Plausibility of Signals by a Heterogeneous Committee

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*K*rishna and Morgan propose "amendments" to two of Gilligan and Krehbiel's theoretical studies of legislative signaling. The new results for homogeneous committees do not significantly change the empirical expectations of prior works, but the results for heterogeneous committees contradict earlier claims. This note gives primary attention to heterogeneous committees and compares and contrasts the new and old equilibria and their empirical implications. The notion of signaling is somewhat nebulous in all such games but seems distinctly less plausible in the key Krishna-Morgan proposition than in previous legislative signaling games. Furthermore, the empirical literature on choice of rules—specifically, the finding of a positive relationship between committee heterogeneity and restrictive rules—is inconsistent with the Krishna-Morgan analysis but consistent with Gilligan-Krehbiel analyses, even though the former is informationally efficient and the latter are not.*

In "Asymmetric Information and Legislative Rules: Some Amendments," Vijay Krishna and John Morgan present nine propositions and two corollaries that extend the open, modified, and closed rule versions of the homogeneous and heterogeneous committees models introduced by Gilligan and Krehbiel (1987, 1988). The authors state: "Our results differ significantly from those of Gilligan and Krehbiel. Since our model and methods are identical, it is worth exploring the reasons for this discrepancy" (Krishna and Morgan 2001b, 436).

This comment is an attempt to assesses the substantive significance of the new findings. The issues that arise are due to multiple equilibria within this class of games. Short of applying explicit equilibrium refinements for signaling games, two factors can be considered when evaluating different sets of results: (1) the plausibility of equilibrium behavior in light of our knowledge of legislative politics, and (2) the empirical support for testable implications of the equilibria based on systematic data analysis. After briefly summarizing the new results, I will offer some remarks on plausibility and on empirical findings.

NEW RESULTS

Table 1 summarizes the results of Krishna and Morgan. Three observations are noteworthy. First, none of the findings allege that prior results are incorrect. Rather, the significance of the article rests on its identification of new equilibria. The key results are propositions 1, 3, and 8, which characterize equilibria that involve more information transmission (i.e., less residual uncertainty) than their respective structurally identical games in Gilligan and Krehbiel (1987, 1988).

Second, approximately half the new results pertain to homogeneous committees. For these committees, the implications for the choice of rules are not qualitatively different from those in previous studies.[1] In fact, the Krishna and Morgan closed rule equilibrium partitions the random variable space more finely than does that of Gilligan and Krehbiel, and the open rule equilibrium and expected utilities are unchanged. These two facts actually strengthen the original informational rationale for restrictive rules.

Third, the new results for heterogeneous committees have empirical implications that contradict those of earlier works. According to the Krishna-Morgan analysis, if committees are heterogeneous, the legislature will always choose to employ open or modified rules rather than closed rules. The reason is simply that, in the more recently identified equilibria, open or modified rules provide a more hospitable setting for credible information transmission than do closed rules. The remainder of this note focuses on this implication, which, as can easily be seen in Table 1, rests fundamentally on proposition 1.

PLAUSIBILITY OF SIGNALS

Krishna and Morgan's proposition 1 identifies an equilibrium in which the floor median voter can infer perfectly the committee members' private information. In the open rule case, the median voter is free to modify the bill so that the realized outcome equals her ideal point. Similarly, in the modified rule case, the median voter chooses the bill offered by the first committee member, and this bill results in an outcome identical to that in the open rule case. As such, the distributional and informational properties could not be better from the perspective of the legislature's median voter.[2]

The proposition 1 equilibrium is technically correct,

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[1] See Gilligan and Krehbiel 1987 for propositions and proofs and Krehbiel 1991, chapter 3, for a more general, nontechnical summary.
[2] An important caveat is that specialization is not endogenous in the Krishna and Morgan analysis, as it was, for instance, in Gilligan and Krehbiel (1987, 1990, 1997). A largely unexplored area of inquiry, therefore, is whether—or the conditions under which—members of a heterogeneous committee would specialize if there were no distributive benefit for doing so. Clearly, the cost of specialization would have to be exceeded by the benefits to the committee of uncertainty reduction. Krishna and Morgan (2001b) take some modest steps in assessing the incentives for heterogeneous commit-

TABLE 1.   Summary of the Krishna and Morgan Results

Number	Content	Rule, Committee	Signaling	Summary, Comments
P1	Characterization of equilibrium	Open, Heterogeneous	Separating	This equilibrium is maximally informationally efficient and, thus, yields greater utility than the corresponding Gilligan and Krehbiel equilibrium (1988, prop. 1).
C1	Preferences over equilibria	Open, Heterogeneous		The equilibrium in proposition 1 is unanimously preferred to all other open rule equilibria.
P2	Inescapable inefficiency	Closed, Heterogeneous	Pooling	All closed rule equilibria involve some pooling and, thus, involve some informational inefficiency.
P3	Characterization of equilibrium	Closed, Heterogeneous	Pooling	The equilibrium in proposition 3 is more efficient than the corresponding Gilligan and Krehbiel equilibrium (1988, prop. 3).
P4	Comparative informational efficiency	Closed, Heterogeneous		Krishna and Morgan's proposition 4 is the most efficient equilibrium of its type.
P5	Identical equilibria	Open and Modified, Heterogeneous	Separating	The proposition 1 equilibrium for the open rule is always an equilibrium for the corresponding modified rule game, too.
C2	Inescapable inefficiency	Open, Homogeneous	Pooling	All closed rule equilibria involve some pooling and, thus, are inefficient.
P6	Expected utilities in equilibrium	Open, Homogeneous	Pooling	This was also derived and noted in Crawford and Sobel (1982) and Gilligan and Krehbiel (1987).
P7	Inescapable inefficiency	Closed, Homogeneous	Pooling	All equilibria with homogeneous committees and a closed rule involve some pooling and are thus inefficient.
P8	Characterization of equilibrium	Closed, Homogeneous	Pooling	This equilibrium is more efficient than the corresponding Gilligan and Krehbiel equilibrium (1987, prop. 5).
P9	Comparison across rules	Open and Closed, Homogeneous	Pooling	Conditions are identified under which the closed rule is more efficient than the open rule.

but how well does its comport with actual legislative behavior? Some simple but substantive examples indicate that the combination of beliefs and behavior in the equilibrium are somewhat implausible.[3] Specifically, suppose a heterogeneous committee's jurisdiction includes authorizations for spending on military armaments and personnel. At the start of a budget cycle (or, analogously, at the beginning of the game), members of Congress are uncertain about the extent to which various areas in the world constitute threats to U.S. national security. Committee members and their staffs, therefore, engage in information gathering. For example, they hold hearings, attend secret briefings, and generally work to estimate the magnitude of the threat to national security in various hot spots throughout the world. The tangible product of these specialization efforts is a policy recommendation to the legislature as a whole. In this context, the random variable, ω, can be

interpreted an indicator of national security. The lower is ω, the greater is the need for defense spending (relative to other possibilities), and vice versa. Within this framework, and depending on the value of ω, two and only two cases emerge.

Case 1

Consider any play of the game in which the committee members learn that the sum total of international threats constitutes a security level such that ω lies on or between 0 and $1 - 2x_c$.[4] For any such state of the world, the equilibrium stipulates that the first committee member, a relative hawk,[5] proposes $b_1 = -\omega$. As noted

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tees to obtain information near the end of their article (see also Gilligan and Krehbiel 1997).
[3] Similar objections can be raised for nearly any signaling model, including those of Gilligan and Krehbiel, so "plausibility" is necessarily subjective and relative. Comparisons are introduced as the discussion proceeds.

[4] See Figure 1 in Krishna and Morgan for a graphic depiction of the equilibrium on which the following discussion is based.
[5] Following Epstein (1998), Krishna and Morgan refer to the first committee member as the "majority" and the second committee member as the "minority." This interpretation, which was not the intention of the original model, suggests that one committee faction is larger than (and therefore can outvote and be more influential than) the other. By extension, the partisan interpretation suggests that the legislature's median voter is a member of the majority party and that, given these partisan references, behavior itself may be

above, this proposal accommodates perfectly the median voter in the legislature because, when she accepts it, as she does in equilibrium, the resulting outcome is her ideal point.

Meanwhile, the second committee member, c_2, a relative dove, offers the proposal $b_2 = -2x_c - \omega$, which is exactly $2x_c$ lower than b_1. The magnitude of this difference in proposals is the same as in the Gilligan-Krehbiel "confirmatory signaling" equilibrium. To make this interval confirmatory, however, Krishna and Morgan's dove must make a proposal that, if it were to be adopted, would provide for considerably less spending than even the dove regards as ideal. So, although the committees are analytically symmetric in all exogenous respects, their derived behavior is not symmetric in the Krishna-Morgan equilibrium. Committee member 1 always caters to the chamber median (here and in case 2 below), whereas committee member 2 (in this case but not the next) oddly confirms the signal by, in effect, understating his preferences by a factor of 2.

Extension of the exercise to the broader political arena is also instructive. Obviously, the dove's proposal, if it were put to a vote on the floor, would be resoundingly defeated. The dove knows this, of course, but might rationalize it within a larger game of politics with reference to the value of position taking (Mayhew 1974).[6] Unfortunately, the requisite rationalization is flimsy because, regardless of whether the proposal is subjected to a knowingly futile vote, the dove's constituents will be unhappy on position-taking grounds. Upon learning the value of ω—as they will if, indeed, the Krishna-Morgan equilibrium is separating—constituents will view their elected representative as having squandered an opportunity to offer a proposal that may have been taken seriously. Instead, the dove crafted a futile proposal that even the somewhat outlying constituents regard as overly extreme on their own side of the spectrum. Accordingly, the dove will find it difficult to explain to constituents the logic of this distinctively asymmetric form of confirmatory signaling.

Confirmatory signaling in the Gilligan-Krehbiel open and modified rule equilibria is different. First, committee behavior is symmetric. Second, the signaling that occurs in equilibrium seems compatible with electoral realities. Specifically, under the modified rule,

when the realization of ω is extreme relative to the committee's preference extremity, each committee member proposes the bill that results in the floor median voter's ideal point. This form of confirmatory compromise is common in politics and seems relatively easy to explain to constituents; for example: "We needed a compromise to pass a bill, so we met the opposition half way." Similarly, under the open rule, each committee member proposes the bill that, if passed, results in his or her respective ideal point. This form of confirmatory position taking also seems easy to explain to constituents: "We gave it our best shot, but the votes just weren't there for the proposal we liked best. Eventually, the House opted for a compromise amendment."[7] In total, these factors seem to confer a comparative advantage to the Gilligan-Krehbiel equilibrium over the Krishna-Morgan equilibrium in terms of plausibility.

Case 2

If the state of the world is above the threshold ($\omega > 1 - 2x_c$ and ≤ 1), the prescribed behavior in the Krishna-Morgan equilibrium is, if anything, more peculiar than in case 1. For substantive motivation, suppose that during secret briefings, the CIA reports an unexpectedly large reduction in anti-U.S. terrorist threats and activity throughout various hot spots, which indicates that the U.S. national security level is somewhat greater than all legislators' prior estimates.

The behavior of the first committee member is identical to that in case 1. He again proposes the bill whose realized outcome equals the floor median voter's ideal point, namely, $b_1 = -\omega$.

In contrast, the behavior of the second committee member is unusual, not only relative to that in case 1 but also and especially relative to the first committee member's behavior. In substantive terms, the equilibrium stipulates that the dove must now behave as if he were a superhawk: $b_2 = 2x_c - \omega$. Like the proposal strategies in case 1, this strategy and that of the other committee member are not symmetric, and, again, the latter is difficult to explain. The substance of the dove's proposal is best revealed with the hawk's proposal as a reference point. Although the hawk's bill results in the median voter's ideal point, which is x_c less than the hawk wants, the dove's proposal adds $2x_c$ to the hawk's proposal. In other words, the dove's proposal, if adopted, would result in a policy that is twice as great as the hawk's ideal point.

To suggest that this action puts the dove in an electorally awkward position is to understate the obvious. Yet, such behavior is technically rational because, in effect, the analyst is free to impose beliefs on the floor median voter, subject to Nash behavior in other

"partisan," in the sense of cohesion independent or in spite of preferences. In other words, these partisan interpretations are slippery slopes to an interpretation of the results as involving cooperative behavior. Because these are unquestionably noncooperative theories, such interpretations should be resisted. I therefore refer to "committee members 1 and 2," who are identical in terms of moves within the game form, with the exception of the closed rule case, in which the first member proposes, and the second member only makes a speech.

[6] Technically, Mayhew-like position taking is inconsistent with the cheap talk assumption of the open rule model. If a player cares about positions apart from consequences, then signals are not costless or, more specifically, payoffs are not independent of signals. To reject a theory on the basis of the possible falsity of one of its many assumptions is harsh, however. All theories simplify reality at the level of assumptions, but many predict well in spite of assumptions that deviate from reality. This discussion should be viewed as subjective but suggestive about whether the Krishna-Morgan or Gilligan-Krehbiel equilibria are likely to predict well.

[7] For moderate values of ω, both committee members send noisy signals. See Gilligan and Krehbiel (1988, 472–3, n. 12) for several possible interpretations of "pooling." There is no firm consensus on this issue, but for present purposes it suffices to think of pooling as a statement such as: "We disagree with one another on what should be done." The median voter's reaction to noisy signals is discussed below.

respects. Given this freedom, a plausibility check on the inferential processes that might culminate in such beliefs seems in order. This, too, is subjective but nevertheless suggestive. The issue is: What would a reasonable floor median voter infer upon seeing various pairs of committee bills? (To address it, I take as given that the first committee member proposes $b_1 = -\omega$, as discussed above.)

If the median voter observes a dove's proposal that provides for much more defense spending than the hawk's proposal, common sense suggests that she might think: "The dove must have learned about a dreadful threat to our national security. He would never advocate such high spending otherwise, so I should pass it."[8] Such reasoning is inconsistent with the beliefs Krishna and Morgan incorporate, however. In their proposition, the floor median voter's thinking has to be something like this: "Proposing an outlandishly large amount of expenditures is just the dove's eccentric way of confirming that we have a high level of national security, so I'll go with the hawk's more dovish proposal." Clearly, the leverage of the Krishna-Morgan equilibrium comes from the stipulation that, however odd it may seem, the floor median voter, upon seeing two proposals in which the dove's is twice as hawkish as the hawk's ideal point,[9] will infer that the hawk's proposal is perfectly in the floor median voter's interest.[10]

EMPIRICAL FINDINGS

It is not inconceivable that legislators' actions and thoughts approximate those of the players in the Krishna and Morgan game, but evidence of this possibility is needed. The above illustrations sharpen the focus on three corresponding questions. Stated more generally than in the cases of defense policy, the questions are as follows.

- Case 1: How often do liberals make proposals much more liberal than even their liberal constituents want? Conversely, how often do conservatives make proposals much more conservative than even their conservative constituents want?
- Case 2: How often do leftist committee members generate proposals twice as rightist as those rightist members? Conversely, do rightists' proposals regularly outflank those of leftists?
- Both Cases: If and when the proposal behavior of high-specialization committees takes on the above properties, do uninformed moderate legislators know exactly how to make sense of committee members' ostensibly peculiar proposals?

If the empirically informed answers to these questions are approximately "often, often, and yes," then advocates of the Krishna-Morgan amendments to legislative signaling theories should be willing and able to come forth with corroborative empirical analysis. If the answers are approximately "rarely, rarely, and no," then, in spite of the superior informational properties of the Krishna and Morgan equilibrium, it seems unlikely that the amended results from the heterogeneous committees model will provide better predictions than the original set of models and results.

In either case, the questions underscore the fact that the suggestions about the comparative plausibility of behavior in Krishna-Morgan and Gilligan-Krehbiel equilibria are ultimately empirical issues. Fortunately, a comparative assessment can be found in studies that derive and test the comparative-statics implications of the equilibria. The key question is whether systematic data analysis reveals a positive or a negative relationship between the heterogeneity of committees and the likelihood their proposals will receive restrictive rules. Among previous studies, none consistently produces the negative relationship that the Krishna-Morgan analysis predicts.[11] In contrast, some studies consistently report empirical findings opposite those predicted by the Krishna-Morgan equilibria but consistent with the Gilligan-Krehbiel comparative equilibrium results (see Krehbiel 1991, 1997). An important qualification, however, is that the measures in these studies are weak. As such, the received wisdom about choice of rules is not as solidly grounded as one would like.

CONCLUSION

This brief comment cannot address all facets of the Krishna and Morgan extensions to informational theories of legislatures, but the focus on proposition 1 covers a large fraction of the authors' substantively significant results.[12] The main new result—corollary

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[8] Although this reasoning seems sensible in isolation, it begs the question of how the uninformed median voter can make sense of the hawk's seemingly soft proposal. In the Gilligan and Krehbiel equilibrium, when these kinds of puzzles arise for moderate ω, the answer is intuitive: She cannot make sense of the proposals, so she infers—with noise—that the national security threat is moderate, because, after all, hawks and doves are in disagreement. In the presence of the resulting uncertainty, the median voter simply and plausibly selects the policy that expectationally yields her ideal point. This is where and why the Gilligan-Krehbiel equilibrium entails informational inefficiency and the Krishna-Morgan equilibrium does not. In the former case, the median voter responds to noisy or implausible signals with a best guess; in the latter case, the median voter responds to peculiar pairs of proposals and knows exactly what they mean about the state of the world.

[9] "Hawkishness" here is implicitly parameterized as x_c, the degree to which the hawk's ideal point deviates from that of the floor median voter $x_f = 0$.

[10] In subsequent communications, Krishna and Morgan (2001a) amend their original amendment (proposition 1A), which under somewhat modified assumptions has the same outcome as proposition 1 for all states of the world but which has more plausible signals in terms of the above discussion. A detailed response is not possible under the circumstances, but it is easy to see that the floor median voter's belief structure and behavior off the equilibrium path are very complex. This comment confines attention to the published work (2001b), but I nevertheless note that Krishna and Morgan's position is that the plausibility objections raised here regarding signaling apply "with equal force" to both sets of models.

[11] In six equations estimated, Dion and Huber (1997) find a negative effect twice, but in both instances the coefficient is not statistically significant.

[12] For example, although I have not addressed the Krishna-Morgan statements about incentives, it suffices to note that such claims, like propositions 2–9 and corollaries 1 and 2, either do not deviate

2—follows directly from proposition 1, which suggests that distribution and efficiency are not in conflict after all. If this were true not only as a theoretical possibility but also as a practical matter, then many central problems of legislative organization—including committee composition, specialization, and choice of procedures—suddenly become trivial. Why, for instance, would we ever observe anything but heterogeneous committees and modified or open rules? In contrast, if the theoretically stipulated behavior in cases 1 and 2 above is not common in practice, then the existing view of legislative organization as one of managing the tension between distributive benefits and informational efficiency remains viable.

Aside from proposition 1 and the results that depend on it, the Krishna and Morgan results are aptly summarized as complementary extensions of the Gilligan-Krehbiel analysis that are based on more informative equilibria than previously identified. These theoretical contributions are interesting and useful, but they do not significantly change the qualitative predictions that were tested with some success in *Information and Legislative Organization* (Krehbiel 1991). Indeed, the Krishna-Morgan homogeneous committee equilibrium was corroborated before it was derived.

More generally, the amendments that Krishna and Morgan propose are of two distinct types: (1) complementary, reinforcing, and, thus, friendly, or (2) seemingly implausible and contrary to extant systematic data on legislative rules and heterogeneous committees. Although all the new results provide food for thought, the friendly amendments are distinctly more palatable than propositions with implausible signaling. I concede, however, that plausibility of signals is an eye-of-the-beholder standard and, therefore, reiterate a less objectionable claim: The new heterogeneous committee results do not account for congressional choice of rules as well as the old results, even though the new dominates the old in terms of informational efficiency.

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qualitatively from those of Gilligan and Krehbiel or do not survive without the implicit backing of proposition 1.

Additional food for thought follows. Given that multiple equilibria in signaling games are common, and assuming that the objective of theory is to predict and explain actual behavior, then perhaps plausibility of signals is a more promising concept on which to build equilibrium refinements than is informational efficiency. In any case, the surprising and thought-provoking results of Krishna and Morgan encourage us to continue to grapple with important issues in legislative organization, but to do so from empirical as well as theoretical perspectives.

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