Informational Pathologies of Bicameralism

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Abstract. A common rationale for bicameralism is that a second look at proposed legislation results in the enactment of informationally better legislation than that enacted by unicameral legislatures. This argument neglects that choices by bicameral chambers to acquire information arise within the strategic environment formed by the interplay of the chambers. Because information is costly, bicameral chambers may attempt to free ride on each other in choosing whether to acquire information. A simple game-theoretic model demonstrates that, under identified parameters, legislation enacted by a bicameral legislature is on average informationally worse – and society is worse off – than if the same legislation had been enacted by a unicameral legislature.
The rise of republican political institutions in the modern era challenged the classical rationale for bicameralism. Why have two legislative chambers if both chambers represent the same set of electors, namely, all voters? While a number of politicians and scholars, both ancient and modern, argue that bicameralism lacks justification when the same selectors elect representatives in both chambers, historically, James Wilson argued that bicameralism with congruent chambers can generate informationally superior outcomes relative to unicameralism, an argument that Rogers (2001, cf., 1998) extended and formalized. Among other limitations, the earlier analysis was limited to pure-strategy equilibria. In this paper, a very simple model shows that the results are not uniformly sanguine for bicameralism in mixed-strategy equilibria in a simultaneous-play game. I argue that a simultaneous-move game more plausibly reflects the central \textit{indicia} of bicameralism, namely, the acoustic separation of the legislators in the different chambers.

The argument proceeds as follows. I first review the rise of the republican challenge to bicameralism and survey more recent scholar work. Next I develop a very simple simultaneous-move game, and derive pure- and mixed-strategy equilibria to the game. I show that in the mixed-strategy equilibrium to the game that bicameralism can decrease social welfare relative to unicameralism. I then discuss how significant of a challenge this may be to the informatonal rational for congruent bicameralism, and to republican bicameralism more generally.

\textbf{I. The Rise of Republican Bicameralism and its Rationale}

There are two basic justifications for bicameralism – bicameralism as a sort of unanimity-requiring mechanism, bicameralism as an information-promoting mechanism. I briefly consider both in turn.
There are two main currents of thought related to bicameralism as a unanimity-requiring institutions. There is the traditional rationale for the British Parliament, treated most famously by Montesquieu, and there is the somewhat more modern view that bicameralism is a status-quo enhancing institution. Both currents of argument spring from the same source but emphasize different aspects of the institution.

Because of the notoriety of Britain’s “mixed government” bicameralism – due in no small measure to Montesquieu’s celebration of it in *The Spirit of the Laws* – one of the most well known purposes of the institution is to grant a veto over proposed legislation to different economic, social, or political interests and, in so doing, to promote political consensus between divergent social “estates.” In the case of Britain, because the political interests of two main social estates – nobles and commoners – diverged, each ostensibly needed the protection of a legislative veto against measures that would advance one estate’s interests at the expense of the other. Thus, in extolling the British example, Montesquieu wrote that nobles must “form a body that has a right to check the licentiousness of the people” but that the people must also have their own chamber to “oppose any encroachment” by the aristocracy (1748/1949, 155).

While the merits of reserving one legislative chamber for an unelected aristocracy did not survive the republicanizing trend of the last two centuries, many constitutional designers nonetheless sought to adapt the mixed-government bicameral form to new republican circumstances, and continued to believe that any advantage that bicameralism conferred on the policy process derived largely from house preferences that diverged from one another. While the legislators in most lower chambers are directly elected by the nation’s citizens (Tsebelis and Money 1997, 46), the selectors of legislators in
national upper chambers vary dramatically. Even when upper chamber legislators are directly elected by the people, they often officially represent subnational geographic or political units, like states in the U.S. Senate (ibid., 47). Overall, the large majority of upper chambers in national bicameral legislatures officially represent someone or some interest other than “the people” (ibid., 48-52). In these cases, as with the traditional form of “mixed government” bicameralism, the bicameral structure is used to accommodate the interests of (at least) two constituencies or interests that hold intrinsically divergent political interests. In discussing the merit of the federal bicameralism of the U.S. Congress, for example, James Madison commended “the dissimilarity in the genius of the two bodies” (1788, 379) because it implied that “No law or resolution . . . [would] be passed without the concurrence, first, of a majority of the people, and then of a majority of the states” (ibid., 378).

At the state level, however, recent historical scholarship has demonstrated that most U.S. states were constitutionally committed to apportioning both bicameral chambers on the basis of population since the Revolution of 1776. In the state constitutions drafted after 1776, state constitutional designers often self-consciously rejected the application of the British “mixed government” theory to U.S. states (Wood 1969, 197-255, Krumen 1997, 131-154, cf., Lee and Oppenheimer 1999, 27-29). In his study of the Revolutionary-era development of state-level bicameralism, Krumen concludes that “Americans of the founding era rejected the notion that the senate should represent property and the house, persons” (1997, 153) and notes that most of the original state bicameral legislatures did not represent geographic units in their upper legislative chambers (ibid., 153-54).
But by representing the same set of electors – all voters – in both houses of a legislature, Revolutionary-era constitutionalists needed to appeal to a rationale for bicameralism other than the “mixed government” theory they had learned from Britain, but had rejected for their new state legislatures. After all, while it is clear that aristocrats or states may have interests distinct from the “people,” and thus the mutual veto of bicameral chambers would promote social or political consensus on enacted legislation, the mixed government rationale does not apply to a bicameral legislature in which the interests of all the people are ostensibly represented in both of the houses.

This problem was explicitly recognized by the state constitutionalists of the era. Thomas Jefferson, for example, complained about the proposed structure of the Virginia state senate because, “being chose by the same electors” it was “too homogenous with the house of delegates.” For Jefferson, second legislative chambers were not useful unless they “introduce[d] the influence of different interests or different principles” relative to the first chamber (1784/1987, 365). Summarizing the state-level debates during this era, historian Wood concludes that, because state constitution-makers insisted on republicanizing both legislative chambers, the “homogeneity of [social] orders” in the U.S. resulted in “two homogenous branches” in state bicameral legislatures (Wood 1969, 237, cf., 214-244). Wood concludes, “The people in the new states seemed to be electing the same kinds of persons to both houses of the legislatures, thus creating a homogeneity of interest between the two branches and destroying the purpose for instituting a mixed polity” (ibid., 216, emphasis added, cf., Kruman 1997, 145).

This worry that republicanizing both chambers of a bicameral legislature made the house preferences too “homogeneous” (or too “congruent” in the modern
terminology) for the second house to be of any benefit was picked up again by the
Progressive-era’s unicameral movement. For example, during the successful unicameral
initiative campaign in Nebraska, political science Professor John Senning advanced the
familiar argument that republican bicameralism lacked a justification because the
chambers do not represent conflicting interests in the way that they do in mixed
government regimes:

The two houses are still defended as checks and revisory bodies, but how
can one house bring another viewpoint to bear on a bill when they are
made up of members elected by the same people, members that are
representative of the same districts and elected on the same qualifications?
Check and revision are impossible, both houses only tinker. Couldn’t one
house of the same representation, in one deliberation . . . be more effective

Similarly, in his speech opening the 1934 Nebraska unicameral initiative campaign,
Progressive U.S. Senator George Norris, the leading unicameralist of his day, argued the
irrelevance and costliness of second legislative chambers in republican political systems:

The qualifications of members of both branches of our State legislature are
exactly the same. They represent exactly the same idea. The official duties
they are to perform are of exactly the same nature. Why should we then
have two bodies instead of one, and burden our taxpayers with the
necessarily increased expense, to attain the object that can be fully attained
by one house instead of two? (1934, 3277)

Some modern scholars have also echoed this complaint about republican bicameralism.
For example, Buchanan and Tullock develop a model showing that dividing the
population into separate groups and having each elect a separate house of a bicameral
legislature can increase the size of popular majorities supporting enacted legislation.
From their analysis they conclude that “unless the bases for representation are
significantly different in the two houses, there would seem to be little excuse for the two-
house system” (1962, 236).
While allocating the selection of legislators in each bicameral house to different sets of electors has been an historically important means of guaranteeing that bicameral chambers have different house preferences, there are a number of other mechanisms that constitutional designers have used to induce house preferences to diverge. After requiring in *Reynolds v. Sims* that the state legislative districts for both legislative chambers be proportioned equally on the basis of population, the U.S. Supreme Court then felt it necessary to answer the criticism that its decision would render state bicameralism “anachronistic and meaningless” because the two chambers would be too similar (*Reynolds v. Sims* 1964, 576). The Court responded by listing ways in which states could still constitutionally induce divergence in the preferences of bicameral chambers:

One body could be composed of single-member districts while the other could have at least some multimember districts. The length of terms of the legislators in the separate bodies could differ. The numerical size of the two bodies could be made to differ, even significantly, and the geographical size of districts from which legislators are elected could also be made to differ. . . . [T]hese and other factors could be . . . utilized to engender differing complexions and collective attitudes in the two bodies of a state legislature, although both are apportioned substantially on a population basis (ibid., 577).

Of course, the assumption that the Court shares with its critics on this point is that bicameralism *would* lack a guiding rationale if the two chambers had similar “complexions and collective attitudes” (ibid.). The Court simply claims that there are other means available to states by which to induce differing “complexions and collective attitudes” without having to violate the one-person, one-vote rule laid down in *Reynolds*. More recently, political scientist Eugene Declercq motivated his study of inter-house differences in American state legislatures by similarly claiming that interhouse institutional variation is “a necessary (albeit not a sufficient) condition for maintaining
bicameral legislatures” (1977, 775) and that “[t]he case for unicameralism becomes substantially stronger if one can find little empirical distinction between the two houses” of state legislatures (ibid.). A simple spatial argument can motivate the point (see Figure 1).

A related argument focuses less on the social agreement necessary to pass laws when bicameral chambers represent different interests or social estates and focuses more on the idea that with two legislative thresholds to pass rather than one, bicameralism deters statutory output. James Madison, for example, argues in *The Federalist* No. 62 that in creating a bicameral Congress, the U.S. Senate would provide a “check on legislation” and so would decrease the “excess of law-making” (1788/1963, 378) that results in the number of “laws be[ing] so voluminous that they cannot be read” (ibid., 381).

Madison wanted to make legislation more difficult to enact and so endorsed bicameralism as an institution that would deter successful legislative activity. In contrast, many Progressive-era politicians wanted legislatures to enact more legislation, and so opposed bicameralism as an impediment to statutory production. This argument underlay the unicameral movement of the early 20th century. Progressive political scientist Lester B. Orfield, for example, complained that “[T]he present system results in too much check and balance. For every poor measure that may be defeated under the bicameral system, it is likely that two or more good measures fail” (1935, 32). Similarly, Progressive U.S. Senator George Norris of Nebraska, the leading unicameralist of his day, criticized bicameralism because “special interests, corporations, and monopolies” find it easier to “prevent legislation” with two chambers than they would with only one (1935, 54).

That bicameralism deters legislative output relative to unicameralism is also
conventional wisdom among political scientists. Stouffer, Opheim and Day, for example, write:

[T]here are some drawbacks [to bicameral legislatures]. Although careless or stupid action is less likely, wise or sensible action is more difficult to accomplish. These days the biggest problem in modern legislative bodies is slowness or inability to act. The passage of bills is a slow, often tortuous procedure made even more complex by having two houses (1991, 306).

Grumm and Murphy argue similarly:

A fundamental problem with American legislatures at the state and the federal levels has been bicameralism. This is the problem of having two houses, each of which serves as a check on the other. . . . Even if the two houses in a legislature were chosen in the same way . . . the legislature as a whole could still be stifled in performing its functions. Bicameralism adds to the separation of power and to the checks and balances within the system. . . . It could be argued that it is twice as hard to get legislation through a bicameral legislature as a unicameral one (1991, 121).

Hill and Mladenka write similarly that “The existence of two houses has one clear effect on the lawmaking process, however. It makes the process of passing new legislation more difficult because of the additional number of hurdles” (1992, 156). Rohde and Spaeth also reflected the conventional wisdom when they observed that “the bicameral character of Congress makes the passage of legislation considerably more difficult than if Congress were unicameral.” (1976, 71) Adrian and Fine similarly observed that “opportunities for preventing the passage of legislation . . . expand with bicameralism (1991, 311).” And Levmore summarized (and endorsed) the conventional wisdom in his 1992 study of bicameralism:

It is easy and even, perhaps, historically correct to think of bicameralism as designed to stall or stop legislation. There will almost surely be less government intervention, less hasty legislation, and more preservation of the status quo if proposals must pass two hurdles rather than one (1992, 151).

Tsebelis and Money also invoke Madison (1997, 28-29) and conclude their modern social
choice analysis of bicameralism by noting that, given their results, support for or opposition to bicameralism is simply a proxy for whether one generally supports or oppose the status quo’s statutory regime:

[A]nalysts who dislike the status quo will be in favor of institutions that promote change, and analysts who like it will prefer institutions that tend to preserve it. Strong bicameralism (where both chambers have veto power) is one such institution (218).

The argument here is seemingly obvious and straightforward: A single legislative chamber enacts $N_u$ policies. If a second chamber is added to the process then only a certain proportion, $p$, of the bills approved by the first chamber will also be enacted by the second chamber, therefore the number of laws enacted by a bicameral legislature will be weakly less than the number of laws enacted by a unicameral legislature, $p \in [0,1]$, $pN_u \leq N_u$.

But while simple and obvious, the answer is also obviously wrong, as I showed in Rogers (2003). Initially define:

1. $N_u =$ # of bills enacted by a unicameral legislature for a given jurisdiction.
2. $N_B =$ # of bills enacted by a bicameral legislature for the same jurisdiction.

Of course, in the U.S., each chamber of a bicameral legislature may originate legislation as well as block the other chamber’s legislation. The number of bills enacted by a bicameral legislature thus depends, first, on the number of bills each one of the bicameral chambers originates and passes, and, second, on the number of those bills that are subsequently also passed by the other chamber. For the bicameral legislature, define:

3. $N_i =$ # of bills passed by chamber $i$ and sent to chamber $j$, $i, j \in \{1,2\}, i \neq j$.

Also define,
(4) \( p_i = \% \) of bills originating in and passed by chamber i that are also passed by chamber j, \( i, j \in \{1,2\}, i \neq j \).

The \( p_i \)'s are referred to as the “interchamber passage rates.” The total number of laws that the bicameral legislature enacts is then the sum of the number of bills originating in and passed by each respective chamber that are also passed by the other chamber, or:

(5) \( N_B = p_1N_1 + p_2N_2 \).

Simply from inspecting equation (5) it is clear that whether bicameral legislative volume is less than unicameral volume, \( N_B < N_U \), depends as a theoretical matter on more than the mere existence of the second chamber. Whether the addition of a second chamber increases or decreases legislative volume depends on the legislative production of each chamber, \( N_i \), and on the rate at which the other chamber rejects the originating chamber’s legislation, \( p_i \). The impact of a second chamber on legislative production is clearly more complicated than that of simply adding a “veto player” to the legislative process. Just as important is the fact that each of the two acoustically-separated chambers can also initiate legislation. This more dynamic picture of the dimensionality of the legislative policy space carries with it different implications for the impact that a second chamber might have on legislative production. To be sure, in the type of “strong bicameralism” practiced in U.S. legislatures, both chambers hold a veto over legislation initiated by the other chamber. At the same time, however, each chamber also serves as a platform from which policy entrepreneurs can originate legislation for consideration by the other chamber. With two sets of legislators working in large measure independently of each other, it is certainly possible that some of the legislation originating in one of the two chambers would not have been conceived of, let alone enacted, by the other chamber.
legislating alone. Thus, any conclusion regarding the net effect of second chambers on legislative production must take into account not only the effect of the second chambers’ veto power, but also the effect of the second chambers’ origination power.

A third argument for bicameralism is that consideration of legislation by two chambers produces informationally superior policies relative to unicameralism. There are two different forms of this argument as well. The more traditional argument is that if bicameral legislatures are structured so that “upper” chambers are composed of wiser legislators relative to “lower” chambers, then the second chamber can check or deter the enactment of rash or imprudent legislation that would have been enacted by the first chamber if legislating alone.

Madison, for example, in addition to arguing that the six-year term for U.S. senators will decrease the mutability of legislation, also argues that the six-year term will permit senators to develop a better “acquaintance” with legislation and that because of their greater expertise relative to House members, the addition of the Senate will result in the production of better legislation than would occur if the House were legislating alone. Tsebelis and Money show that this argument for reserving second chambers for those with “experience and wisdom” dates at least back to the Greeks. They identify institutional requirements that would encourage the development of expertise and wisdom on the part of upper chambers, including “higher age minimums for the upper chamber than for the lower chamber and selection criteria that involve some evaluation of expertise” (1997, 40). Nonetheless, the argument that one bicameral chamber will be composed of legislators with more “experience and wisdom” than those composing the other chamber is not without its problems as a justification for bicameralism: If one
chamber is always wiser and more expert than the other chamber, why not simply let it
draft and enact all the legislation and dispense with the less wise, less expert other
chamber? Or, in the alternative, if the imposition of certain institutional rules and
requirements would encourage the attainment of wisdom and expertise for one bicameral
chamber, why would a constitutional designer not also impose the same requirements on
the other chamber so that its legislators would be just as wise and expert?

There is a second informational justification advanced for bicameralism, one that
does not depend on one chamber being superior to the other. Tsebelis and Money
observed:

[T]he mere presence of a second legislative chamber creates the
possibility of quality control in the modern sense. Quality control
rests on two ideas. The first is preventive: knowing that someone
else will examine the product makes the producer more careful
initially. Second, there is a system to discover mistakes after they
have been committed. A second chamber, regardless of its level of
expertise and wisdom, constitutes such a quality-control mechanism
(1997, 40).

This rationale points to the informational interaction of the two chambers as the possible
basis for a bicameral advantage.

Over 200 years before, James Wilson – one of the original Supreme Court justices
and, before that, a leading critic of Pennsylvania’s unicameral legislature – advanced a
similar informational argument for bicameralism, one derived not from the superiority of
one chamber relative to the other, but from the informational interaction of acoustically
separated chambers. He summarized this rationale for bicameralism in his 1791 Lectures
on Law:

[Many] reasons . . . may be assigned, why all the advantages, to be
expected from two branches of a legislature, may be gained and preserved,
though those two branches derive their authority from precisely the same
source. . . [These include a] double source of information, precision, and sagacity in planning, digesting, composing, comparing, and finishing the laws, both in form and substance (1791/1987, 378, emphasis added).

Wilson’s reference to both chambers “deriv[ing] their authority from precisely the same source” is a reference to the republican bicameralism developing in U.S. states in which all of the state’s voters participated in electing both houses of the state legislature. As Wood writes, “The homogeneity of interests between the two houses . . . promoted by Wilson was precisely the deficiency of the American mixed governments that men like Jefferson and Madison were worried about” (Wood 1969, 248). In contrast to many of the other founders, who believed that bicameralism could be advantageous only if the preferences of the two houses were significantly different, Wilson argued that a second chamber would be advantageous even when – or especially when\textsuperscript{14} – it held the same preferences as the first chamber (ibid., 247-48, 556). More recently, in striking down the unicameral legislative veto in \textit{INS v. Chadha}, the U.S. Supreme Court identified the acoustic separation of the two congressional chambers, and the informational implications that follow from that, as an important source of the value of congressional bicameralism: “The division of the Congress into two distinctive bodies assures that the legislative power would be exercised only after opportunity for \textit{full study and debate in separate settings}” (1983, 962, emphasis added). Rogers (2000) formalized and extended this argument.

Rogers’ (2000) argument depends on both chambers being informed on policy outcomes, implicitly assuming that informational costs were lower than the expected contribution of the additional information to legislator welfare. While that is possible, it is also possible that legislators in one chamber free ride on the costly informational
efforts of legislators in the other chamber. (These could be efforts in committees; the argument does not require that an entire chamber of legislators attend to specific pieces of legislation.)

Rogers (1998) allowed chambers endogenously to acquire (costly) information and sequence themselves. There were certain parameters in which both chambers acquired information and certain parameters in which only one chamber acquired information (and the other chamber then allowed it to move first in the legislative sequence). Rogers (1998) focused on pure-strategy sequential decisions. In this set up, bicameral legislative outcomes were informationally never worse than unicameral outcomes, and Rogers (2000) showed that sometimes bicameral outcomes could be better than unicameral outcomes.

The very simple model developed here shows, however, that a mixed-strategy equilibrium to a bicameral game results in legislative outcomes that are informationally worse than legislation produced by a unicameral legislature. I now turn to that analysis.

II. A Simple Model of the Informational Pathology of Bicameralism

The model developed here is very simple. I first develop a unicameral baseline with which to compare the bicameral outcomes. There are two actors in the unicameral baseline case – the legislature and the public. The unicameral chamber and the public (and the second chamber as well) share common state-contingent preferences over the outcomes. These are described by:

2.1

$$\Pi = u(l = A|s = A) = u(l = B|s = B) > u(\emptyset|\bullet) = 0 > u(l = A|s = B) = u(l = B|s = A) = -\Pi$$

where $$P \in R_+$$ . Adopting law A in state A (law B in state B, resp.) is better than adopting
no bill, which is better than adopting law A in state B. The unicameral legislature can inform itself at cost c regarding the true state of the world. If it does, then it knows the true state of the world with probability 1. If the legislature does not choose to become informed, then state A (resp. state B) occurs with probability 0.5, and the expected payoff to the chamber is zero. The result for the unicameral legislature is obvious:

**Baseline Result: The Unicameral Chamber becomes informed for \( \Pi - c > 0 \).**

The bicameral model is now specified. There are, of course, now two chambers and the public. The two chambers can move simultaneously or sequentially, but even if sequentially, need not pay attention to action in other chamber. The effect of the “acoustic separation” of the chambers, to the extent that it is correct, is that the chambers do not need to move simultaneously effectively to behave as though they were moving simultaneously, i.e., that they do not know what occurred in their other chamber outside of the bare text of the proposal they receive from the other chamber. The simple game is shown in Figure 2.

For the bicameral legislature there are three equilibria, two pure-strategy equilibria (U,I) & (I,U), and one mixed-strategy equilibrium. Costly information creates incentive to free-ride on informational investment of other chamber. In mixed-strategy equilibrium the first chamber becomes informed with probability p and the second chamber becomes informed with probability q. In equilibrium, each chamber becomes informed with probability

\[
p = \frac{\Pi - C}{\Pi}, \quad q = \frac{\Pi - C}{\Pi}.
\]

The payoff to the public in the mixed-strategy equilibrium is \((p + q + pq)\Pi\). Recall that the payoff to the public with the unicameral legislature is \(\Pi\). It follows immediately that
\[ \Pi(p + q + pq) < \Pi \text{ for } p, q \in (0,1). \]

Therefore the public is worse off with bicameral legislature than with unicameral legislature in the mixed-strategy equilibrium. Substituting the parameterized probabilities in for the mixed-strategy equilibrium, the social loss to the public of bicameralism relative to uncameralism in this equilibrium is:

\[ \Pi(p + q + pq) - \Pi = -\frac{C^2}{\Pi}. \]

**III. Discussion and Conclusion**

This result raises several questions and issues to think about. First, how significant are informational losses relative to informational gains? This requires some sort of empirical assessment of the incidence of pure-strategy equilibria relative to the mixed-strategy equilibrium. Scholars have had a notoriously difficult time developing systematic theories and measures for equilibrium selection.

Secondly, can or do bicameral chambers coordinate on the pure-strategy equilibria? Note that, in this game (and in Rogers 1998), even if bicameral chambers do coordinate, there is no gain for bicameralism relative to unicameralism in the pure-strategy equilibria, yet there remains a welfare loss in the mixed equilibrium. To be sure, there are informational gains if both chambers are informed and aggregate the information they have (Rogers 2000), but this result is undermined by incentives that legislators have in each chamber has to free ride on the informational efforts legislators in the other chamber (let alone incentives to free ride among legislators in the same chamber (Rogers 2002). Nonetheless, if information is cheap enough relative to the policy gains, then in aggregating information the chambers would generate a higher payoff, \( \Pi' > \Pi \),
when both chambers are informed (I,I). This possibility would offset the informational loss of the mixed-strategy equilibria.

The traditional rationale for bicameralism is that it fixes power for a social estate, class or caste, whether economic, political, or “expert.” All of these justifications are in tension with the republicanizing tendencies of modernity. This raises the question whether second legislative chambers are the appendix of the modern body politic, a largely useless appendage leftover from the needs of an earlier era. Informational or other process or efficiency rationales suggest that the bicameral process can generate better legislation even if the bicameral chambers are entirely congruent. The results presented here suggest that it is not yet clear whether bicameral processes generate a predictable net gain or a net loss to the policy process, independent of the substantive political preferences of particular political interests.
Figure 1. Spatial Argument that Bicameral Chambers

Median Voter in Unicameral Legislature

Convergence to unicameral outcome when the legislators in the two chambers are combined or if they represent the same electors
Figure 2. Simple Bicameral Information-Acquisition Game

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