Supporting Information for "Competing Gridlock Models and Status Quo Policies

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Extended Discussion of Competing Models

Spatial models of lawmaking yield precise predictions about legislative outcomes and the frequency of policy change. We consider a series of models that vary in their assumptions about the nature of party influence, comparing a non-partisan pivotal politics baseline against a set of hybrid pivot-plus-party models. Each hybrid model involves a distinct form of party influence, as we distinguish direct pressure on roll-call voting from agenda control, and further distinguish positive from negative agenda control. Formally, each model is a sequential game that represents a single-period of lawmaking for a single issue and assumes a uni-dimensional policy space where legislators' preferences over policy outcomes are single-peaked and symmetric, assigns key players agenda power or veto power, and posits the existence of a status quo policy. [1] Our approach follows Chiou and Rothenberg (2003) and Richman (2011) in considering combined pivots-plus-parties models, and the set of models we compare encompasses theirs. Indeed, three of the four models are identical to models considered by Chiou and Rothenberg (2003) while the fourth model draws from the cartel agenda model of Cox and McCubbins (2005).

The baseline model in our analysis is the *non-partisan pivot* (NP) model, following the theory advanced by Brady and Volden (2006) and Krehbiel (1998). Parties have no explicit role in the model, which instead emphasizes that supermajoritarian voting rules constrain policy change. In the theory, any legislator may make a proposal (so that proposal rights are diffuse) and in order to pass, proposals must have enough support to overcome both a

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[1] For ease of exposition, we assume a unicameral legislature in this section. In our statistical model and empirical analysis, we follow the implementation of Chiou and Rothenberg (2003), which allows for bicameralism. The differences between the unicameral and bicameral versions of the models are mainly technical and not substantively interesting.

Senate filibuster (requiring a 3/5 Senate vote) and a presidential override (requiring 2/3 of each chamber). Outcomes implied by these assumptions are equivalent to those in a model in which the *median legislator* makes proposals subject to the approval of the *filibuster pivot* and the *veto pivot*.[2] Specifically, status quo policies outside of the gridlock interval will be brought inside the interval as close to the median legislator's preferred policy as the pivots will allow.

The *party unity* (PU) model is a hybrid pivot-plus-party model with the strongest form of party influence, and in their analysis Chiou and Rothenberg (2003) find the greatest empirical support for this model. The model retains the pivotal politics assumption that lawmaking requires supermajority votes to overcome filibusters and stave off presidential vetoes but adds the idea that parties exert direct pressure on member behavior, such as roll-call voting (Cox and Poole 2002, Snyder and Groseclose 2000).[3] Such strong influence might be possible to the extent that parties can discipline their members through rewards and punishments (e.g., committee assignments, leadership positions, campaign funds, support for legislative proposals, or district-level spending). In the PU model, it is assumed that members of each party act identically to its median member in all aspects of the legislative process so that the only relevant preferences are those of the majority and minority party medians. The spatial locations of the proposer and pivots will depend on the size of the majority and the locations of these two partisan players rather than on the entire distribution of preferences. Because the floor median behaves identically to the majority party median, it necessarily follows that the proposer in the PU model is the majority party median. In most cases, the veto pivot is the median of the president's party while the filibuster pivot is the median of the the non-presidential party. However, the majority party median will control both pivots if either the party has a veto-proof majority (regardless of the president's party affiliation) or if the president's party has a filibuster-proof majority. In these latter two cases, the PU model predicts a complete absence of gridlock, but in general, the PU model involves majority party proposal power and minority party blocking power and predicts that status quo policies will be brought as close as possible to the majority party median's ideal point so long as the minority party median prefers it to the status quo.

The degree of party influence that the PU model posits is extraordinarily strong, especially because it involves influence on roll call voting—one of the most visible manifestations of legislative behavior. Interest groups analyze and publicize voting behavior, and votes at odds with constituents' wishes are often highlighted by challengers, meaning that voting with the party will be electorally costly for many members (Canes-Wrone, Brady and Cogan 2002) and party unity will be very costly to achieve. Indeed, there is little to no evidence in the roll-call voting literature that party influence is as strong as what the PU model entails (e.g., McCarty, Poole and Rosenthal 2001). Acknowleding the difficulty of achieving instances of party discipline, some theorists have proposed that parties exert a weaker—though still consequential—form of party influence through control of the legislative agenda (Cox and McCubbins 2005). Such control is possible to the extent that voters and

[2]We emphasize that the "median as proposer" assumption does not mean the median is actually a monopoly agenda setter. A model with a monopoly agenda setter is isomorphic to a model with an open rule without time constraints or delay costs, so the assumption should instead be viewed as an equivalent analytic simplification rather than as anything that is substantively meaningful.

[3]For critiques of this literature see Krehbiel (1993, 2003) and Smith (2007).

constituents pay less attention to policy proposals than they do to voting behavior. In our analysis, we distinguish between two distinct forms of agenda control.

In the *party agenda setter* model (AS), the majority party has positive agenda power but cannot influence its members' voting behavior. That is, it has a monopoly on proposal power (e.g., as if it operates under a closed rule), so like the PU model, the proposer in the AS model is the majority party median. But like the NP model, heterogeneity in legislators' preferences, both within and between parties, is consequential. There are two critical differences between the AS and PU models. First, the minority party is less influential. It cannot block policies opposed by its median member but supported by the veto or filibuster pivots (even if one of those pivots is a co-partisan). Second, the majority party cannot force the floor median to accept outcomes preferred by the majority party median that it would otherwise oppose. As a consequence, the AS model predicts gridlock to the extent that there is heterogeneity within the majority party, even when the majority is veto-proof or filibuster-proof.

The *party gatekeeping* model (GK) involves the weakest form of party influence in our anaysis, and we follow Cox and McCubbins (2005) in assuming that parties' primary means of influence is through negative agenda power (otherwise known as gatekeeping, e.g., Denzau and Mackay 1983). Specifically, we assume that the majority party can use its scheduling power to keep issues off of the legislative agenda, but once it puts an issue on the agenda it cannot prevent the floor median from making proposals (i.e., operates under an open rule) nor can it pressure members to vote with the party. Formally, the GK model adds a prior stage to the NP model in which the majority party median acts as a gatekeeper, first deciding whether to retain the status quo or to play the baseline pivotal politics game.[4] The resulting hybrid pivots-cartel model predicts a greater frequency of gridlock, but when policies pass in the GK model they are the same as what would pass in the NP model.

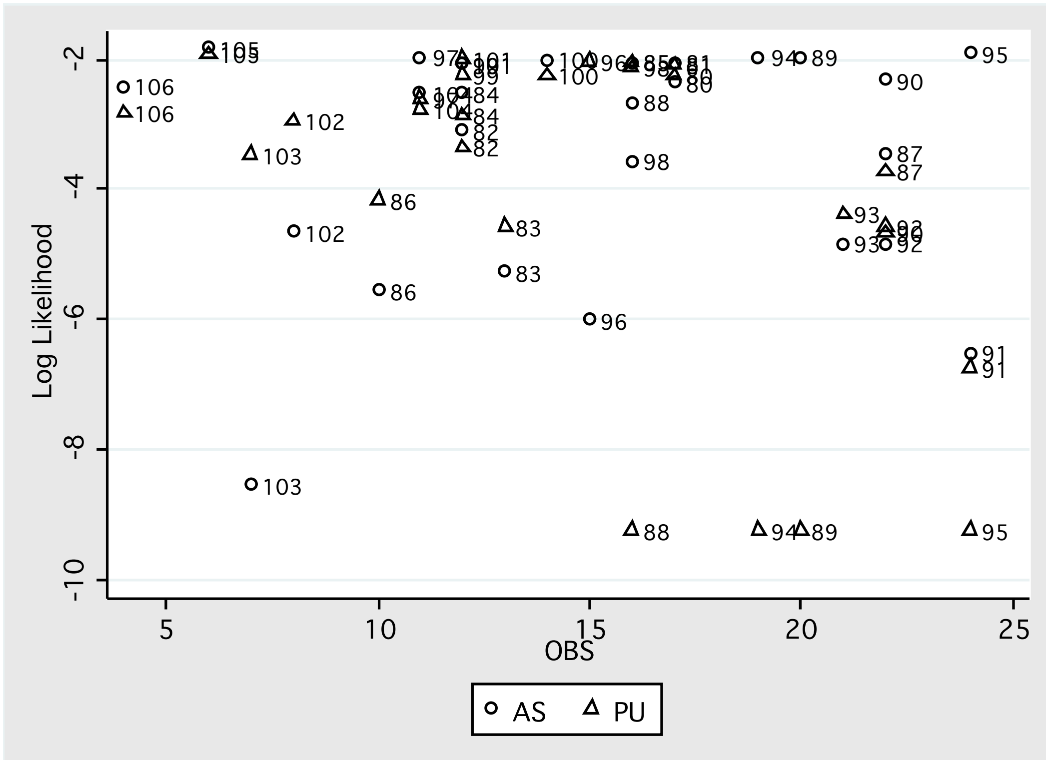
Comparison of AS and PU Results

To get a better sense of why the model with party agenda setting power (AS) fares better than the strongest party unity model (PU), Figure A1 presents observation-specific likelihoods using uniform weighted average shocks, plotted against the observed productivity levels. Overall, there are 17 observations for which the AS likelihood (circle) is higher than the PU likelihood (triangle). Both models appear to fit well for the middle-range of productivity levels as well as for extremely low levels (high gridlock), and for many observations the difference in fit between the two models is small. The PU model appears to do somewhat better for a few congresses with observed productivity in the mid-to-low range (6-10 bills) while the AS appears to do much better when observed productivity is high (more than 18 bills).

Note that the fit of the PU model for four observations (88th, 89th, 94th, and 95th) is especially poor, as the trianglees are at the bottom of the figure. Each of these observations corresponds to unified Democratic government with filibuster-proof Senate majorities. In

[4]Because the House is widely believed to be the more partisan chamber, we assume in our empirical analysis that the gatekeeper is the House majority party median. In other words, the House majority party moves before legislators play the fully bicameral NP game.

Figure A1: Observation-Specific Log Likelihoods for Binder Productivity Measure and Uniform Weighted Average Shocks



these cases, the PU model implies that Democratic Party leaders are able to dictate policy, which results in a nearly empty gridlock interval. In terms of the likelihood, the distributions of B_t implied by the PU model for these congresses are degenerate: they put *all* of the mass at the maximum level of productivity, $B_t = N$. But since the value of the parameter N selected by maximum likelihood differs from the observed productivity level, the probability mass put on the observed level is zero. Thus, these are observations for which the zero-likelihood problem is relevant, although the root cause of the zero-likelihoods is theoretical rather than computational: under unified government with a filibuster-proof Senate majority, the PU model predicts congresses with EGI widths of zero and therefore predicts full productivity with certainty.[5]

In contrast, the fit of the AS model for each of these Congresses (88th, 89th, 94th, and 95th) is very high, which suggests that the observed level of legislative productivity is close to the mode of the probability mass function. Moreover, the AS model fits very poorly for only one congress (103rd). There is also only one observation (96th) for which the PU model does substantially better than the AS model. Overall, Figure A1 suggests that the AS model has the best overall fit because it predicts all levels of observed productivity well.

[5]The value of N is therefore most relevant for fitting this model.

Additional Pivot Model Results

NOTE: SPL denotes "strong presidential leadership" and corresponds to the results in Chiou and Rothenberg's (2003) Proposition 5.

Table A1: Maximum Likelihood Results, Binder Salience Level 1, $80^{th} - 106^{th}$ Congresses

Shock	Model	LL	Issues	σ or δ	α
Normal Add.	PN	-156.02	90	0.325	
Normal Add.	AS	-158.94	100	0.375	
Normal Add.	PU	-160.02	100	0.325	
Normal Add.	GK	-164.24	90	0.425	
Normal Add.	SPL	-169.67	100	0.35	
Uniform WA	PN	-155.46	85	0.725	0.25
Uniform WA	PU	-159.32	85	1.075	0.2
Uniform WA	AS	-162.34	95	0.675	0.1
Uniform WA	GK	-164.56	90	1.15	0.2
Uniform WA	SPL	-176.87	105	1.075	0.15

Table A2: Maximum Likelihood Results, Binder Salience Level 2, $80^{th} - 106^{th}$ Congresses

Shock	Model	LL	Issues	σ or δ	α
Normal Add.	PU	-123.44	80	0.2	
Normal Add.	PN	-123.91	55	0.275	
Normal Add.	AS	-124.98	55	0.275	
Normal Add.	SPL	-125.01	85	0.2	
Normal Add.	GK	-135.91	60	0.35	
Uniform WA	PN	-119.17	55	0.45	0.1
Uniform WA	AS	-126.9	55	1.125	0.55
Uniform WA	PU	-132.85	95	1.0	0.6
Uniform WA	GK	-134.08	70	0.5	0.0
Uniform WA	SPL	-146.58	105	1.15	0.65

Table A3: Maximum Likelihood Results, Binder Salience Level 3, $80^{th} - 106^{th}$ Congresses

Shock	Model	LL	Issues	σ or δ	α
Normal Add.	AS	-112.06	45	0.225	
Normal Add.	PN	-113.65	45	0.225	
Normal Add.	PU	-118.07	55	0.2	
Normal Add.	GK	-120.34	40	0.425	
Normal Add.	SPL	-125.01	55	0.225	
Uniform WA	PN	-106.3	40	0.475	0.2
Uniform WA	AS	-108.69	45	0.525	0.15
Uniform WA	PU	-117.15	70	0.975	0.6
Uniform WA	GK	-117.91	40	0.85	0.15
Uniform WA	SPL	-129.99	100	1.1	0.7

Table A4: Maximum Likelihood Results, Binder Salience Level 5, $80^{th} - 106^{th}$ Congresses

Shock	Model	LL	Issues	σ or δ	α
Normal Add.	AS	-81.981	25	0.25	
Normal Add.	GK	-86.471	25	0.425	
Normal Add.	PN	-89.797	25	0.25	
Normal Add.	PU	-104.16	30	0.25	
Normal Add.	SPL	-109.35	35	0.225	
Uniform WA	AS	-80.868	25	1.05	0.55
Uniform WA	PN	-83.024	25	0.525	0.3
Uniform WA	GK	-87.919	25	1.15	0.45
Uniform WA	PU	-101.92	45	1.05	0.65
Uniform WA	SPL	-110.11	50	1.05	0.6

Gatekeeping Models

Gatekeeping With Pivots

We first consider the generic version of the model with a single gatekeeper G_t. As noted in the model section of the main paper, the pivots are L_t and R_t and the proposer is P_t. At the start of the game, the gatekeeper can block policy (exercise gatekeeping) or allow policymaking to proceed. If policymaking is allowed to proceed, then the outcome of the pivot subgame is given in equation (2) from the main paper. If policymaking is blocked, the outcome is the status quo q_t^i.

The gatekeeper will block policy if $x_t^i(q_t^i)$ is further from G_t than q_t^i. Equivalently, gatekeeping will be exercised if $x_t^i(q_t^i)$ is not between the interval defined by q_t^i and $2G_t - q_t^i$. This will occur only if G_t is outside the EGI $[L_t, R_t]$. If $G_t < L_t$, then the gatekeeper strictly prefers to leave an issue off the agenda if $q_t^i \in [2G_t - P_t, L_t]$ and the policy outcome for the game in this case is described by

$$y_t^i(q_t^i) = \begin{cases} P_t & \text{if} \quad q_t^i \leq 2G_t - P_t \\ q_t^i & \text{if} \quad 2G_t - P_t < q_t^i \leq R_t \\ 2R_t - q_t^i & \text{if} \quad R_t < q_t^i \leq 2R_t - P_t \\ P_t & \text{if} \quad 2R_t - P_t < q_t^i \end{cases}. \tag{A1}$$

Similarly, if $G_t > R_t$, then the gatekeeper strictly prefers to block an issue if $q_t^i \in [R_t, 2G_t - P_t]$ and the policy outcome is

$$y_t^i(q_t^i) = \begin{cases} P_t & \text{if} \quad q_t^i \leq 2L_t - P_t \\ 2L_t - q_t^i & \text{if} \quad 2L_t - P_t < q_t^i \leq L_t \\ q_t^i & \text{if} \quad L_t < q_t^i \leq 2G_t - P_t \\ P_t & \text{if} \quad 2G_t - P_t < q_t^i \end{cases}. \tag{A2}$$

But if $G_t \in [L_t, R_t]$ then the outcome $x_t^i(q_t^i)$ is always closer to G_t than q_t^i, so gatekeeping power in this case will never be used and $y_t^i(q_t^i) = x_t^i(q_t^i)$ where $x_t^i(q_t^i)$ is given in equation (2) from the main paper.

Extending the model to two gatekeepers is straightforward. Let the gatekeepers be $\underline{G}_t$ and $\overline{G}_t$ where, without loss of generality, $\underline{G}_t \leq \overline{G}_t$. Each gatekeeper will weakly prefer to block policymaking under the same conditions as in the single gatekeeper model. The presence of the second gatekeeper only affects whether a gatekeeper has a strict preference for blocking policy or is indifferent (when the other gatekeeper will also block the issue). If both gatekeepers are on the same side of the EGI or at least one gatekeeper is in the interior of the EGI, then outcomes are identical to the single gatekeeper model. More specifically, if $\underline{G}_t < L_t$ and $\overline{G}_t < R_t$ then the outcome is given by equation (A1) with $\underline{G}_t$ in place of G_t; if $L_t < \underline{G}_t$ and $R_t < \overline{G}_t$ then the outcome is given by equation (A2) with $\overline{G}_t$ in place of G_t. If both gatekeepers are in the interior of the EGI, $L_t < \underline{G}_t \leq \overline{G}_t < R_t$,then gatekeeping power is never exercised and the outcome is given by equation (2) of the main paper.

The key difference from the model with a single gatekeeper is when the gatekeepers are on opposite sides of the EGI. In this case, the outcome is

$$y_t^i(q_t^i) = \begin{cases} P_t & \text{if} \quad q_t^i \leq 2\underline{G}_t - P_t \\ q_t^i & \text{if} \quad 2\underline{G}_t - P_t < q_t^i \leq 2\overline{G}_t - P_t \\ P_t & \text{if} \quad 2\overline{G}_t - P_t < q_t^i \end{cases} . \tag{A3}$$

Gatekeeping Without Pivots

In the model without a president or supermajority pivots, the proposer P_t only needs to gain the vote of a median legislator M_t for a bill to pass. (As noted above, in our implementation of the structural model, we continue to account for bicameralism so that P_t is the Senate floor median while M_t is the House floor median.) Suppose that $P_t < M_t$ for purposes of exposition. (The case where $P_t > M_t$ is symmetric.) Without pivots, gatekeepers anticipate that if an issue is placed on the agenda, the outcome will be

$$\tilde{x}_t^i(q_t^i) = \begin{cases} P_t & \text{if} \quad q_t^i \leq P_t \\ q_t & \text{if} \quad P_t < q_t^i \leq M_t \\ 2M_t - q_t & \text{if} \quad M_t < q_t^i \leq 2M_t - P_t \\ P_t & \text{if} \quad 2M_t - P_t < q_t^i \end{cases} . \tag{A4}$$

The analysis follows the same basic reasoning as the models with pivots. With a single gatekeeper such that $G_t < P_t$ or if there are two gatekeepers such that $G_t = \underline{G}_t$ and $\overline{G}_t < M_t$, then

$$\tilde{y}_t^i(q_t^i) = \begin{cases} P_t & \text{if} \quad q_t^i \leq 2G_t - P_t \\ q_t^i & \text{if} \quad 2G_t - P_t < q_t^i \leq M_t \\ 2M_t - q_t^i & \text{if} \quad M_t < q_t^i \leq 2M_t - P_t \\ P_t & \text{if} \quad 2M_t - P_t < q_t^i \end{cases} . \tag{A5}$$

Similarly, if there is a single gatekeeper such that $P_t < G_t$ or if there are two such that $G_t = \overline{G}_t$ and $P_t < \underline{G}_t$, then

$$\tilde{y}_t^i(q_t^i) = \begin{cases} P_t & \text{if} \quad q_t^i \leq P_t \\ q_t^i & \text{if} \quad P_t < q_t^i \leq 2G_t - P_t \\ P_t & \text{if} \quad 2G_t - P_t < q_t^i \end{cases} . \tag{A6}$$

With two gatekeepers that are more extreme than the proposers and median, that is $\underline{G}_t < P_t$ and $M_t < \overline{G}_t$, the outcome is the same as in (A3). If both gatekeepers are between the proposer and the median, $P_t < \underline{G}_t$ and $\overline{G}_t < M_t$, then the outcome is the same as in (A4).

For the purposes of testing, we consider several versions of gatekeeping models, varying two components: which chambers grant the majority party gatekeeping power (House, Senate, or both) and whether or not there are supermajority pivots (to facilitate comparison with a "pure" or non-hybrid cartel model). We are interested in gatekeeping models without pivots because they are closest to the model proposed by Cox and McCubbins (2005). In order to make the gatekeeping models comparable to Chiou and Rothenbergs generalized pivot models, we assume that the Senate floor median is the agenda setter. In models without supermajority pivots, we assume that the House floor median has veto power to account for bicameralism. Each variety of model is designated by the chamber (H, S, or B), and by the lack of pivots (N). (The designation GKH is the same as GK in the main text of the paper.) The results for these models follow.

Additional Gatekeeping Model Results

Table A5: Gatekeeping Results: Binder Salience Level 1, $80^{th} - 106^{th}$ Congresses

Shock	Model	LL	Issues	σ or δ	α
Normal Add.	GKS	-159.59	90	0.475	
Normal Add.	GKH	-164.26	90	0.475	
Normal Add.	GKB	-165.75	90	0.425	
Normal Add.	GKNB	-181.43	85	0.3	
Normal Add.	GKNH	-181.82	85	0.35	
Normal Add.	GKNS	-182.3	85	0.325	
Uniform WA	GKNS	-155.57	85	0.5	0.1
Uniform WA	GKNH	-156.18	85	0.5	0.0
Uniform WA	GKNB	-159.4	85	0.45	0.0
Uniform WA	GKS	-159.99	85	0.9	0.1
Uniform WA	GKH	-164.56	90	1.15	0.2
Uniform WA	GKB	-168.33	85	0.95	0.15

Table A6: Gatekeeping Results: Binder Salience Level 2, $80^{th} - 106^{th}$ Congresses

Shock	Model	LL	Issues	σ or δ	α
Normal Add.	GKS	-129.37	55	0.375	
Normal Add.	GKH	-135.91	60	0.35	
Normal Add.	GKB	-137.9	55	0.35	
Normal Add.	GKNH	-172.38	55	0.475	
Normal Add.	GKNS	-184.06	55	0.35	
Normal Add.	GKNB	-184.4	55	0.175	
Uniform WA	GKS	-128.07	55	1.0	0.4
Uniform WA	GKH	-134.08	70	0.5	0.0
Uniform WA	GKB	-140.27	55	1.05	0.45
Uniform WA	GKNH	-145.73	55	0.5	0.0
Uniform WA	GKNS	-150.66	55	0.45	0.0
Uniform WA	GKNB	-162.1	55	0.5	0.0

Table A7: Gatekeeping Results: Binder Salience Level 3, $80^{th} - 106^{th}$ Congresses

Shock	Model	LL	Issues	σ or δ	α
Normal Add.	GKS	-117.3	35	0.425	
Normal Add.	GKH	-120.34	40	0.425	
Normal Add.	GKB	-132.59	45	0.3	
Normal Add.	GKNH	-141.15	35	0.525	
Normal Add.	GKNS	-147.92	35	0.475	
Normal Add.	GKNB	-158.66	35	0.525	
Uniform WA	GKS	-110.23	50	0.45	0.05
Uniform WA	GKH	-117.91	40	0.85	0.15
Uniform WA	GKNS	-126.1	40	0.5	0.0
Uniform WA	GKB	-128.27	50	0.5	0.1
Uniform WA	GKNH	-131.62	40	0.5	0.0
Uniform WA	GKNB	-147.04	40	0.5	0.0

Table A8: Gatekeeping Results: Binder Salience Level 4, $80^{th} - 106^{th}$ Congresses

Shock	Model	LL	Issues	σ or δ	α
Normal Add.	GKH	-96.324	30	0.475	
Normal Add.	GKS	-100.16	30	0.425	
Normal Add.	GKB	-103.76	30	0.425	
Normal Add.	GKNH	-123.00	25	0.475	
Normal Add.	GKNS	-128.36	25	0.525	
Normal Add.	GKNB	-130.38	25	0.525	
Uniform WA	GKH	-95.277	30	0.90	0.20
Uniform WA	GKS	-95.358	30	0.75	0.20
Uniform WA	GKB	-106.37	25	1.10	0.15
Uniform WA	GKNH	-110.01	30	0.50	0.00
Uniform WA	GKNS	-113.82	30	0.50	0.00
Uniform WA	GKNB	-123.24	25	1.00	0.00

Table A9: Gatekeeping Results: Binder Salience Level 5, $80^{th} - 106^{th}$ Congresses

Shock	Model	LL	Issues	σ or δ	α
Normal Add.	GKH	-86.471	25	0.425	
Normal Add.	GKS	-88.618	25	0.35	
Normal Add.	GKB	-90.837	25	0.425	
Normal Add.	GKNH	-119.19	25	0.325	
Normal Add.	GKNS	-132.34	25	0.3	
Normal Add.	GKNB	-132.66	25	0.35	
Uniform WA	GKS	-84.572	25	1.1	0.5
Uniform WA	GKH	-87.919	25	1.15	0.45
Uniform WA	GKB	-97.591	25	1.25	0.4
Uniform WA	GKNH	-104.56	25	0.45	0.05
Uniform WA	GKNS	-106.56	25	0.45	0.0
Uniform WA	GKNB	-124.09	25	0.5	0.05

Table A10: Gatekeeping Results: Mayhew, $80^{th} - 110^{th}$ Congresses

Normal Add.	GKH	-103.35	25	0.375	
Normal Add.	GKB	-104.86	25	0.375	
Normal Add.	GKS	-109.65	25	0.35	
Normal Add.	GKNH	-134.53	25	0.25	
Normal Add.	GKNS	-143.86	25	0.25	
Normal Add.	GKNB	-145.08	25	0.30	
Uniform WA	GKH	-108.63	25	1.050	0.45
Uniform WA	GKS	-109.73	25	0.50	0.00
Uniform WA	GKB	-116.9	25	0.50	0.00
Uniform WA	GKNH	-119.18	25	0.65	0.40
Uniform WA	GKNS	-125.89	25	0.65	0.35
Uniform WA	GKNB	-143.35	25	0.80	0.50

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