpha(1-2\gamma(1))}{2\beta^2(1-\gamma(1))^2} > 0$$

The limit as β becomes arbitrarily large and α becomes small is

$$\lim_{\beta\to\infty}\bar{\rho} = \lim_{\alpha\to 0}\bar{\rho} = \frac{1}{2(1-\gamma(1))} \in (\frac{1}{2},1)$$

Finally, let $\gamma'(s_i) \equiv \frac{\partial\gamma(s_i)}{\partial\pi} > 0$. By the chain rule,

$$\frac{\partial\bar{\rho}}{\partial\pi} = \frac{\gamma'(1)(\alpha+\beta)}{2\beta(1-\gamma(1))^2} > 0$$

It follows that $\bar{\rho}$ is increasing in π. $\square$

If the type $(L,1)$ legislators sends $m_i = (H,0)$, his expected payoff is

$$(1-\frac{1}{2^{n-1}})\alpha + (\frac{1}{2^{n-1}})\alpha\gamma(1) + (1-\frac{1}{2^{n-1}})\beta[\gamma(1)+\rho(1-\gamma(1))] + \beta(\frac{1}{2^{n-1}})[\gamma(1)+(1-\gamma(1))(1-\rho)]$$

The difference between his deviation payoff and equilibrium payoff is

$$\alpha[\gamma(1)F(\frac{n-1}{2},n-1,q) - (1-\gamma(1))F(\frac{n-1}{2},n-1,1-q)] +$$

$$\beta[\gamma(1)F(\frac{n-1}{2},n-1,q) + (1-\gamma(1))F(\frac{n-1}{2},n-1,1-q)(1-2\rho)]$$

This is less than or equal to zero if and only if

$$\rho \geq \rho_1 \equiv$$

$$\frac{\beta[\gamma(1)F(\frac{n-1}{2},n-1,q) + (1-\gamma(1))F(\frac{n-1}{2},n-1,1-q)] - \alpha[(1-\gamma(1))F(\frac{n-1}{2},n-1,1-q) - \gamma(1)F(\frac{n-1}{2},n-1,q)]}{2\beta(1-\gamma(1))F(\frac{n-1}{2},n-1,1-q)}$$

A $(L,0)$ type earns an equilibrium payoff of

$$(1-\frac{1}{2^{n-1}})[\alpha+\beta\gamma(0)+\beta\rho(1-\gamma(0))]$$

$$+(\frac{\alpha}{2^{n-1}})[\gamma(0)(1-F(\frac{n-3}{2},n-1,q))+(1-\gamma(0))F(\frac{n-3}{2},n-1,1-q)]$$

$$+(\frac{\beta}{2^{n-1}})[\gamma(0)(1-F(\frac{n-3}{2},n-1,q))+(1-\gamma(0))(F(\frac{n-3}{2},n-1,1-q)\rho+(1-F(\frac{n-3}{2},n-1,1-q))(1-\rho))]$$

His payoff if he sends message $m_i=(H,0)$ is

$$(1-\frac{1}{2^{n-1}})[\alpha+\beta\gamma(0)+\beta\rho(1-\gamma(0))]+(\frac{\alpha}{2^{n-1}})\gamma(0)+(\frac{\beta}{2^{n-1}})[\gamma(0)+(1-\gamma(0))(1-\rho)]$$

The difference between his deviation payoff and equilibrium payoff is

$$\alpha[\gamma(0)F(\frac{n-3}{2},n-1,q)-(1-\gamma(0))F(\frac{n-3}{2},n-1,1-q)]+$$

$$\beta[\gamma(0)F(\frac{n-3}{2},n-1,q)+(1-\gamma(0))F(\frac{n-3}{2},n-1,1-q)(1-2\rho)]$$

This is less than or equal to zero if and only if

$$\rho\geq\rho_0\equiv$$

$$\frac{\beta[\gamma(0)F(\frac{n-3}{2},n-1,q)+(1-\gamma(0))F(\frac{n-3}{2},n-1,1-q)]-\alpha[(1-\gamma(0))F(\frac{n-3}{2},n-1,1-q)-\gamma(0)F(\frac{n-3}{2},n-1,q)]}{2\beta(1-\gamma(0))F(\frac{n-3}{2},n-1,1-q)}$$

Finally, the $(H,1)$ type earns an equilibrium payoff of $\alpha+\beta\rho$. His payoff if he sends message $m_i=(H,0)$ is $\beta(1-\rho)$. He is weakly better off in equilibrium if and only if $\rho\geq\frac{\beta-\alpha}{2\beta}$. If he sends the message $m_i=(L,0)$, his payoff is

$$(1-\frac{1}{2^{n-1}})(\alpha+\beta\rho)+\frac{1}{2^{n-1}}[\alpha F(\frac{n-3}{2},n-1,1-q)+\beta(1-F(\frac{n-3}{2},n-1,1-q))]$$

He is weakly better off in equilibrium if and only if $\rho\geq\frac{(\alpha-\beta)(1-F(\frac{n-3}{2},n-1,1-q))}{2\beta(F(\frac{n-3}{2},n-1,1-q)-1)}=\frac{\beta-\alpha}{2\beta}$.

Now note that $\bar{\rho}\geq\frac{\beta-\alpha}{2\beta}$ if $\alpha+\beta\geq0$ which is true by assumption. Therefore the critical probability of state revelation sufficient to deter any lie by the $(H,1)$ type is not binding.

The following Lemma establishes properties of ρ_1 and ρ_0 that will be useful in showing that $\max\{\rho_1,\rho_0,\bar{\rho}\}=\bar{\rho}$.

Lemma 4 *ρ_0 and ρ_1 are strictly decreasing in n.*

Proof:

Let $\rho_0(n)$ denote the value of ρ_0 for an n-member legislature. Consider the difference $\rho_0(n) - \rho_0(n+2)$. I show that ρ_0 is decreasing in n by showing that this difference is positive for an arbitrary n. The inequality holds if

$$\beta[F(\frac{n-1}{2}, n+1, 1-q)F(\frac{n-3}{2}, n-1, q) - F(\frac{n-3}{2}, n-1, 1-q)F(\frac{n-1}{2}, n+1, q)] >$$

$$\alpha[F(\frac{n-3}{2}, n-1, 1-q)F(\frac{n-1}{2}, n+1, q) - F(\frac{n-1}{2}, n+1, 1-q)F(\frac{n-3}{2}, n-1, q)]$$

Because $\alpha > 0$ and $\beta > 0$, the right-hand side is negative and the left-hand side positive if

$$\frac{F(\frac{n-3}{2}, n-1, 1-q)}{F(\frac{n-3}{2}, n-1, q)} < \frac{F(\frac{n-1}{2}, n+1, 1-q)}{F(\frac{n-1}{2}, n+1, q)}$$

It follows from Lemma 1 that this inequality is true. Therefore ρ_0 is strictly decreasing in n. A similar technique establishes that ρ_1 is decreasing in n. $\square$

I first show that $\bar{\rho} \geq \rho_1$. Note that $\bar{\rho} \geq \rho_1$ if both of the following inequalities are satisfied

$$\frac{\beta}{2\beta(1-\gamma(1))} \geq \frac{\beta[\gamma(1)F(\frac{n-1}{2}, n-1, q) + (1-\gamma(1))F(\frac{n-1}{2}, n-1, 1-q)]}{2\beta(1-\gamma(1))F(\frac{n-1}{2}, n-1, 1-q)}$$

$$\frac{\alpha(1-2\gamma(1))}{2\beta(1-\gamma(1))} \leq \frac{\alpha[(1-\gamma(1))F(\frac{n-1}{2}, n-1, 1-q) - \gamma(1)F(\frac{n-1}{2}, n-1, q)]}{2\beta(1-\gamma(1))F(\frac{n-1}{2}, n-1, 1-q)}$$

Rearranging and simplifying reveals that both conditions are true if

$$F(\frac{n-1}{2}, n-1, 1-q) \geq F(\frac{n-1}{2}, n-1, q)$$

Because $q > 1/2$, this inequality is true.

I now show that $\bar{\rho} \geq \rho_0$. From Lemma 4, ρ_0 is maximized at $n = 3$. It is therefore sufficient to show that $\bar{\rho} \geq \rho_0$ for all n to show that the inequality holds for $n = 3$.

Plugging q and π into $\gamma(1)$ yields

$$\bar{\rho} = \frac{\beta[\pi(1-q)+(1-\pi)q] - \alpha[(1-\pi)q - \pi(1-q)]}{2\beta(1-\pi)q}$$

For $n = 3$, $F(\frac{n-3}{2}, n-1, q) = (1-q)^2$ and $F(\frac{n-3}{2}, n-1, 1-q) = q^2$. Plugging π and q into $\gamma(0)$ and simplifying yields

$$\rho_0 = \frac{\beta[\pi(1-q)+(1-\pi)q] - \alpha[(1-\pi)q - \pi(1-q)]}{2\beta(1-\pi)q} = \bar{\rho}$$

$\square$

6.3.2 Proof of Proposition 2

Lemma 2 establishes that $\mu_i(0,\emptyset)$ is strictly increasing in n with $\lim_{n\to\infty} \mu_i(0,\emptyset) = 1/2$. Lemma 3 establishes that $\bar{\rho}$ is constant in n. $\square$

6.3.3 Proof of Proposition 3

Let K_n denote a set on n challengers, k_i. Let $\mu_i^n(0,\emptyset)$ denote a voter's belief in a PAE in an n-member legislature. Assume that a PAE exists and that $\rho < \bar{\rho}$. Proposition 1 implies that for all $k_i \in K_n$, $k_i \notin (\mu_i^n(1,\emptyset), \mu_i^n(0,\emptyset)]$. Now hold ρ and all other parameters constant and add $l \leq n-3$ members to the legislature. The set of challengers is now $K_n \cup K_l$ where K_l denotes a set of l challengers. Let N denote the set of original members and let L denote the set of new members. In the $(n+l)$-member legislature, let m^n denote the set of messages sent by original members and let m^l denote the messages sent by new members. Define ψ^n and ψ^l similarly. Let $X(\psi^n)$ denote the set of all $\psi \in \Psi$ with ψ^n where Ψ is the type space for the $(n+l)-$member legislature. I prove that the following is an equilibrium in the $(n+l)-$member legislature.

Lemma 5 *If a PAE exists for an n-member legislature, the following is a weak sequential equilibrium for a $(n+l)$-member legislature:*

Original members truthfully report their type

$$\tilde{m}_i^*(\theta_i, s_i) = (\theta_i, s_i) \quad \textit{for all} \quad i \in N$$

New members all report the same type regardless of their type

$$\tilde{m}_i^*(\theta_i, s_i) = (L, 1)) \quad \textit{for all} \quad i \in L$$

Original members vote for the policy they believe is optimal

$$\tilde{v}_i^*(\theta_i, s_i, m) = 0 \quad \textit{if and only if} \quad \zeta_i(\theta_i, s_i, m) \geq 1/2 \quad \textit{for all} \quad i \in N$$

New members vote for the popular policy

$$\tilde{v}_i^*(\theta_i, s_i, m) = 0 \quad \textit{for all} \quad i \in L$$

Voter beliefs at each information set for original members are the same in the $(n + l)$ legislature as in the n-member legislature.

$$\mu_i^{n+l}(\phi) = \mu_i^n(\phi) \quad \textit{for all} \quad \phi \in \Phi \quad \textit{for all} \quad i \in N$$

Voter beliefs at each information set for new members equal their prior

$$\mu_i^{n+l}(\phi) = 1/2 \quad \textit{for all} \quad \phi \in \Phi \quad \textit{for all} \quad i \in L$$

Original member beliefs about the state are only informed by the messages of original members

For all $i \in N$,

$$\eta_i(X(\psi^n)) = \begin{cases} 1 & \text{if} \quad \psi^n_{-i} = m^n_{-i} \quad \text{and} \quad \psi_i = (\theta_i, m_i) \\ 0 & \text{otherwise} \end{cases}$$

For all $i \in L$, $\eta_i(\psi)$ satisfies Bayes' rule wherever possible.

Off path, all members believe that the state is $\omega = 1$ if at least one original members sends $(H, 1)$ and at least one other sends $(H, 0)$.

For any $m^n \in \Psi^C$, $\eta_i(X(\psi^n)) > 0$ if and only if $\psi_j = (H, 1)$ for all legislators with $m_j = (H, 1)$.

Proof: I first show that voter beliefs for new members satisfy Bayes rule. No new member has any influence on policy in equilibrium. Therefore for all $i \in L$ and all ϕ, $Pr(\phi|\theta_i = H) = Pr(\phi|\theta_i = L)$ which implies that $\mu_i(\phi) = 1/2$.

It is straightforward to check that $\mu^n_i(\phi) = \mu^{n+l}_i(\phi)$ for all $i \in N$. In equilibrium $Pr(y = \omega|\theta_i = H) = 1$ as in a PAE. Also as in a PAE, $Pr(y = \omega|\theta_i = L) = (1 - \frac{1}{2^{n-1}}) + \frac{1}{2^{n-1}}F^R$. If an original member is a low type, the correct policy is chosen if any other original members is high ability or if all other members are low ability and $\frac{n+1}{2}$ or more correct signals are observed.

In the voting stage, all n original members vote as a bloc. No member of the legislature is pivotal if $n > \frac{n+l+1}{2}$. The right-hand side is maximized at $l = n - 3$. For $l = n - 3$, this inequality becomes $n > \frac{n-1}{2}$ which is true. Therefore no member can affect his payoff by affecting policy in the voting stage.

Given original members' beliefs, new messages have no affect on the legislature's policy choice. They therefore have no incentive to send a message other than the message proscribed by equilibrium.

Finally, because $k_i \notin (\mu^n_i(1, \emptyset), \mu^n_i(0, \emptyset)] = (\mu^{n+l}_i(1, \emptyset), \mu^{n+l}_i(0, \emptyset)]$ for all $k_i \in K_n$, no original member can benefit electorally from the popular policy when the unpopular policy should be chosen. Therefore original members cannot gain by deviating in the messaging stage. □

Lemma 5 immediately implies Proposition 3. □

6.3.4 Proof of Proposition 4

A single decision-maker is accountable if and only if he selects $y = s_i$ in equilibrium. In such an equilibrium, $\mu_i^1(0, \emptyset) = \frac{\pi}{\pi+\pi q+(1-\pi)(1-q)}$. Note that

$$\pi q + (1-\pi)(1-q) = (1 - \frac{1}{2^{n-1}})\pi + \frac{1}{2^{n-1}}[\pi F(\frac{n+1}{2}, n, 1-q) + (1-\pi)F(\frac{n-1}{2}, n, q)]$$

for $n = 1$. Lemma 2 implies that $\mu_i^n(0, \emptyset) < \mu_i^1(0, \emptyset)$ for any $n \geq 3$.

A $(H, 1)$ executive in close race earns an equilibrium payoff of $\alpha + \beta\rho$. If he chooses $y = 0$, his payoff is $(1-\rho)\beta$. He is better off in equilibrium if $\rho \geq \frac{\beta-\alpha}{2\beta}$.

A $(L, 1)$ executive in a close race earns an equilibrium payoff of $(1-\gamma(1))(\alpha + \beta\rho)$. If he chooses $y = 0$ instead, he earns a payoff of $\gamma(1)(\alpha + \beta) + (1-\gamma(1))(1-\rho)\beta$. Equilibrium payoff exceeds this if $\rho \geq \bar{\rho} \geq \frac{\beta-\alpha}{2\beta}$. Therefore the critical probability of state revelation sufficient to prevent pandering for the executive is the same as in any legislature. □

6.3.5 Proof of Proposition 5

Lemma 2 establishes that $\mu_i(0, \emptyset)$ is increasing in π. Lemma 3 establishes that $\bar{\rho}$ is increasing in π. □

6.3.6 Proof of Proposition 6

Lemma 2 establishes that $\mu_i(0, \emptyset)$ is constant in α and β. Lemma 3 establishes that $\bar{\rho}$ is decreasing in α and increasing in β. □

6.3.7 Proof of Proposition 7

Lemma 3 immediately implies Proposition 7. □

7 Supplemental Appendix

7.1 Legislator Off-path Beliefs

I base my restriction on legislator off-path beliefs the following argument. Any type who sends a false message $m_i = (H, 1)$ strictly harms himself relative to equilibrium. This is true even under the most optimistic beliefs about how his colleagues act off path. Therefore if members observe such a message, they should believe the legislator who sent the message is type $(H, 1)$ with probability one. In this subsection I show formally that all types except $(H, 1)$ strictly harm themselves by sending $m_i = (H, 1)$.

All $(H, 0)$ types realize a policy payoff of α and are reelected with certainty in equilibrium, earning a payoff of β. If a $(H, 0)$ type sends $m_i = (H, 1)$ and there are no other high ability member, the legislature selects $y = 1$ which ensures that the wrong policy is selected. The electoral cost of this deviation is minimized for a legislator who faces a very weak opponent. In this case he loses the election only if the state is revealed. If there is at least one other high ability member, then he earns a payoff of $G(H, 0) \leq (\alpha + \beta)$ where $G(H, 0)$ depends on the legislator's beliefs about the decision that the legislature will make off the equilibrium path. It follows that his maximal deviation payoff is

$$(1 - \frac{1}{2^{n-1}})(\alpha + \beta) + (\frac{1}{2^{n-1}})\beta\rho < \alpha + \beta$$

A $(L, 0)$ type earns the same expected policy payoff from sending $m_i = (H, 1)$ independent of k_i:

$$\alpha(\frac{1}{2^{n-1}})(1 - \gamma(0)) + \alpha(1 - \gamma(0))(1 - \frac{1}{2^{n-1}}) + G_\alpha(L, 0)\gamma(0)(1 - \frac{1}{2^{n-1}})$$

where $G_\alpha(L, 0)$ is the policy payoff he receives given his beliefs about how the other members act following an off-path message. The best possible outcome from a policy perspective that he can hope for is that the other legislators ignore his message and enact $y = 0$. In this case $G_\alpha(L,0)=\alpha$. Subtracting this deviation payoff from the $(L,0)$ type's policy payoff reveals that his equilibrium policy payoff is strictly larger in equilibrium if

$$\gamma(0)(1-F(\frac{n-3}{2},n-1,q))>(1-\gamma(0))(1-F(\frac{n-3}{2},n-1,1-q))$$

Because $q>1-q$, $F(\frac{n-3}{2},n-1,1-q)>F(\frac{n-3}{2},n-1,q)$ and $\gamma(0)>(1-\gamma(0))$. Therefore $m_i=(H,1)$ strictly harms a $(L,0)$ type's policy payoff. This is unsurprising as policy payoff is maximized when the probability that $y=\omega$ is maximized. A PAE accomplishes this and the lie $m_i=(H,1)$ lowers the probability that the state matches policy.

Now consider the best electoral payoff that a $(L,0)$ type can earn by sending $m_i=(H,1)$. The argument in the main text establishes that all legislators who are not in close races maximize their probability of reelection by maximizing the probability that $y=\omega$. Because these members strictly lose policy utility from sending $m_i=(H,1)$, they are strictly better off in equilibrium. All that remains is to verify that type $(L,0)$ members in close races are worse off compared to equilibrium. They earn an electoral payoff from sending $m_i=(H,1)$ of

$$\frac{1}{2^{n-1}}[(1-\gamma(0))\rho]+(1-\frac{1}{2^{n-1}})[(1-\gamma(0))\rho+\gamma(0)G_\beta(L,0)]$$

where $G_\beta(L,0)$ is the electoral payoff he receives given his beliefs about how the other members act following an off-path message. In the most advantageous scenario for reelection, members ignore conflicting signal and choose $y=0$ which yields $G_\beta(L,0)=\beta$. Note that this is the same expected response to an off-path message that yields the optimal $G_\alpha(L,0)$. Subtracting this electoral payoff from the $(L,0)$ type's equilibrium payoff reveals that he strictly worse off telling the lie if

$$(1-\gamma(0))(1-F(\frac{n-3}{2},n-1,1-q))(1-2\rho)+\gamma(0)(1-F(\frac{n-3}{2},n-1,q))>0$$

The left-hand size is minimized at $\rho = 1$. At $\rho = 1$, the inequality holds if

$$\gamma(0)(1 - F(\frac{n-3}{2}, n-1, q)) > (1 - \gamma(0))(1 - F(\frac{n-3}{2}, n-1, 1-q))$$

It was just established that this inequality is true. Therefore there is always strict electoral loss to a $(L, 0)$ type from sending $m_i = (H, 1)$.

Finally, the $(L, 1)$ type earns a policy payoff from $m_i = (H, 1)$ of

$$\alpha \frac{1}{2^{n-1}}(1 - \gamma(1)) + \alpha(1 - \frac{1}{2^{n-1}})(1 - \gamma(1)) + \alpha(1 - \frac{1}{2^{n-1}})\gamma(1)G_\alpha(L, 1)$$

In the best scenario off path, the legislature ignores his message and chooses $y = 0$ which yields $G_\alpha(L, 1) = \alpha$. Subtracting this from his equilibrium policy payoff implies that equilibrium is strictly better for him if

$$\gamma(1)(1 - F(\frac{n-1}{2}, n-1, q)) > (1 - \gamma(1))(1 - F(\frac{n-1}{2}, n-1, 1-q))$$

The following Remark will be useful for establishing policy loss.

Remark 1

$$(1 - \gamma(1))F(\frac{n-1}{2}, n-1, 1-q) > \gamma(1)F(\frac{n-1}{2}, n-1, q)$$

$$(1 - \gamma(0))F(\frac{n-3}{2}, n-1, 1-q) > \gamma(0)F(\frac{n-3}{2}, n-1, q)$$

Proof: Writing out the cdfs and $\gamma(1)$ explicitly and simplifying, the first inequality becomes

$$\pi \sum_{i=0}^{\frac{n-1}{2}} \binom{n-1}{i} q^i (1-q)^{n-i} < (1 - \pi) \sum_{i=0}^{\frac{n-1}{2}} \binom{n-1}{i} (1-q)^i q^{n-i}$$

which can be further rewritten

$$\sum_{i=0}^{\frac{n-1}{2}} \binom{n-1}{i} [\pi q^i (1-q)^{n-i} - (1-\pi)(1-q)^i q^{n-i}] < 0$$

A sufficient condition for this inequality to hold is

$$\pi q^i (1-q)^{n-i} < (1-\pi)(1-q)^i q^{n-i}$$

for all i which can be rewritten

$$\frac{\pi}{1-\pi} < (\frac{q}{1-q})^{n-2i}$$

Because $\pi > 1/2$ and $q > p$, the inequality is true for all $n - 2i \geq 1$. The minimum value that $n - 2i$ takes is $n - 2(\frac{n-1}{2}) = 1$. Therefore the sufficient condition is satisfied for all i. An analogous argument establishes that the second inequality in the Lemma holds. □

By Remark 1, a $(L, 0)$ type always suffers strict policy loss relative to equilibrium by sending $m_i = (H, 1)$. Like the $(L, 0)$ type, all $(L, 1)$ types not in close races maximize their probability of reelection by maximizing the probability that the state matches policy. Because a PAE does this and the lie imposes strictly positive policy cost, all $(L, 0)$ types who are not in close races are strictly better off in equilibrium. All that is left is to consider members in close races. They earn an expected electoral payoff from sending $m_i = (H, 1)$ of

$$\beta \frac{1}{2^{n-1}}[(1-\gamma(1))\rho] + \beta(1 - \frac{1}{2^{n-1}})(1-\gamma(1))\rho + \beta(1 - \frac{1}{2^{n-1}})\gamma(1) G_\beta(L, 1)$$

The best they can do off path electorally is for their colleagues to ignore his message and choose $y = \omega = 0$. The maximal value of $G_\beta(L, 1)$ is therefore β. Note that this is compatible with the optimal $G_\alpha(L, 1)$. Subtracting this from his equilibrium payoff shows that the member is strictly better electorally in equilibrium if

$$\gamma(1)(1-F(\frac{n-1}{2},n-1,q))+(1-\gamma(1))(1-F(\frac{n-1}{2},n-1,1-q))(1-2\rho)>0$$

The left-hand side is minimized at $\rho = 1$ which implies that the inequality holds if

$$\gamma(1)(1-F(\frac{n-1}{2},n-1,q))>(1-\gamma(1))(1-F(\frac{n-1}{2},n-1,1-q))$$

which it was just established holds. Thus any type who sends a false message $m_i = (H, 1)$ strictly harms himself relative to equilibrium.

7.2 Legislator uncertainty about colleagues' ability

As mentioned in the introduction, my model of the policymaking process differs from the similar two-stage process in Visser and Swank (2007) in that legislators do not know each others' ability. If instead legislators know each others' ability, there are only two lies to consider: high ability legislators can tell a big lie or low ability legislators can tell a small lie. Because the critical probability of state revelation necessary to prevent the latter is always larger than the former, in this alternative setup $\bar{\rho}$ is always ρ_L. This modifies the results in only one significant way. Group size ceases to have any effect on $\bar{\rho}$ as ρ_L is constant in n. Because $\bar{\rho} = \rho_L$ in the model for sufficiently large n and may exceed this for small n, accountability may be sustained where it otherwise cannot if legislators are informed of each others' ability.

7.3 Super-majority voting rules

For tractability I assume that policy is selected by a simple majority vote in the legislature. This assumption can be relaxed without significantly affecting the results. Consider an alternative setup in which one policy is designated as the status quo. If the alternative receives greater than $d \geq (n+1)/2$ votes, it is enacted. Otherwise the status quo remains policy. Returning to the motivating example of Congressional response to a recession, the alternative policy may be a bank bailout and the status quo allowing the bank to fail. Passing the bailout requires the consent of three-fifths of the legislators in order to get past a potential filibuster. Because all votes are unanimous in a PAE, no member is pivotal for $d < n$. Therefore no member can ever influence policy in the voting stage and cannot gain by voting against the majority. As in the baseline model, the communication stage is what matters for determining whether a PAE exists or not. Analysis of this stage is identical to that of the baseline model for all $d < n$. The results do not, however, generalize to unanimity rules, $d = n$. In this case legislators in close races can manipulate the group's decision in the voting stage as well as the communication stage.

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