What Does it Take for Congress to Enact Good Policies? Unpacking Institutions & Electoral Concerns

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Abstract

In this paper, we study the conditions under which members of Congress incorporate policy-specific information in their voting decisions. To do this, we estimate an empirical model that accounts for uncertainty and private information about the quality of the proposal. We show that seniority and uncompetitive elections lead to higher ideological rigidity, and curtail the role of information in policy-making. These findings provide a rationale in favor of reforms aimed at increasing actual and potential renewal of the membership.

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1 Introduction

Modern pieces of legislation are complex objects, putting forth elaborate solutions to multiple intertwined issues. This is true for both "technical" legislation away from the public eye (such as the appropriation bills for ballistic missile defense systems) and heavily publicized bills alike, such as the health care reform, financial regulation reform, or the new proposals for immigration reform:

> "At 1,075 pages long, it's not the biggest bill to come through in recent years – that honor still belongs to the health care law – but the immigration legislation pending in the Senate is challenging the ability of voters to get their brains around its complexity. Touching on everything from border security to welfare programs to free trade, the massive bill is dominating legislative action this month on Capitol Hill." *The Washington Times*, June 16, 2013.

In this context, the oftentimes useful analytical simplification of left and right-wing politics falls short of capturing some of the key aspects of the decision-making problem faced by members of Congress, in which ideological considerations interact with uncertainty about factual elements of the policy environment. Getting these objective relations right is neither left-wing nor right-wing, but instead reflects what we call a *quality* dimension to policy-making.

Surveying actual legislation, in fact, the relevance of quality in legislative policy-making comes out naturally. Consider, for example, the *Americans with Disabilities Act* (ADA) of 1990. While the main goal of the bill was to improve the working conditions for disabled employees, Acemoglu and Angrist (2001) found that because of the additional costs imposed on employers the ADA actually reduced employment for young disabled workers. This is a bad outcome for all legislators, left or right. Similar stories of good intentions undone by perverse incentives reemerge in the *Endangered Species Act* of 1973, which imposes restrictions on landowners who find endangered species on their property,[1] or the *Wild and*

[1]The Endangered Species Act (ESA) gave federal agencies a broad mandate to constrain activity likely to harm species in danger of extinction. As pointed out by List, Margolis, and Osgood (2006), however, the vast majority of endangered species have their habitat in private lands, which gives landowners incentives to preemptively destroy the habitat to avoid potential regulation and the associated economic costs. The authors find evidence that the ESA might actually be endangering the species it intended to protect.

Free-Roaming Horses Act of 1971, which makes the killing of wild horses a federal crime.[2]

In other instances, still, unintended or failed policies arise for reasons other than badly designed economic incentives, due to the incorrect assessment of the environment in which the law takes effect (e.g., *Iraq War Resolution*). In fact, in many issues, the apparent "ideological" divisions are at heart disagreements about the relative effectiveness of alternative policies to attain some common objective, based on limited information available to politicians or to society in general. Consider for example the Dodd-Frank Act. A key factor driving the support or opposition to the bill was whether the provisions in the bill would actually reduce or increase taxpayers' cost in the event of a future financial collapse. This key factor, however, was unknown to legislators at the time of voting.[3]

The point here is that an integral part of the production of legislation is the assessment of objective relations between policies and the environment in which these policies take effect, many of which are hard to pin down precisely. Getting these objective relations right is what we call here quality. What does it take for Congress to enact high quality legislation? Under what conditions will representatives incorporate policy-specific information when evaluating the merit of legislative proposals?

Surprisingly, we know relatively little about this. While political scientists have long recognized that bringing about good public policy is one of the main goals pursued by members of Congress (Fenno, 1973; Kingdon, 1977), most of the empirical congressional literature focused on purely ideological or distributional problems, disregarding the quality dimension of legislation. Even the work that addressed quality head on - most notably Krehbiel (1991) Epstein and O'Halloran (1999) - focused primarily on its implications for the institutional organization of Congress. The contributions in this area were mostly theoretical, centering on the implications of electoral considerations and career concerns on the incentives of elected politicians to vote informatively or pander to the public (e.g., Maskin

[2]Michael Winerip, "The Wild Horses Troubled Rescue". *The New York Times*. 17 June 2013.

[3]The associated report of the Congressional Budget Office (CBO) states: "Depending on the effectiveness of the new regulatory initiatives, enacting this legislation could change the timing, severity, and federal cost of averting and resolving future financial crises. However, CBO has not determined whether the estimated costs under the bill would be smaller or larger than the costs of alternative approaches to addressing future financial crises and the risks they pose to the economy as a whole."

and Tirole, 2004; Canes-Wrone and Shotts, 2007). However, we know from the voluminous research on Congress that institutions *and* electoral concerns matter for voting behavior in Congress. We argue here that institutions and electoral concerns, both, also matter to determine the conditions under which representatives pursue high quality legislation.

The goal of this paper is to quantify the role of institutions and electoral considerations on the propensity of legislators to incorporate private information about the bill in their voting decisions. To do so, we use a structural approach, in which we derive the empirical model from the theory. Our theory consists of two building blocks. At the macro level is a connection between the characteristics and position of each individual legislator, and their beliefs, preferences, and capabilities. At the micro level is a model of voting with incomplete information, which guides the interactions between legislators given the information they have about the bill and each other. Together, the macro and micro components connect institutions and electoral concerns with individual vote outcomes, and allow us to estimate the beliefs and behavior of members of Congress (MCs).

A crucial feature of our voting model is that it captures MCs' incentives to incorporate new information in their voting decisions in the context of the bicameral structure of Congress. This is important because bicameralism is a fundamental reason why we can expect to observe a substantial degree of informative voting in the first place, as it forces the party holding the majority of the seats in the House to compromise with the minority if it wants to achieve policy change.[4] This is because the likelihood that a bill introduced in the House is approved in the Senate increases significantly if it receives the support of a large majority of members of the House voting the bill on its merits (Iaryczower, Katz, and Saiegh, 2013). Thus, while it is always tempting for the party in control of the House to take advantage of its commanding position, securing passage of a partisan piece of legislation with a bare majority could be akin to a nominal victory.

[4]Through its control of the Rules Committee, the leadership of the party in control of the House has agenda setting power over which bills are put up for a vote and how these are considered (amendments, debate, sequence). The composition of the Rules Committee is heavily weighted in favor of the majority party, in a nine to four configuration since the late 1970s. See Oleszek (2004).

Estimating the impact of electoral concerns and institutions on legislators' voting behavior is not straightforward because both the quality of the bill and MCs' voting strategies are unknown, latent quantities. To address this challenge, we build on developments in latent class regression analysis (Ungar and Foster, 1998; Huang and Bandeen Roche, 2004) to implement a novel statistical model fit *via* Markov chain Monte Carlo simulations.

The results show that in spite of the clear partisan divide in voting behavior, electoral considerations and the position of the legislators in the internal organization of Congress have a first order effect on voting strategies. Consider first congressional institutions. Leadership, seniority, and committee membership, all have a quantitatively and statistically significant impact on the number of representatives voting informatively, and thus on information aggregation and the pursue of high quality legislation. In particular, and in line with our expectations, we find that majority party leaders are more likely to vote unconditionally in favor of the bill than the rank and file, and majority members of the committee that reported the bill are more likely to support the bill unconditionally than non-members. The key result, however, concerns the impact of seniority. We find that a more senior legislature reduces the incentives for the majority party to pursue high quality legislation in two ways: it lowers the proportion of its own members willing to support the bill unconditionally, and reduces the propensity of opposition legislators voting informatively. Moreover, this impact is quantitatively important. For members of the majority party, the probability of supporting proposals unconditionally is almost 15 percentage points higher for a freshman legislator than for a Congressman serving 15 terms. At the same time, a seasoned member of the minority is about 10% less likely to vote informatively than a newly elected Congressman in the opposition.

Electoral safety, and to a lesser extent voters' information about policies and candidates, are also important predictors of voting behavior. The central finding in this regard is that uncompetitive elections are detrimental for the pursue of moderate, high-quality legislation. This argument has two parts. First, we find that minority legislators in more competitive districts are less inclined to vote against proposals independently of their private assessment of their merit. On the other hand, majority members who ran unopposed in the previous

electoral cycle are more likely to base their voting decision on the their evaluation of the quality of the bill. These results imply that by both reducing the propensity of its own members to toe the party line and raising the proportion of minority legislators voting systematically against the majority's proposals, uncompetitive elections are detrimental for the pursue of moderate high-quality legislation.

Taken together, the results for seniority and electoral competition have strong implications for institutional design and the quality of democratic representation. Our estimates indicate that reducing actual and potential renewal of the membership leads to higher ideological rigidity and less use of information in policy-making. These findings provide a rationale in favor of term limits and reforms in electoral rules aimed at increasing the competitiveness of elections.

2 Related Literature

At its core, this paper is about the quality of legislation: what does it take for Congress to enact high quality legislation? What kind of institutions and electoral incentives lead MCs to incorporate policy-specific information when evaluating the merit of legislative proposals? To the best of our knowledge, our paper provides the first empirical analysis of this issue. In doing so, the paper builds on the sizable contributions of a large literature.

Two influential studies, Krehbiel (1991) and Londregan (2000), are closely related to our paper. Krehbiel (1991) initiated a prolific literature on the informational role of congressional committees. The starting point for this work is the existence and relevance of what we call a quality dimension in legislative policy-making. But while in our model information is dispersed across all members of Congress, Krehbiel focuses on transmission of information between the median member on the committee – who is informed about the realization of a policy-relevant state – and the median member on the floor, who is not. In addition, while our empirical analysis focuses on the effect of electoral and institutional covariates on the voting strategies of individual legislators and policy outcomes, Krehbiel focuses on the implications of the theory for the institutional organization of Congress.

Londregan (2000) introduces *valence* in an empirical model of legislative policy-making.

As in this paper, the focus of the empirical analysis is on legislators' voting behavior. The key difference with our approach is that Londregan's valence is a *publicly known* quality of legislation. There is no uncertainty about whether the proposal *gets* the environment right, and therefore no private information. In this setting, therefore, it is impossible to address the issue of whether institutions and electoral incentives lead MCs to incorporate policy-specific information when evaluating the merit of legislative proposals.[5] In our paper, instead, the quality of each bill is unknown, and legislators imperfectly informed.

Estimating a voting model in which legislators are imperfectly informed about the quality of the proposal raises several technical challenges. Differently than in the well known spatial voting model (Poole and Rosenthal 1985, 1991; Heckman and Snyder 1997), MCs receive private signals from a distribution that is conditional on the realization of an unobservable state (the quality of the proposal). While we employ Bayesian methods, the essence of the empirical strategy used here is similar to that of Iaryczower and Shum 2012 and Iaryczower, Lewis, and Shum (2013). However, new issues arise here due to bicameralism. Specifically, the model must also account for the strategic incentives that arise because voting outcomes transmit information to members of the Senate. To incorporate this feature, we build on the theoretical analysis of Iaryczower (2008b), and the methods and empirical analysis developed in Iaryczower, Katz, and Saiegh (2013).

Unlike Iaryczower, Katz, and Saiegh (2013), though, we focus on assessing the impact of institutions and electoral concerns on MCs reliance on policy-specific information when evaluating the merit of legislative proposals. To do this we adopt a more flexible and general approach to modeling heterogeneity in representatives' voting decisions. To determine the role of institutions and electoral concerns in shaping voting behavior, we rely on the vast body of research on congressional politics. We discuss this literature in Section 3.

[5]Londregan does consider variation across policy areas by estimating the model for different committees in the Chilean Senate.

3 Theory and Empirical Model

In this section, we present the theory and derive the empirical model with which we analyze the data. The empirical model integrates two distinct components. The first one links preferences and information to voting outcomes through a strategic collective decision-making model. The second captures the effect of bill characteristics observable prior to the vote, institutions and electoral concerns on legislators' preferences and information. The likelihood function combines both components in a single block that draws information from both observable factors and equilibrium analysis.

3.1 Micro Politics: Collective Decision-Making Model

Our decision-making model builds on Iaryczower (2008b), which we augment by allowing the information and preference parameters to depend on both bill- and legislator-specific covariates in the empirical analysis.[6] Thus, MC's preferences and information, along with the equilibrium being played, change in each roll call vote t according to the characteristics of the individuals and of the bill under consideration.[7]

We begin by describing the decision-making environment. This is a streamlined depiction of the process of policy change in Congress, for analytical tractability. MCs in the House (H) and the Senate (S) choose between a proposal A_t and a status quo SQ_t. Chamber $j = H, S$ is composed of n_j MCs. The proposal is considered sequentially by the two chambers. The alternatives are first voted on in the House; members of the Senate observe the outcome of the vote in the House, and then vote between the two alternatives. The proposal passes in Chamber j if it receives at least $(n_j + r_j)/2$ votes, for $r_j \in \{1, \ldots, n_j\}$. The proposal is adopted by Congress if and only if it passes in both the House and the Senate. To this basic setting we add the various components of the model: the information of the different agents (prior beliefs and private information), and their preferences. We then describe equilibrium behavior, connecting underlying parameters to voting outcomes.

[6] The proof of the result presented in this section requires only a small modification of the proof in that paper, and is included in the Supplementary Materials Appendix for completeness.

[7] This flexibility allows our model to fit the data very well, which suggests that the value added by adding additional complexity to the model would be limited.

Information. Individual legislators are imperfectly informed about the quality of the proposal being voted in roll call t, ω_t. MCs cannot observe the quality of the bill, which can be high $\big(\omega_t = 1\big)$ or low $\big(\omega_t = 0\big)$, and for each roll call $t = 1, \ldots, T$ have a prior belief $p_t \in (0, 1)$ that the bill is of high quality. These beliefs are common knowledge for legislators but uncertain for the econometrician. Specifically, we assume that legislators' beliefs that the proposal is of high quality are given by:[8]

$$Pr(\omega_t = 1|\mathbf{x}_t, \nu_{c[t]}, \vartheta_{g[t]}) = p_t = \frac{\exp(\mathbf{x}_t'\alpha + \nu_{c[t]} + \vartheta_{g[t]})}{1 + \exp(\mathbf{x}_t'\alpha + \nu_{c[t]} + \vartheta_{g[t]})} \tag{1}$$

where $\mathbf{x}_t$ includes bill-specific covariates which we expect to be correlated with members' beliefs about the quality of the proposal, and ν_c, ϑ_g are Gaussian error terms accounting for unobserved heterogeneity in the quality of bills in different Congresses and issue areas.

In addition to the public information contained in p_t, each MC i in the House receives an imperfectly informative signal $s_{i,t} \in \{-1, 1\}$ about the quality of each bill. This signal can capture information that is only available to each individual, or can also reflect the fact that individuals might have a different understanding of publicly available information. Individuals' signals are i.i.d. conditional on the quality of the proposal, with $\Pr(s_{i,t} = 1|\omega_t = 1) = \Pr(s_{i,t} = -1|\omega_t = 0) = q_t > 1/2$.[9] The precision of the signal is common knowledge for legislators but uncertain for the econometrician, and we assume that in each roll call vote t, q_t is drawn from a truncated normal distribution in $(1/2, 1)$:

$$q_t(\mathbf{w}_t, \beta, \epsilon_{c[t]}, \varphi_{g[t]}) \sim TN(\mathbf{w}_t'\beta + \epsilon_{c[t]} + \varphi_{g[t]}, \sigma_q^2, 0.5, 1), \tag{2}$$

where ϵ_c and φ_g are congress- and issue area random effects, respectively, and $\mathbf{w}_t$ includes proxies for the information content and complexity of the legislation.

Preferences. MCs care about the quality of the bill, but also have 'ideological' biases: a preference over proposals that is unrelated to the quality of the bill. In particular, we assume that in each roll call t, each MC i has a publicly known ideology bias either

[8] We follow Gelman and Hill (2007) and use $c[t]$, $g[t]$ to denote congresses and policy areas associated with roll call t, rather than adding extra subindices to reflect the multi-level nature of our data.

[9] Senators observe a private signal with precision $\tilde{q}_t > 1/2$. This value will not be directly relevant for estimation, since in equilibria consistent with the data, only House members vote informatively.

for or against the proposal, and we say that i is *pro-change* or *anti-change* respectively. Given information $\mathcal{I}_i$, pro-change MCs prefer the proposal to the status quo whenever $\Pr(\omega_t = 1|\mathcal{I}_i) \geq \pi_t^P$, while anti-change MCs are willing to support the proposal only if $\Pr(\omega_t = 1|\mathcal{I}_i) \geq \pi_t^A$, where $\pi_t^A > \pi_t^P$.[10] These preference parameters do not enter the likelihood directly, but affect equilibrium voting behavior.

Equilibrium Voting Behavior. We consider Perfect Bayesian equilibria in pure strategies in which at least some members of the House vote *informatively*; i.e., in favor of the bill when their private assessment is that the bill is of high quality, and against the bill otherwise. Moreover, because in our data House bills are almost never killed on a vote in the Senate floor (see Section 4.1) we focus on equilibria in which only members of the House vote informatively.[11]

In all equilibria with these characteristics, members of the Senate disregard their private information, and act only to raise the hurdle that the alternative has to surpass in the House to defeat the status quo, killing the House bill when the vote tally in the House is below an *endogenous majority rule* (EMR), and approving it otherwise. The voting strategies of House members assure that legislators of both the House and the Senate have incentives to follow their respective equilibrium behavior. Members of the Senate have incentives to disregard their information because the information contained in the vote tally of individuals voting informatively in the House overpowers their preference bias, π_i. House members voting informatively have incentives to do so because conditional on affecting the outcome in the Senate, their inference of the information of other members of the House voting informatively also exactly compensates their bias. We relegate a formal

[10] More specifically, pro-change MCs face a cost of $\pi_t^P \in (0, 1)$ if Congress approves a low quality bill and a cost of $1 - \pi_t^P$ if it does not approve a high quality proposal, while anti-change MCs face a cost of $\pi_t^A \in (\pi_t^P, 1)$ if Congress approves a low quality proposal and a cost $1 - \pi_t^A$ if it does not approve a high quality bill. The payoffs for both pro and anti-change MCs if Congress approves a high quality proposal or rejects a low quality bill are normalized to zero. The expressions in the text follow immediately.

[11] Equilibria in which members of both the originating and receiving chambers vote informatively require by construction that bills approved in the House pass/fail a vote in the Senate with positive probability. In the kind of equilibria considered here, however, it is irrelevant whether a proposal fails in the Senate because it is voted down or because it is never taken up for consideration. See Iaryczower (2008b) for details.

statement of the results and their proof to the Supplementary Materials Appendix, and focus here entirely on an informal description of equilibrium voting strategies and their effect on the likelihood function.

The characterization of EMR voting equilibria varies slightly depending on whether pro-change legislators have a winning coalition in the Senate or not. When they do, MCs voting informatively in equilibrium must also be biased in favor of the bill. In particular, a number k_t^P of pro-change legislators in the House vote informatively, while the remaining pro-change legislators vote unconditionally in favor of the proposal, and all anti-change legislators in the House vote unconditionally against the proposal. Instead, when pro-change legislators are *not* a winning coalition in the Senate, those voting informatively must be predisposed against the bill. In any such equilibrium, a number k_t^A of anti-change legislators in the House vote informatively and the rest vote unconditionally against the proposal, while pro-change legislators in the House vote unconditionally in favor of the proposal. In each case, the House bill passes in the Senate if and only if the tally of the votes of individuals voting informatively in the House outweighs the bias of a pro or anti-change legislator respectively.[12]

EMR voting equilibria, therefore, separate members of the House in three *behavioral types* $\theta_i \in \Theta \equiv \{I, Y, N\}$: in equilibrium, each individual can be voting informatively ($\theta_i = I$), uninformatively in favor of the proposal ($\theta_i = Y$), or uninformatively against the proposal ($\theta_i = N$). Conditional on the bill being of high (low) quality, a legislator i voting informatively supports the proposal with probability q_t ($1 - q_t$). A legislator voting uninformatively in favor (against) the proposal, on the other hand, votes in favor of the proposal with probability 1 (0), independently of the state. In our empirical model, however, we allow for a probability of error μ at the individual level, so that whenever equilibrium behavior dictates a vote $v_{i,t} \in \{0, 1\}$ we observe $y_{i,t} = v_{i,t}$ with probability $1 - \mu$ and $y_{i,t} = 1 - v_{i,t}$ with probability μ. Thus, for any $\omega_t \in \{0, 1\}$, the probability of

[12] In each case, an EMR equilibrium exists if and only if the information of all individuals voting informatively can overturn the bias of a senator in the relevant coalition. See Section S.1 in the Supplementary Materials Appendix for details.

observing a vote in favor of the proposal is

$$\Pr(y_{i,t} = 1|\theta_i, \omega_t, q_t) = \begin{cases} 1-\mu & \text{if } \theta_i = Y \\ \mu & \text{if } \theta_i = N, \end{cases} \tag{3}$$

while for $\theta_i = I$, instead,

$$\Pr(y_{i,t} = 1|\theta_i, \omega_t, q_t) = \begin{cases} (1-q_t)(1-\mu) + q_t\mu & \text{if } \omega_t = 0 \\ q_t(1-\mu) + (1-q_t)\mu & \text{if } \omega_t = 1 \end{cases} \tag{4}$$

In equilibrium, the behavioral type of each legislator is known for other legislators but uncertain for the econometrician. We assume that the probability that legislator i is a behavioral type $l \in (Y, N, I)$ is given by:

$$\Pr\big(\theta_i = l\big|\mathbf{z}_i, \eta_{c[i]}, \varepsilon_{g[i]}\big) = \frac{\exp(\mathbf{z}_i'\gamma_l + \eta_{c[i],l} + \varepsilon_{g[i],j})}{\sum_l \exp(\mathbf{z}_i'\gamma_l + \eta_{c[i],l} + \varepsilon_{g[i],l})} \tag{5}$$

where $\eta_{c,l}$ and $\varepsilon_{g,l}$ are zero-mean random effects associated with congress c and policy area g, respectively, and $\mathbf{z}_i$ comprises legislator-specific and contextual variables affecting i's propensity to incorporate policy-relevant information in her voting decisions, or to support/oppose the proposals on purely ideological grounds.[13]

3.2 Macro Politics: Issues, Institutions & Electoral Concerns

In this section, we present the second building block of the likelihood function. This macro component captures the effect of bill characteristics observable prior to the vote, institutions and electoral concerns on legislators' preferences and information (eqs. (1), (2), and (5)).

3.2.1 Institutions, Electoral Concerns and Voting Behavior

The preferences and voting behavior of MCs are shaped by their electoral concerns and position in the institutional setting. The relationship between MCs' individual considerations and their propensity to incorporate new information in their voting decisions, however, is far from trivial. While some of these factors are likely to promote ideological rigidity of

[13]For identification purposes, we fix $\gamma_N = \eta_N = \varepsilon_N = \mathbf{0}$.

members of congress, inducing them to downplay policy-specific information in favor of posturing on general grounds, others will have the opposite effect, allowing information dispersed among many legislators to shape policy outcomes. In this section we discuss how these political and institutional factors affect equilibrium voting behavior building on the insights of the voluminous congressional literature. We organize the discussion in three blocks: institutions, electoral concerns, and the *unconditional* (or average) effect of parties.

Internal Organization of Congress. Collective action in the House is shaped by institutions and procedures which constrain legislative exchanges (Shepsle 1979, Shepsle and Weingast 1981). This institutional arrangement has two central pillars. The first is MCs' standing in the legislative and partisan hierarchies, as summarized by the attainment of leadership positions and seniority status. The second is their role in the consideration of the bill, and in particular whether or not they belong to the committee in which the bill was originated (Shepsle and Weingast 1981; Weingast and Marshall 1988).

The *party leaderships* play a pivotal role in the organization of collective action in the House. This is particularly true of the majority party leadership, which enjoys both scheduling power and control of the procedural reigns. Because of their unique role in the legislative process, we expect majority party leaders to be more inclined than members of the rank and file to give their unqualified support to bills that are put up for a vote. First, there is a gatekeeping effect: except for extreme circumstances, the leadership will only choose to advance bills that they themselves do not oppose. Second, once the leadership chooses which bills to advance, its own success or failure is determined by whether these bills pass or not (Sinclair 1983). This makes the leadership more invested in the success of the bill. Third, majority leaders oftentimes provide a signaling function towards the rank and file, with the goal of protecting the brand image presented to the electorate in congressional elections (Sinclair 1983; Cox and McCubbins 1993). This signaling function gives the majority leadership an incentive to give the bill a clear-cut, unconditional support.

The *seniority* of members of Congress provides a more nuanced measure of their political clout. Formal and informal rules in Congress give MCs with more seniority an advantage

over junior colleagues in terms of advancement to chairmanship of key committees and subcommittees (Polsby 1970; Kellerman and Shepsle 2009). From a direct extension of the arguments for the leadership, therefore, we expect the likelihood that a majority (minority) party member supports (opposes) the bill unconditionally to be increasing with seniority. On the other hand, as Stratmann (2000) notes, freshman MCs face more uncertainty about their reelection, and are thus more dependent on the intra-legislative and electoral benefits provided by parties than seasoned members of Congress, who enjoy increased reputation and name recognition. This suggests that MCs who feel constrained when juniors should become *less* likely to vote along party lines over the course of their careers in Congress. This "liberating" effect of seniority, if present, should arguably be stronger for the majority party, which can control more resources than the minority with which to help junior members in need. Ultimately, however, whether the leadership or liberating effects of seniority prevail is an empirical question.

While leadership and seniority both have a predominantly partisan content, *committee membership* sorts individuals according to both partisan and policy considerations. Given assignment, however, the logic linking committee membership with voting strategies is similar to that of leadership positions. First, as with leadership positions, there is a gate-keeping effect: committee members will advance bills they favor, and therefore will tend to support these bills when voting on passage. Moreover, there is also a reputation effect: participating in framing and crafting legislation in a committee gives legislators a stake in getting it passed (Fenno 1973; Poole and Rosenthal 1997). This is most clear for the majority, but can also apply to minority members if the committee process is not overly partisan.

Electoral Concerns. The second pillar shaping legislators' voting behavior is given by what we can broadly call the reelection motive (Mayhew 1974; Ferejohn 1986). In our context, the effect of the reelection motive can be decomposed in two distinct aspects: (i) whether the degree of *electoral security* of a legislator frees her to vote informatively more often, and (ii) whether the extent to which district *voters are informed* about their

representative and about political affairs in general affects MCs' incentives to pander to the electorate.

What exactly is the effect of electoral security on MCs' voting behavior is a controversial point in the literature. Two main mechanisms have been identified. On the one hand, Lott and Davis (1992) and Kau and Rubin (1993) show that electoral pressures can constrain legislators to develop predictable and stable voting records; MCs who exhibit too much drift or 'flip-flop' are penalized by voters. This argument suggests that electoral concerns will generally deter legislators from voting based on information that is not available to the voters. Since MCs who enjoy a significant electoral advantage will tend to be less constrained in their voting behavior (Kalt and Zupan 1990), this argument implies that legislators who are less vulnerable to transitory changes in constituents' support will be more likely to vote informatively.

On the other hand, several studies focusing on the electoral impact of legislators' voting behavior suggest that ideological rigidity is associated with a decrease in the MC's vote-share. In particular, Canes-Wrone, Brady, and Cogan (2002) show that conditional on the district's ideology, Republican (Democratic) incumbents' vote-shares tend to be lower the more conservative (liberal) their voting record, and that party discipline is negatively correlated with the chance of reelection. However, the evidence in this respect is rather inconclusive, suggesting that, if anything, the impact of legislators' roll call voting patterns on their electoral fortunes is quite small. In this direction, the findings in Bernstein (1989) and Erikson and Wright (1993) indicate that ideological rigidity entails relatively low costs for incumbents in safe districts, and that only incumbents running in close elections would have incentives to moderate their voting behavior in order to increase their chance of being reelected.

Which of these opposing effects prevails quantitatively can depend on the position the MC takes with respect to the bill, and thus on whether she is a majority or minority member. For members of the majority, "moderation" means sometimes opposing bills that are ex ante favored to the status quo by voters. For members of the minority, instead, moderation means sometimes contributing to the passage of a proposal that is ex ante worst

than the status quo for voters. It is plausible that voters can punish "compromise" when this means voting against the proposal of the MCs' own party, but reward "compromise" by a minority member if this means supporting the bill of the party with the majority in the chamber. Alternatively, voters can punish compromise of minority members when this is allowing a bill of the majority to pass, but reward the freedom of mind of a member of the majority who goes against her own party. This is ultimately an empirical issue.

An additional consideration is that the impact of elections on politicians' behavior can also be markedly different depending on the characteristics and composition of the electorate. A key consideration is how informed the electorate is, about both the characteristics of the representatives themselves and the policy alternatives under consideration. When voters are uninformed about the nature of the decisions or the characteristics of elected officials, electoral concerns can induce distortions in the behavior of the politicians, giving them incentives to posture or pander to the electorate (Canes-Wrone, Herron, and Shotts, 2001). In fact, Canes-Wrone and Shotts (2007) show that elected officials will be more inclined to pander when there is more uncertainty regarding their congruence with the electorate. A similar conclusion is obtained by Maskin and Tirole (2004), who show that elections induce pandering when the public is poorly informed about what the optimal action is, and when feedback about the quality of the decision is limited. These papers suggest that we should see a higher predisposition to vote informatively when the electorate is informed, and more posturing when the electorate is less informed.

The Unconditional Effect of Party. In addition to mediating the influence of institutions and electoral concerns on MCs' voting behavior, there is a direct effect of party. This is what we call an average (across institutions and electoral concerns) or unconditional effect of party. In our context, the *unconditional* effect of party boils down to two key considerations. First, how often are members of the *minority* willing to support majority legislation when their own assessment of the proposal is positive? Second, what is the nature of the *majority* support? Do majority legislators give party bills their unqualified support, or do they support compromise bills conditionally, depending on their private

assessment of the merits of the proposal?

The behavior of majority and minority MCs is of course naturally intertwined, as they respond to the same underlying policy proposal. Partisan policies promote ideological rigidity of members of both the majority and the opposition, who downplay policy-specific information in favor of posturing on general grounds. When instead the party in control of the House pursues an inclusive agenda strategy, we expect at least a significant fraction of minority legislators to be open to considering the proposals of the majority on its merits. The gain across the aisle, however, comes at the cost of losing the unconditional support of some of its members. While more partisan bills will receive the unqualified support of most party members, a fraction of the majority will only support compromise bills conditionally, depending on their private assessment of the merits of the proposal. In this sense, we can interpret the extent of conditional support within the majority party as a measure of the cost of pursuing a strategy of compromise vis-à-vis more partisan policies.[14]

3.2.2 Prior Beliefs and Private Information

Various bill-specific characteristics observable by legislators prior to the vote are likely to be correlated with the quality of the bill. This is the case of the number of cosponsors, the formal backing of the president, and the saliency of the issue. Because these observable characteristics will influence legislators' beliefs about the merits of the proposal, it is important to take them into consideration in equation (1).

Consider first co-sponsorship of legislation. Because MCs want to avoid being blamed for failed policies (bills that are stricken down as unconstitutional, are badly coordinated with provisions in other statutes, etc.), they are unlikely to cosponsor bills they perceive to be of low quality. As a result, the number of cosponsors of a bill can be a signal of quality to both the econometrician *and* other legislators (Woon, 2008). Raw cosponsoring data,

[14]Since leadership positions in US legislative parties are highly contestable, the leadership cannot afford to alienate the membership on a systematic basis (Cox and McCubbins 2005, 2007, Iaryczower 2008a). In fact, Sinclair (1983), Krehbiel (1998) and Kiewiet and McCubbins (1991), among others, see the leadership as agents of the majority of the party. As a result, congressional party leaders rarely advance bills that run against a majority of party members' preferences, and majority party members will generally be positively predisposed towards the bills advanced by the Rules Committee. The nature of their support, however, will be a function of the type of bill being advanced.

however, can be a noisy signal of quality. If only members of the majority co-sponsor a proposal, a higher number of cosponsors may reflect not quality, but ideological proximity (Campbell, 1982; Pellegrini and Grant, 1999). To account for this fact, we also allow MCs prior beliefs to depend on the proportion of minority cosponsors.

A similar argument holds for the president's decision to "go public" in support of a legislative initiative. Both directly (because they do not want to be associated with failed policies) and indirectly (because they don't want to support bills that will not pass), presidents will tend not to back low quality legislation. Since this is common knowledge among MCs, presidential support can be informative to members of Congress. In this direction, Marshall and Prins (2007) maintain that presidents strategically choose which initiatives to throw their weight behind in order to "claim credit" for successful initiatives. In our model, "high quality" bills are more likely to be approved by Congress, and thus presidential support should be positively correlated with the quality of legislative initiatives.[15]

A third factor that we expect will affect MCs' perception of the quality of the proposal is the saliency of the issue.[16] Scholars have long argued that the visibility of an issue can influence legislative decision-making and, more specifically, enhance MCs' responsiveness to constituency preferences (Kingdon, 1977; Fenno, 1978). The effect of saliency on members' responsiveness to their information and prior beliefs about the quality of a proposal, however, is a priori ambiguous. On the one hand, to the extent that constituents tend to be more informed about and hold representatives accountable for key roll call votes (Ansolabehere and Jones, 2010), saliency can induce legislators to consult extensively before making their decision and to put more effort and attention to assure good quality legislation. On the other hand, saliency can also be a manifestation of partisan antagonism and make it more difficult to reach agreements about policy contents (McCubbins, 1985; Shull and Vanderleeuw 1987). In this case, legislators might be willing to sacrifice "technical"

[15]It is important to note that this argument does not imply a causal effect of presidential backing on legislators' prior belief about the quality of the bill. In fact, following Marshall and Prins (2007), the direction of the effect may well go in the opposite direction (but see Canes-Wrone, 2001). Nonetheless, we would expect to see presidential support and p_t moving in the same direction.

[16]Of course, presidential public position-taking can certainly increase the salience of a proposal (Covington, 1987; Canes-Wrone, 2001). However, salience could be related to various other factors as well. Hence, we include measures for both factors in equation 1 and allow their coefficients to differ.

considerations in favor of ideological concerns. Whether quality or ideology prevails in the formation of MCs' beliefs is therefore an empirical question.

Legislators are also faced with an increasingly challenging set of problems and with resource constraints preventing a detailed examination of policy proposals (Ringquist, Worsham, and Eisner, 2003). It is therefore reasonable to assume that the precision of MCs' private information is negatively associated with the complexity of the proposal and positively correlated with the familiarity of the matter under consideration. To capture these factors we use the number of words of the bill (Epstein and O'Halloran, 1999), the number of committees the initiative was referred to, and a measure of representatives' experience with similar legislation. The random intercepts in equation 2 account for the fact that MCs' signal precision may vary across policy areas - e.g., because legislation in some areas is technically more complex than in others.

4 Data and Methods

4.1 Data

Our data consists of individual- and bill-specific covariates, and voting data. The regressors included in the analysis follow the discussion in Section 3.2, as well as control variables commonly used in the congressional literature. A detailed description of the coding used for the predictors and their sources can be found in Table A.1 in the Appendix. Tables S.1 and S.2 in the Supplementary Materials Appendix present summary statistics for these variables and the distribution of bills in our sample by Congressional session and issue area.

The voting data comprise all *bills* that were *originated* in the House, and whose *passage* in the House was decided by a *roll call* vote over the period 1991-2006 (Congresses 102 through 109).[17] By *bills* we refer to both bills (say H.R. 100) and Joint Resolutions (say H.J.Res.100) - which have the same effect as bills unless they are used to propose

[17]In principle, it would be possible to estimate our model for bills originating in the Senate as well, contrasting the behavior of members of the different originating chambers as well as the fate of the bills in the receiving committee. However, the number of bills originating in the Senate between 1991 and 2006 that were approved by a roll call vote on passage was quite low (106). Such comparison would thus require extending the period covered in the analysis, which we leave for future research.

amendments to the Constitution. We define a bill as *originated* in the House if it was voted on final passage in the House before being voted on final passage in the Senate. We consider only votes on final passage and ignore votes on procedure or amendments. Moreover, we consider only bills that passed the House by a non-unanimous roll call vote in which members' votes are recorded individually, and that record made publicly available prior to consideration of the bill in the Senate. Each bill was then classified into one of nine policy areas (Defense, Economic Activity, Education and Labor, Health, International Affairs, Government Operations, Judiciary, Transportation, and Other) according to the coding of the *Policy Agendas Project* (http://www.policyagendas.org).

Between 1991 and 2006, a total of 819 such bills were considered for approval in a vote *on passage* in the House.[18] Less than 1.5% of these (10) failed to pass a - roll call or voice - vote in the Senate. However, more than 40% (360) were never taken up for consideration on final passage in the Senate: 201 were not reported to the floor by committee to which they were reported, 152 were put on the legislative calendar but never voted, and the rest were ignored (i.e., no action was taken in the Senate during the congressional session in which the House passed the bill).

4.2 Estimation

In order to estimate our model, we adopt an empirical strategy that integrates developments in collaborative filtering and latent class regression analysis (Ungar and Foster, 1998; Huang and Bandeen Roche, 2004). This approach allows us to recover the key unobservable variables (θ, ω, q) of our strategic collective decision-making model from observed voting patterns, while simultaneously quantifying the impact of individual, bill-specific and macro-political factors $\mathbf{X}_t \equiv (\mathbf{x}_t, \mathbf{w}_t, \mathbf{z}_i)$ on legislators' preferences, information and behavior.

Estimating the impact of the covariates of interest on legislators' information and voting behavior is relatively straightforward once MCs have been classified in behavioral types

[18] Under the House rules, can also be approved in the House by an alternative streamlined procedure, called *suspend the rules and pass* (SRP). In a SRP vote, debate is restricted, amendments are not allowed, and the bill has to be approved by a two-thirds majority of the votes. Estimates obtained considering also the 314 bills that had a non-unanimous roll call vote by the SRP procedure lead to similar substantive conclusions as those reported below.

and bills have been categorized as "high" or "low" quality. The problem is more involved, though, because both θ_i and ω_t are unknown, latent quantities, which are to be estimated. However, this can be achieved using the information from our model. Note that given observed roll call votes, $y = \big(y_1, \ldots, y_T\big)$, we can write the marginal distribution $P(y)$ (ignoring random effects for ease of exposition) as:

$$P(y) = \prod_{t=1}^{T} \sum_{s\in\{0,1\}} \sum_{i\in n_H} \sum_{l\in\Theta} \Pr\big(y_{i,t}|\theta_i = l, \omega_t = s, q_t, \mathbf{X}_t\big) \Pr\big(\theta_i = l\big|\mathbf{z}_i\big) \Pr(\omega_t = 1|\mathbf{x}_t), \qquad (6)$$

where $\Pr(\omega_t = 1|\mathbf{x}_t)$ is given by (1), $\Pr\big(\theta_i = l\big|\mathbf{z}_i\big)$ is given by (5), and $\Pr\big(y_{i,t}|\theta_i = l, \omega_t = s, q_t, \mathbf{X}_t\big)$ is given by (3) and (4), with q_t given by (2). This formulation allows us to estimate the quantities of interest by using both observables and equilibrium information. Our interest lies primarily in the parameters α, β, and γ of expressions (1)-(5).

Since θ_i and ω_t can be seen as missing data, estimates could in principle be obtained by maximum likelihood estimation *via* the Expectation-Maximization (EM) algorithm or by Bayesian approaches based on Markov chain Monte Carlo (MCMC) methods (McLachlan and Peel, 2000). However, as discussed by Ungar and Foster (1998), the standard EM algorithm cannot efficiently tackle our two-sided clustering problem (i.e., classifying legislators into *types* and roll calls into *states* describing the quality of the bill).[19] Hence, we resort to Markov chain Monte Carlo simulations. In a nutshell, the MCMC algorithm alternates between: i) generating random draws for each θ_i and ω_t from the posterior probabilities of class membership given the observed data and current parameter estimates; ii) drawing new values for the regression parameters from the augmented data posterior which regards the class-membership indicators as known. Repeating these steps generates a sequence of iterates converging to the stationary observed data posterior distribution.

Prior Distributions and Model Checks. Three parallel MCMC chains with dispersed initial values were run for 200,000 cycles, discarding the first half as burn-in. Convergence

[19] More precisely, the need to simultaneously partition legislators and rollcalls into clusters destroys the tractability and separability of the EM algorithm (Ungar and Foster, 1998). Although more sophisticated - e.g., variational (Hoffman and Puzicha, 1999) - EM algorithms can be used, other advantages of Bayesian methods include appropriately incorporating the uncertainty inherent in class assignments into the estimation, easily obtaining any functions of the model parameters, and the possibiliy of a more detailed description of these parameters through the examination of their posterior distributions.

was assessed using Gelman and Rubin (1992)'s potential scale reduction factor $\widehat{R}$, with posterior summaries computed from the pooled convergent samples. We assume a *Uniform*(0, 0.1) distribution for μ and use conjugate priors for the remaining parameters: *Inverse Gamma(0.001, 0.001)* distributions for σ_q^2 and the Congress- and area-specific variance components, $N(0, 100I)$ priors for β, and $N(0, 9/4I)$ distributions for α and γ.

Routine sensitivity checks indicate that the estimates and substantive conclusions reported below are robust to the choice of priors. The average overlap between the prior and posterior distributions was quite small, indicating that the model is well identified and relatively insensitive to prior assumptions (Garrett and Zeger, 2000). Diagnostics based on posterior predictive simulations (Gelman and Hill, 2007) do not indicate substantial misspecification or model failure. In fact, our model fits the data quite well: a comparison of replicated vote vectors $y_{i,t}^{Rep}$ generated under the model with the observed roll call votes $y_{i,t}$ for each representative in our sample shows that the average proportion of correctly predicted votes is 0.79, ranging from 0.52 to 1 across MCs (see Section S.2 of the Supplementary Materials Appendix).[20] Trace plots of sampled parameter values showed no evidence of label switching and Stephens (2000)'s relabeling algorithm converged rapidly, without requiring reordering across chains.

5 Results

We begin by discussing the *unconditional effect* of party on legislators' voting behavior. In a partisan environment, we expect both majority and minority party members to vote in favor and against the proposals of the majority party irrespective of their evaluation of the quality of the proposal. When instead the majority party pursues an inclusive agenda strategy, we expect a significant fraction of minority legislators to be open to considering the proposals on their merits.

Indeed, our results show that on average, a large fraction of the minority members

[20] In this sense, the performance of our model compares favorably to that of Keith Poole's Optimal Classification (OC) common-space estimates. Using the OC point estimates, the average proportion of correctly predicted votes in our sample is 0.72, ranging from 0.04 to 0.96 across legislators. See Figure S.3 in the Supplementary Materials Appendix.

incorporates their private information in their voting decision.[21] In fact, a whopping 77% of the opposition votes in favor of the bill if and only if they have a positive private assessment of its quality, while 18% votes against the bill unconditionally of their evaluation of its merits. Moreover, the internal "cost" of this strategy for the majority party is relatively low. On any given bill, roughly 90% of its members support the bill unconditionally, while 9% vote the bill according to their assessment of its merits. Only very rarely (0.1%) a majority member opposes the bill despite observing favorable supporting information. Overall, more than half of the members of the House (50.6%) use their private information about the proposals at the moment of casting their vote on the floor. These results are summarized in Figure 1.

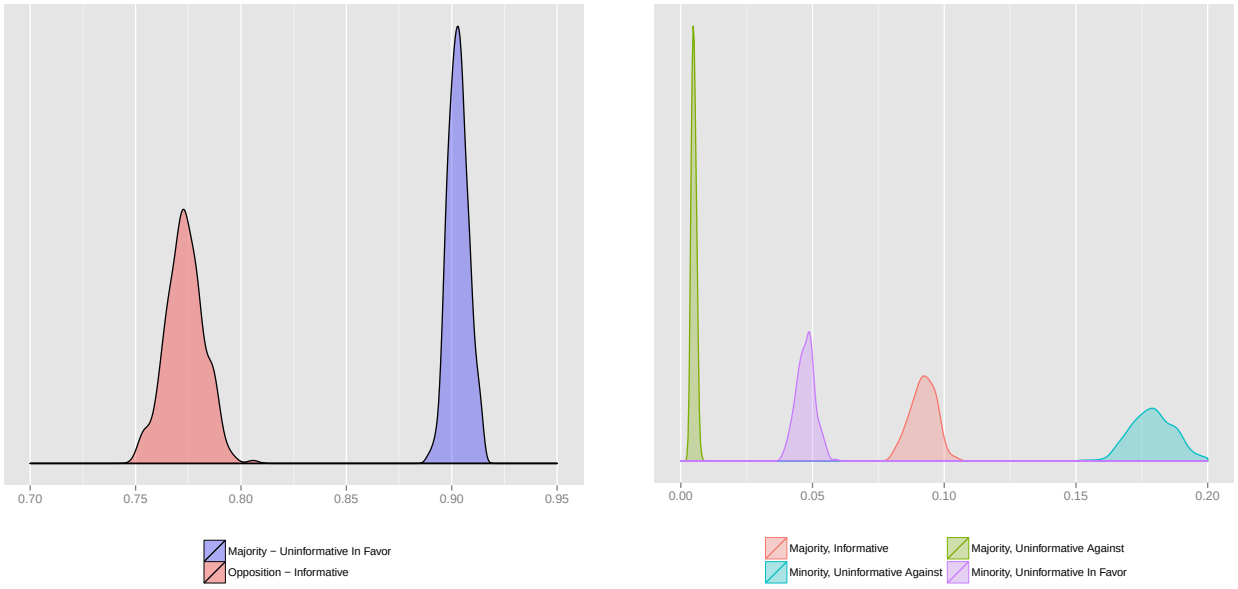

Figure 1: Posterior distribution of behavioral types in the majority and the minority.

The fact that we classify a large proportion of the minority as voting informatively has a clear counterpart on raw data. As discussed by Krehbiel (1998), winning coalitions in

[21] Table A.2 in the Appendix summarizes the "raw" parameter estimates. However, because these are quite difficult to interpret, we center the discussion on "auxiliary" quantities such as average predictitive comparisons (Gelman and Hill, 2007) and posterior distributions of the latent variables. These quantities are more relevant from a substantive perspective, and are easily computed from the MCMC output.

the House are normally much greater than minimum-majority size, both at the level of roll call votes generally and votes on final passage more specifically. "Consider, for example, all final passage of laws enacted by the 102d and 103d Congresses (1991-94). The average size of the winning coalition on these 324 votes is 79%. Furthermore, such coalitions are typically bipartisan. For example, we can ask: In what fraction of the votes did at least 40 percent of Republicans join at least 40 percent of Democrats in the winning coalition (or vice versa). The answer is considerably over a half: 68 percent to be precise" (Krehbiel, 1998, p.6). The stylized fact pointed out by Krehbiel is the reduced form representation of the underlying equilibrium voting strategies we estimate.

5.1 Institutions and Voting Behavior

The results for the unconditional effect of parties show that party membership is a strong predictor of equilibrium voting strategies and behavioral types. Party, however, only provides a partial account of MCs' voting behavior. Institutions and reelection concerns shape voting behavior as well.

Table 1 summarizes our findings regarding the impact of institutions on MCs' voting behavior. The results show that the institutions organizing collective action in the House have a quantitatively and statistically significant influence on the number of MCs voting informatively, and thus on information aggregation and the pursue of high quality legislation. Moreover, these estimates also show that the impact of institutions is markedly different for members of the majority and minority parties. This is true for leadership, seniority, and committee membership.

Table 1: Average predictive differences in $Pr(\theta_i = l)$, associated with changes in institutional variables

Covariate		$\Delta Pr(\theta_i = I)$	$\Delta Pr(\theta_i = Y)$	$\Delta Pr(\theta_i = N)$
Leadership	Majority Party	−7.32 (−9.01, −5, 87)	7.77 (6.31, 9.39)	−0.45 (−0.61, −0.22)
	Minority	3.39 (−3.14, 9.76)	−2.03 (−4.16, 0.15)	−1.36 (−7.42, 3.99)
Seniority	Majority Party	0.82 (0.16, 1.54)	−2.44 (−3.25, −1.54)	1.62 (1.10, 2.19)
	Minority	−2.74 (−3.84, −1.51)	0.11 (−0.48, 0.67)	2.63 (1.52, 3.56)
Committee Membership	Majority Party	−1.71 (−3.50, −0.09)	1.94 (0.32, 3.70)	−0.23 (−0.48, 0.01)
	Minority	−7.73 (−10.90, −4.25)	4.14 (1.72, 5.67)	3.59 (1.21, 6.06)

Note: The table reports the expected change in $Pr(\theta_i = l)$, $l = I, Y, N$, associated with a change in MCs' *Leadership*, *Seniority* and *Committee Membership* status (from 0 to 1), in percentage points. 90% highest posterior density intervals in parentheses.

Consider first the effect of leadership on voting behavior. As we discussed in Section 3, we expect majority party leaders to be more inclined to give their unqualified support to bills that are put up for a vote than members of the rank and file. The predictions for the leadership of the minority party are less clear-cut. Without agenda setting power, the gatekeeping effect is moot, as is the payoff to delivering the passage of the proposals taken up for a vote. Our findings are consistent with these predictions. All else equal, majority party leaders are almost 8 percentage points more likely to vote unconditionally in favor of the bill than rank and file members. Thus, 96% of the time, leaders in the majority vote unconditionally in favor of the bill. In the minority party, on the other hand, we find no

significant differences between leadership and the rank and file.

The influence of committee membership on voting behavior also differs for majority and opposition members. For MCs in the majority, we expect that membership in the committee in which the bill was introduced will make them more likely to support the bill unconditionally on the floor. In fact, we find that members of the committee that reported the bill are 2% points more likely to support the bill unconditionally than non-members. Minority members of the committee, instead, are more likely to vote uninformatively both in favor and against committee bills that legislators of the oppostion not in the committee in which the bill was drafted. This result suggests a split of minority members into two camps, one involved in the drafting of the bill and more inclined to support the proposal on the floor than non-committee minority MCs (4.1%), and one opposing the bill from conception, more likely to vote against the proposal unconditionally than non members of the minority (3.6%).

The key result within the institutional realm concerns the effect of seniority on voting strategies and outcomes. As a measurement of clout or power, we expect MCs with more seniority to be more likely to support or oppose legislation unconditionally. On the other hand, as noted above, freshmen are arguably more dependent on the resources and benefits supplied by parties (particularly the majority party). We find that, indeed, these two considerations play out differently for majority and minority party members. For members of the majority, increasing seniority by one standard deviation (four congressional sessions) is associated with a 2.4% decline in the probability of voting unconditionally in favor of the proposal. For legislators in the opposition, instead, a one-standard-deviation increase in seniority is correlated with a 2.6% rise in the probability of voting unconditionally against the bill. This suggests that the disciplining effect is present for the majority – when resources are more important– but not for the minority party, when they are not.

A crucial implication of this result is that a more senior legislature diminishes the incentives for the majority party to pursue moderate high quality legislation in two ways: it lowers the proportion of its own members willing to support the bill unconditionally, and reduces the propensity of opposition legislators voting informatively. The extent of

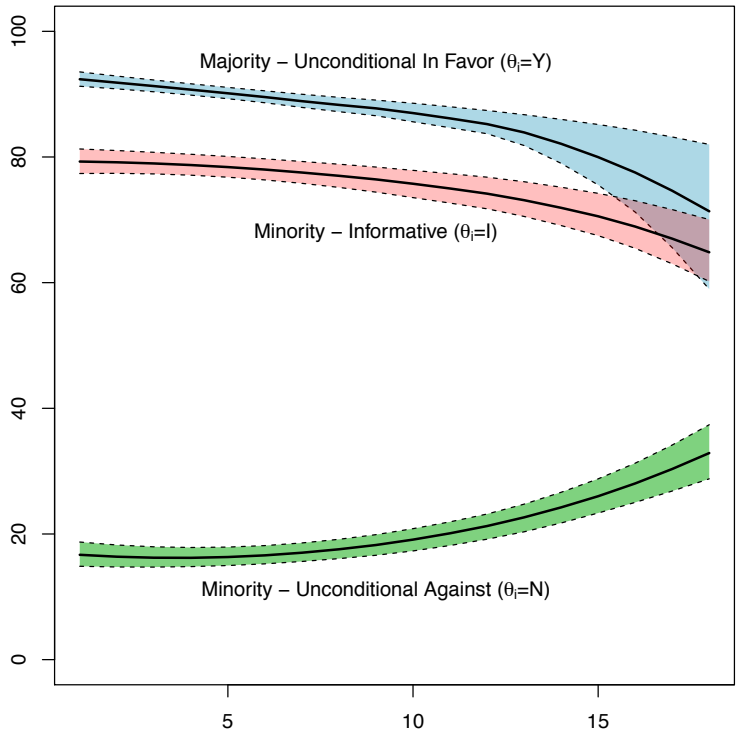

Figure 2: Distribution of behavioral types, by party, as a function of seniority. The solid lines represent the average proportion of behavioral types among legislators of the majority and opposition. Colored regions correspond to the 90% highest posterior density intervals.

this effect is illustrated in Figure 2, which plots the distribution of behavioral types as a function of seniority, holding other variables constant. For members of the majority party, the probability of voting unconditionally in favor of the proposal drops from 94% for a freshman to around 80% for a MC serving 15 terms. At the same time, for a member of the minority, the probability of voting informatively decreases from 79% for a freshman to 70% for a legislator serving 15 terms.

5.2 Electoral Concerns and Voting Behavior

As mentioned in Section 3.2, there are two contrasting arguments regarding the effect of electoral security on voting behavior. The first contends that since voters tend to penalize MCs who change positions frequently, MCs running in close elections will tend to avoid

voting based on information that is not available to their constituents. The second suggests that ideological rigidity can be costly for legislators running in highly competitive races. As we noted in Section 3.2, which effect prevails can depend on the position the MC takes with respect to the bill.

Our estimates, summarized in Table 2, indicate that this is indeed the case. First, we find that minority legislators in more competitive districts are *less* inclined to vote against bills independently of their private assessment of the quality of the bill. For one, minority members who ran unopposed in the previous electoral cycle are 6.4% points more likely to oppose bills unconditionally than those who ran in contested elections. In addition, conditional on having been elected in a competitive election, a one-standard deviation increase in the margin of victory is associated with a 9% increase in the probability that a minority member votes unconditionally against the proposal - roughly corresponding to a 0.40% increment for each additional percentage gain in her vote vis-à-vis the closest challenger. This suggests that marginal voters in close elections reward compromise by minority members, who sometimes contribute to the passage of a proposal that is ex ante worst than the status quo for the minority party.

Table 2: Average predictive differences in $Pr(\theta_i = l)$, associated with changes in electoral variables

Covariate		$\Delta Pr(\theta_i = I)$	$\Delta Pr(\theta_i = Y)$	$\Delta Pr(\theta_i = N)$
Margin of Victory	Majority Party	0.85 (−0.32, 1.83)	−0.55 (−1.52, 0.62)	−0.30 (−0.43, −0.20)
	Minority	−7.25 (−8.75, −5.84)	−2.68 (−3.22, −2.22)	9.93 (8.55, 11.19)
Unopposed	Majority Party	6.61 (3.39, 9.28)	−6.62 (−9.45, −3.54)	0.01 (−0.01, 0.03)
	Minority	−4.42 (−10.20, 0.79)	−2.00 (−4.11, −0.46)	6.42 (1.91, 11.50)
Newspaper Reading	Majority Party	0.14 (−0.49, 0.96)	0.01 (−0.74, 0.75)	−0.16 (−0.26, −0.06)
	Minority	−1.14 (−2.32, 0.77)	0.19 (−0.40, 0.70)	0.94 (−0.14, 0.19)
Lack of Familiarity with the Incumbent	Majority Party	−0.75 (−1.50, −0.08)	0.58 (−0.17, 1.39)	0.17 (−0.04, 0.35)
	Minority	0.36 (−0.86, 1.50)	0.17 (−0.47, 0.72)	−0.53 (−1.42, 0.64)

Note: The table reports the expected change in $Pr(\theta_i = l)$, $l = I, Y, N$, associated with a unit difference in the covariates capturing MCs' electoral environment, in percentage points. Estimates correspond to a change from 0 to 1 in the dummy variables and a one standard deviation increase in the continuous covariates. 90% highest posterior density intervals in parentheses.

The effect of electoral security on the voting behavior of members in the majority, however, is substantially different. First, we estimate that majority members who ran unopposed in the previous election are 6.6 percentage points more likely to base their voting decision on the their assessment of the quality of the bill. This is consistent with marginal voters in close elections punishing compromise of majority party members, who

sometimes vote against the proposal of the MCs' own party. The margin of victory for majority members who were elected in competitive elections, however, has no impact on their voting behavior: legislators obtaining a larger victory margin are on average more inclined to vote informatively, but the magnitude of the effect – 0.03 percentage points for each 1% increase in the margin of victory – is quite small and statistically indistinguishable from zero.

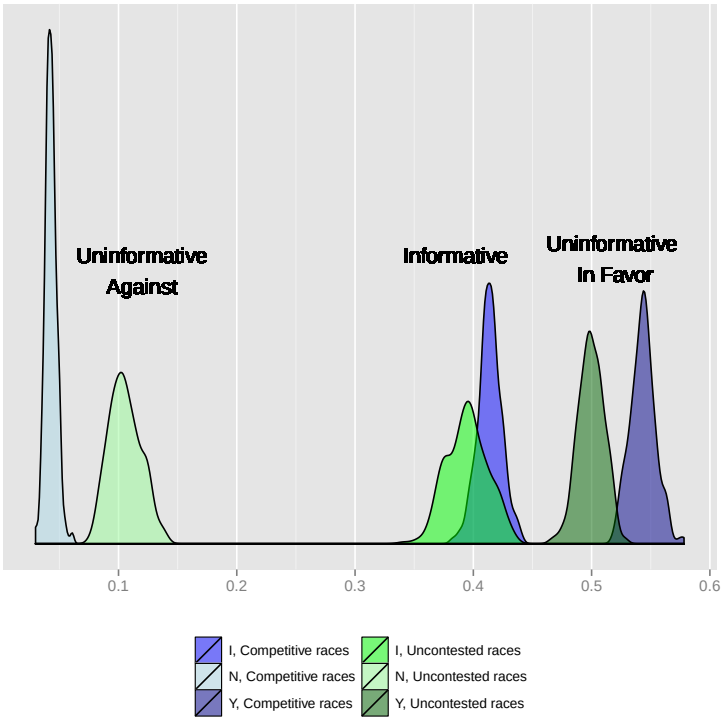

Figure 3: Posterior distribution of behavioral types under two alternative electoral scenarios.

Altogether, these results imply that by both reducing the propensity of its own members to toe the party line and raising the proportion of minority legislators voting systematically against the majority's proposals, uncompetitive elections are detrimental for the pursue of moderate high-quality legislation. This is illustrated in Figure 3, which compares the proportion of MCs in each of the three behavioral types under two alternative scenarios: one with a 1% margin of victory in every House election, and one in which all incumbents were elected in uncontested races.

Voters' Information. As discussed earlier, the impact of elections on politicians' behavior can also be markedly different depending on voters' level of political knowledge. When constituents are uninformed about the nature of the decisions or the characteristics of the politicians, electoral concerns can induce distortions in the behavior of the politicians, giving them incentives to posture or pander to the electorate instead of using their information at the service of good policymaking (Canes-Wrone, Herron, and Shotts, 2001; Canes-Wrone and Shotts, 2007).

Our findings suggest that this mechanism might not be a quantitatively important determinant of the voting behavior of members of Congress. On the one hand, majority members do respond to the fraction of voters in their district that are informed about their ideology, in line with Canes-Wrone and Shotts' theoretical prediction. This impact is relatively small in magnitude, though: a one-standard-deviation increase in the proportion of constituents being uninformed about the ideology of the incumbent decreases the probability that she votes informatively by 0.75%. In other words, as the proportion of uninformed individuals in a district goes from 0% to 100%, the average probability of voting informatively among legislators in the majority decreases from 0.10 to 0.08. Moreover, we find that constituents' information about the ideology of the incumbent has no systematic influence on the behavior of minority legislators. Similarly, we do not find a statistically significant impact of constituents' general level of political information - as measured by average newspaper reading frequency in the district - on legislators' propensity to evaluate proposals based on their merit.[22]

[22] As noted in Table A.1, our measures of constituents' political knowledge are obtained as district-level averages of individual responses in the American National Election Studies (ANES). Not every district is represented in the ANES, though, and the number of respondents in districts that are represented can be quite small. Hence, we also fit our model substituting these survey-based measures with constituents' sociodemographic characteristics. The results of this alternative specification are more in line with Canes-Wrone and Shotts (2007)'s hypotheses, indicating that the probability that a representative votes informatively is positively correlated with the median household income and the proportion of older and college-educated constituents. Additional details are available from the authors upon request.

5.3 Prior Beliefs and Private Information

As we argued in Section 3.2.2, MCs' beliefs about the quality of the proposal can be influenced by variables correlated with quality that are observable by legislators prior to the vote. In our specification, in particular, we considered the number of cosponsors, the formal backing of the president, and the saliency of the issue.

Consider first the extent of public support to the bill by other Congressmen through co-sponsorship of legislation. The results indicate that the percentage of minority cosponsors has a large and significant impact on legislators' beliefs about the quality of the bill. As seen in Table 3, a one-standard-deviation increase in *% of Minority Cosponsors* is associated with a 10% increase in MCs ' prior belief that the bill is of high quality. That is, as the fraction of cosponsors of the opposition rises from 0 to 1, p_t increases from just above 0.4 to 0.75.[23] Moreover, through its effect on beliefs, the proportion of minority cosponsors also affects MCs' voting strategies, which in equilibrium adjust to the change in the prior. This indirect equilibrium effect is relatively important: a one-standard-deviation increase in the proportion of minority cosponsors results in a 2.8% increase in the probability that a minority member votes informatively, and in a 2.3% increase in the probability that she votes unconditionally in favor of the bill.

As we argued in Section 3, the backing of the President can also provide a signal of quality, for both the econometrician and MCs. According to our estimates, in fact, presidential support for a policy proposal turns out to be a strong signal of quality for legislators. Bills that are publicly backed by the president are perceived as almost 10% more likely to be of high quality than those about which he adopts no position, and 20% more likely than those he explicitly opposes. As with minority cosponsorship, this change in beliefs induces a corresponding change in attitudes and voting strategies. In our estimates, the probability that members of the minority reject the proposal regardless of its content drops by almost 8 percentage points on average when the president explicitly supports it. This finding is in line with Mouw and MacKuen (1992), who show that members of

[23] Furthermore, across-the-aisle support for the bill seems to be a better predictor of its perceived quality than the raw numbers of cosponsors: *Number of Cosponsors* does not have a systematic influence on the common prior about bill quality once the proportion of minority cosponsors is taken into account.

Table 3: Average predictive differences in p_t, associated with changes in bill-specific factors

Covariate	Δp_t
Number of Cosponsors	−0.69 (−3.37, 2.27)
% of Minority Cosponsors	9.83 (7.02, 12.65)
Presidential Position	10.23 (5.24, 13.47)
Key Vote	−12.72 (−19.25, −5.29)

Note: The table reports the expected change in $Pr(\omega_t = 1)$ associated with a change in bill-specific covariates. Estimates correspond to a one unit increase in the categorical variables and a one standard deviation increase in the continuous covariates. 90% highest posterior density intervals in parentheses.

Congress tend to adopt more moderate positions when presidents publicly address an issue, and cast some doubts on the argument that presidents' public appeals tend to reduce the possibility of compromise in Congress (Covington, 1987).

In contrast, we find that *Key Vote* is negatively correlated with p_t: legislators put a 13% lower probability that the bill is of good quality in key votes relative to other votes. In addition, our estimates indicate that key votes are less likely to be evaluated on their own merits than other proposals. In particular, minority legislators are 2.4 percentage points less likely to consider key votes based on their merits, and 6 points more likely to vote systematically against these proposals relative to other pieces of legislation. This result is consistent with the findings of Shull and Vanderleeuw (1987), who demonstrate that key votes tend to be more ideological and controversial than other roll call votes.

On the other hand, none of the predictors in $\mathbf{w}_t$ is systematically associated with changes in the precision of representatives' signals (see Table A.2). This is not entirely surprising since, as noted before, these variables are coarse proxies for the complexity and information content of the bills. We do, however, find considerably variations in q - as well as in

MC's prior beliefs and voting behavior - across Congresses and issue areas. Due to space limitations, we relegate the discussion of these findings to the Supplementary Materials Appendix (Section S.3). Still, the value of q is quite high - larger than 0.8 - in all sessions and policy domains, and precisely estimated, indicating that private information about the quality of the proposals that is dispersed across individuals is quite important.

5.4 Passage in the Senate

We argued that bicameralism is a fundamental reason why we can expect to observe a substantial degree of informative voting in Congress in the first place. This is because the likelihood that a bill introduced in the House is approved in the Senate increases significantly if it receives the support of a large majority of members of the House voting the bill on its merits (Iaryczower, Katz, and Saiegh, 2013). In this section we expand on the analysis in Iaryczower, Katz, and Saiegh (2013) by showing that the probability that a bill originating in the Houses passes in the Senate depends on the tally of votes of representatives classified as informative, on House members' beliefs about the quality of the proposal and, ultimately, on the variables affecting these beliefs and vote outcomes.

We begin by estimating a simple hierarchical logit model where the dependent variable $\tilde{y}_t \in \{0, 1\}$, indicating the Pass/Fail outcome in the Senate for bills that passed in the House, is regressed against the prior p_t and the net vote tally of members classified as voting informatively in the House, τ_t.[24] The results, reported in Figure 4, lend support to our core argument. For each percentage point increase in p_t, the probability that the bill is approved in the Senate augments by 0.21%, while each one-vote increase in τ_t is associated with a 0.15% rise in $P(\tilde{y}_t = 1)$.

The probability that a bill passes the Senate, however, is related to *both* τ_t and p_t. More precisely, in an EMR equilibrium, $\tilde{y}_t = 1$ if and only if $\tau_t \geq \lambda_t$, where λ_t is an endogenous cutpoint in the Senate, itself a function of the prior p_t, such that the receiving chamber

[24] The net informative tally is calculated as the number of "aye" minus "nay" votes among MCs' classified as belonging to behavioral type I: $\tau_t \equiv \sum_{i:\theta_i=I} y_{i,t}$. The *hierarchical* nature of the model incorporates Congress- and issue area random effects. We also estimated generalized additive logistic models, but found no evidence of non-linearity in the relationship between the predictors $\tilde{y}_t$.

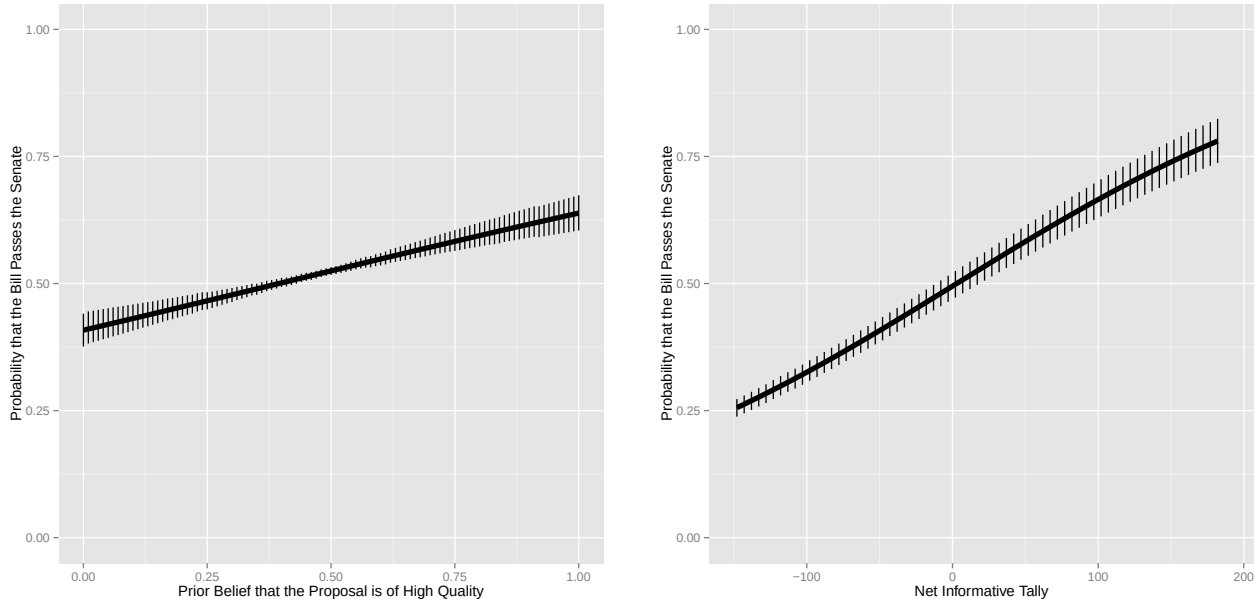

Figure 4: Relationship between p_t, τ_t, and the probability that the proposal passes in the Senate. The thick horizontal line represent point estimates (posterior means), and the thin vertical lines correspond to the 90% highest posterior density intervals.

approves the House bill if and only if $\tau_t \geq \lambda_t$ (see the Supplementary Materials Appendix for details). Assuming an i.i.d. random error term ϵ_t with c.d.f. $F(\cdot)$ (e.g., logistic), we can estimate the endogenous cutpoint λ from the data, using

$$P(\tilde{y}_t = 1|\tau_t, \delta_t) = F(\tau_t - \lambda_t). \tag{7}$$

We can then estimate the expected change in the probability that a clears the Senate associated with a change in covariate x from x_0 to x_1 by comparing the distribution of $P(\tilde{y}_t = 1|\tau_t, \lambda_t) \times P(\tau_t, \lambda_t|x_1, \dots)$ and $P(\tilde{y}_t = 1|\tau_t, \lambda_t) \times P(\tau_t, \lambda_t|x_0, \dots)$, keeping other regressors constant.

Section S.4 in the Supplementary Materials Appendix describes the results of this exercise for the individual and bill-specific covariates examined in the previous sections. In line with our previous findings, institutions and electoral concerns affecting the problem of members of the House have a significant impact on the probability that House bills clear the Senate. In particular, we found in Section 5 that more senior legislatures and less com-

petitive elections are associated with a reduction in informative voting. These factors also have a substantive impact on $P(\tilde{y}_t = 1)$. Consider for example a change in the composition of the House, from a situation in which MCs served at least 15 sessions and ran unopposed in their districts, to one in which all MCs are freshmen who got elected in closely contested races. Everything else equal, this change in the composition of the House is correlated with a 5% boost in the probability of passage in the Senate. The impact of the bill-specific covariates is quite substantive as well. For example, the average probability that the proposal is approved by the Senate is almost 9% higher if the majority of the cosponsors are in the opposition compared to a scenario in which only majority party members support the inititative. Similarly, presidential support for the bill is associated with a 5% increase in $P(\tilde{y}_t = 1)$.

6 Conclusion

An integral part of the production of legislation is the assessment of objective relations between policies and the environment in which these policies take effect, many of which are hard to pin down precisely. Getting these objective relations right is what we call here quality. What does it take for Congress to enact high quality legislation? Under what conditions will representatives incorporate policy-specific information when evaluating the merit of legislative proposals?

Surprisingly, we know relatively little about this. While political scientists have long recognized that bringing about good public policy is one of the main goals pursued by members of Congress, most of the empirical literature focused on purely ideological or distributional problems, disregarding the quality dimension of legislation. In this paper, we bridge this gap, and quantify the role of institutions and electoral considerations on the propensity of legislators to incorporate private information about the proposals in their decisions. To do this, we estimate a model of voting in Congress that incorporates uncertainty about the quality of the proposal.

The results show that besides clear partisan divides, both electoral considerations and the position of the legislator in the internal organization of Congress have a first order effect

on voting strategies. In particular, we find that seniority and uncompetitive elections lead to higher ideological rigidity and reduce the role of information in policy-making. These findings provide a rationale in favor of reforms aimed at increasing actual and potential renewal of the membership.

Much work remains ahead to better understand the complex relations between the environment in which legislators operate and their individual career concerns, on one side, and their voting behavior and impact on policy outcomes, on the other.

Two avenues seem particularly worth pursuing. One is to generalize our voting model. Although our model fits the data remarkably well – exceeding the benchmark of the two-dimensional spatial voting model –, enriching some aspects of our model can shed light to issues that remain unexplored. Paramount among these is the representation of the informational structure. A limitation of our approach is that it doesn't incorporate heterogeneity in the precision of signals across legislators. This is clearly restrictive, since the experience and expertise of Congress members varies across policy areas and issues. Undertaking this extension of our model is thus desirable, but also full of challenges. Key among them is that characterizing the equilibrium of the theoretical model becomes much more complex. While in the current version all the information transmitted from the House to the Senate is summarized in the vote tally of informative representatives, with heterogeneous ability the vote of each legislator becomes a signal with different precision. This, in turn, has repercussions on the inferences and best responses of members of both chambers. We hope to address this issue in future work.

From an empirical standoint, it would be relevant to include in our analysis bills initiated in the Senate as well in order to compare the prevalence and determinants of information-based decision-making in both chambers. Given that the number of roll call votes on passage is markedly smaller in the the upper chamber, this would require extending the period covered in our study considerably. This is an arduous task, mainly due to the need of linking the vote outcome of bills in the originating committe to their fate in the receiving chamber. Nonetheless, the availability of data on roll call votes spanning over two centuries and prior research in this direction - e.g., Poole and Rosenthal (1997) - could provide

valuable guidance in this process. Another promising application of our model would be to the study of informative voting and strategic information transmission in legislatures characterized by different sets of institutions, rules and partisan compositions. As attested by the application of the sincere spatial model to several legislatures throughout the world, this could contribute to our undestanding of congressional politics from a comparative perspective.

We end with a cautionary note. Although our paper uncovers interesting and novel patterns regarding the determinants and consequences of information-based voting in the US Congress, our analytical framework is not well suited for establishing causal relationships. Hence, estimating the causal effect of institutional and electoral factors on legislators' incentives to incorporate policy-specific information in their decisions calls for experimental methods and/or alternative econometric techniques. Still, the theoretical and empirical insights from this paper can provide a stepping stone for such efforts. Thus, we see this objective as complementary to the goals pursued in this article, and hope that our work encourages more research in this direction.

Appendix

Table A.1: Variable Definitions and Sources

Variable	Definition and Source
Policy Area	Defense, Government Operations, Health, International Affairs, Judiciary and Transportation coincide with topics 16, 20, 3, 19, 12 and 10 in the Policy Agendas Project's "Topics Codebook" (http://www.policyagendas.org/page/datasets-codebooks), respectively. Economic Activity includes all bills codes as 1, 15 or 18, while Education and Labor comprises bills in topics 5 and 6. All other codes were aggregated into the category "Other".
Number of Cosponsors	Source: James Fowler's Cosponsorship Network Data.
% of Minority Cosponsors	Proportion of cosponsors who do not belong to the party holding a majority of the seats in the House. Source: James Fowler's Cosponsorship Network Data.
Key Vote	1 if the vote was classiffied as a Key Vote by Congressional Quarterly (QC), and 0 otherwise. Source: CQ Key Votes: 1949 - 2012, voteview.com.
Presidential Position	1 for "nays", 2 for "no position" and 3 for "yeas". To assess the sensitivity of our results, we also used indicators for bills that were endorsed and opposed by the executive, with "no position" as the reference category. Source: Political Institutions and Public Choice Program, Duke University.
Number of Words	Source: Based on data gathered from the Library of Congress (Thomas).
Multiple Committees	1 for bills that were referred to more than one House committee, 0 otherwise. Source: Based on data gathered from the Library of Congress (Thomas).
Accumulated Expertise	Number of reports that the committee(s) considering the bill presented during the three previous Congressional sessions. Source: Based on data gathered from the Library of Congress (Thomas).
Majority Party	1 if the legislator is a member of the party holding a majority of the seats in the House, and 0 otherwise. Source: Charles Stewart's Congressional Data Page.
Leadership	1 if a legislator holds any of the following positions: Speaker of the House; Majority Leader; Minority Leader; Majority Whip; Minority Whip; Rules Committee Chair; Ways and Means Committee Chair; Democratic Caucus Chair; Republican Conference Chair; Democratic Campaign Committee Chair; Republican Policy Committee Chair; National Republican Congressional Committee Chair; Democratic Caucus Vice-Chair; Republican Conference Vice-Chair; Republican Conference Secretary. Source: Amer, M. (2008): "Major Leadership Election Contests in the House of Representatives, 94th-111th Congresses", Congressional Research Service, Report RL30607.

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Table A.1 – *Continued from previous page*

Variable	Definition and Source
Seniority	Number of periods a legislator has served in the House. Source: Charles Stewart's Congressional Data Page.
Committee Membership	1 if the legislator is a member of a committee in which the bill is originated and 0 otherwise. Source: Charles Stewart's Congressional Data Page.
Margin of Victory	Difference in the vote-shares of the incumbent and her closest challenger in the previous House election. As a robustness check, we also operationalized this variable with the binary indicator *Safe district*, taking the value 1 if the if the incumbent won by at least 60% (Canes-Wrone, Brady, and Cogan, 2002) of the vote. Source: Election Statistics, Office of the Clerk of the U.S. House of Representatives.
Unopposed	1 if the legislator ran unopposed in the previous House election, 0 otherwise. Source: Election Statistics, Clerk of the U.S. House of Representatives.
Last Period	1 when a legislator is on her terminal term, 0 otherwise. Source: Based on data from Charles Stewart's Congressional Data Page and CQ *Weekly Reports*.
Newspaper Reading	Frequency of reading daily newspapers averaged by district, used as proxy for constitutents' general level of political information (Snyder and Strömberg, 2010). Based on responses to the survey question: "How many days in the past week did you read a daily newspaper?". Source: American National Election Studies.
Lack of Familiarity with the Incumbent	Average proportion of individuals in a district who cannot recognize their House representative or are unable to place her on a seven point ideological scale, used as proxy for constituents' familiarity with MCs' preferences (Snyder and Strömberg, 2010). Individual answers are coded as 1 if the respondent is not able to place the legislator on the scale or cannot recognize her, and 0 otherwise. Source: American National Election Studies.
Divided Government	1 if the same party controls the executive and legislative branches, and 0 otherwise. With the exception of the 107th Congress, the same party held the majority of the seats in the House and the Senate throughout the period under analysis.
Majority Surplus	Number of seats in excess of 218 held by the majority party. Source: Party Divisions of the House of Representatives, History, Art and Archives, US House of Representatives.

Table A.2: Posterior Summary for Model Parameters
(excluding random intercepts)

Covariate		Mean	Std. Dev.	90% HPD
Determinants of θ_i				
Majority Party	γ_I	1.517	0.902	0.233, 2.974
	γ_Y	8.018	0.867	6.701, 9.453
Leadership	$\gamma_{I,Majority}$	0.408	0.806	−0.848, 1.701
	$\gamma_{Y,Majority}$	2.121	0.745	0.850, 3.287
	$\gamma_{I,Minority}$	0.180	0.369	−0.451, 0.738
	$\gamma_{Y,Minority}$	−0.629	0.635	−1.615, 0.402
Seniority	$\gamma_{I,Majority}$	−1.786	0.445	−2.313, −0.895
	$\gamma_{Y,Majority}$	−2.031	0.439	−2.761, −1.362
	$\gamma_{I,Minority}$	−0.109	0.078	−0.231, 0.012
	$\gamma_{Y,Minority}$	0.041	0.136	−0.173, 0.239
Seniority^2	$\gamma_{I,Majority}$	−0.080	0.175	−0.375, 0.179
	$\gamma_{Y,Majority}$	0.059	0.170	−0.251, 0.293
	$\gamma_{I,Minority}$	−0.092	0.030	−0.137, −0.045
	$\gamma_{Y,Minority}$	−0.237	0.079	−0.365, −0.118
Committee Membership	$\gamma_{I,Majority}$	0.496	0.541	−0.235, 1.509
	$\gamma_{Y,Majority}$	0.757	0.524	−0.043, 1.673
	$\gamma_{I,Minority}$	−0.380	0.148	−0.599, −0.166
	$\gamma_{Y,Minority}$	0.519	0.251	0.184, 0.916
Margin of Victory	$\gamma_{I,Majority}$	1.212	0.376	0.591, 1.761
	$\gamma_{Y,Majority}$	1.107	0.362	0.498, 1.617
	$\gamma_{I,Minority}$	−1.679	0.156	−1.945, −1.434
	$\gamma_{Y,Minority}$	−0.800	0.067	−0.927, −0.705
Unopposed	$\gamma_{I,Majority}$	2.036	1.144	0.261, 3.845
	$\gamma_{Y,Majority}$	2.404	1.165	0.761, 4.423
	$\gamma_{I,Minority}$	1.571	0.287	1.110, 2.040
	$\gamma_{Y,Minority}$	3.071	0.850	1.765, 4.341
Last Period	$\gamma_{I,Majority}$	3.378	0.820	2.058, 4.629
	$\gamma_{Y,Majority}$	3.308	0.807	1.813, 4.376
	$\gamma_{I,Minority}$	1.267	0.236	0.927, 1.673
	$\gamma_{Y,Minority}$	1.979	0.297	1.479, 2.441
Newspaper Reading	$\gamma_{I,Majority}$	0.500	0.236	0.132, 0.857
	$\gamma_{Y,Majority}$	0.484	0.229	0.146, 0.843
	$\gamma_{I,Minority}$	−0.091	0.062	−0.174, 0.195
	$\gamma_{Y,Minority}$	−0.031	0.099	−0.184, 0.141

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Table A.2 – *Continued from previous page*

Covariate		Mean	Std. Dev.	90% HPD
Lack of Familiarity with the Incumbent	$\gamma_{I,Majority}$	−0.435	0.221	−0.731, −0.034
	$\gamma_{Y,Majority}$	−0.330	0.220	−0.668, 0.016
	$\gamma_{I,Minority}$	0.050	0.064	−0.057, 0.143
	$\gamma_{Y,Minority}$	0.084	0.106	−0.118, 0.236
Divided Government	$\gamma_{I,Majority}$	1.737	0.913	0.312, 3.122
	$\gamma_{Y,Majority}$	0.826	0.919	−0.637, 2.405
	$\gamma_{I,Minority}$	−0.108	0.717	−1.193, 0.964
	$\gamma_{Y,Minority}$	−0.834	0.849	−2.119, 0.563
Majority Surplus	$\gamma_{I,Majority}$	2.560	0.564	1.603, 3.475
	$\gamma_{Y,Majority}$	2.255	0.599	1.401, 3.381
	$\gamma_{I,Minority}$	−0.903	0.346	−1.339, −0.340
	$\gamma_{Y,Minority}$	−0.751	0.406	−1.371, −0.061
Determinants of ω_t				
Number of Cosponsors	α_1	−0.037	0.092	−0.182, 0.112
Minority Cosponsors	α_2	0.523	0.099	0.379, 0.711
Presidential Position	α_3	0.463	0.114	0.281, 0.670
Key Vote	α_4	−0.674	0.229	−1.084, −0.321
Determinants of q_t				
Number of Words	β_1	−0.002	0.104	−0.169, 0.166
Multiple Committees	β_2	0.009	0.138	−0.180, 0.253
Issue Experience	β_3	−0.002	0.058	−0.086, 0.092

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What Does it Take for Congress to Enact Good Policies? Unpacking Institutions & Electoral Concerns.

Supplementary Materials Appendix.

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Contents

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S.1 Voting Model: Details and Proofs

As described in the paper, we consider Perfect Bayesian equilibria in pure strategies in which at least some members of the House vote *informatively*; i.e., vote in favor of the bill when their private assessment is that the bill is of high quality, and against the bill otherwise. Moreover, because in the data House bills are never killed on a vote in the Senate floor, we focus on equilibria in which only members of the House (the originating chamber) vote informatively.

Establishing existence of EMR equilibria in a manner that is robust to any possible reasonable refinement requires that we assume that the signals of members of the originating chamber are more informative than those of members of the receiving chamber; and in particular, that $q/(1-q) \geq \tilde{q}^2/(1-\tilde{q})^2$. We maintain this assumption throughout.[1] To preserve conflict of interests, we also assume throughout that more than one positive House signal is necessary to convince an anti-change legislator to support the bill, and that more than one negative House signal is necessary to convince a pro-change legislator to vote against the bill.

There are two types of EMR equilibria, depending on whether pros have a winning coalition in the Senate (i.e., $m_s^P \geq R_s$) or not. In each case, an EMR equilibrium exists if and only if the information of all individuals voting informatively is enough to overturn the bias of a senator in the relevant coalition. We measure these biases in terms of the smallest number of positive signals a legislator would need to observe among members of the House for her to vote in favor of the proposal if he had observed n positive signals among members of the Senate. We call these thresholds ρ_n^P and ρ_n^A for pro and anti-change legislators. Specifically, for any group of representatives B_H, and senators B_S, and any integers x and y, let

$$\beta(x,y) \equiv \Pr(\omega = 1 | \sum_{i \in B_H} s_i = x, \sum_{i \in B_S} s_i = y) = 1/\left[1 + \left(\frac{1-p}{p}\right)\left(\frac{1-q}{q}\right)^x \left(\frac{1-\tilde{q}}{\tilde{q}}\right)^y\right].$$

Then ρ_y^P (ρ_y^A) is the smallest integer k such that $\beta(k,y) \geq \pi^P$ (such that $\beta(k,y) \geq \pi^A$).

[1] PBE of voting games of the kind considered here can be non-robust to small perturbations to the voting behavior of committee members around their equilibrium strategies. To rule out this possibility we consider the following perturbation of the game. With probability $1-\upsilon$, a committee member i is a *moderate*, and has the preferences described above; with probability $\upsilon > 0$, she is a *partisan*. Conditional on being a partisan, i votes for (against) the proposal unconditionally with probability α (respectively, $1-\alpha$). We say that a strategy profile $\sigma(\cdot)$ is a *voting equilibrium* if there exists an $\overline{\upsilon} > 0$ such that for all $\upsilon < \overline{\upsilon}$ there exist beliefs $\{\mu_i^\upsilon(s_{-i}|s_i,h_j)\}$ such that (σ,μ^υ) is a PBE of the game Γ_υ in pure anonymous strategies. This is a relatively strong refinement, to establish the robustness of the equilibria we identify. These equilibria are also sequential, and weakly undominated. We can also consider a similar refinement to the one we propose here, in which pros (antis) can only be partisan for (against) the proposal. In this case, the requirement that $q >> \tilde{q}$ in the Proposition is not needed.

Propositions 1 and 2 show that an EMR equilibrium exists if and only if the bias of a senator in the relevant coalition is sufficiently small. More precisely, Proposition 1 shows that if pro-change legislators are a winning coalition in the Senate, there exists a C^P such that if $|\rho_1^P| \leq C^P$, there exists an EMR voting equilibrium. Specifically,

$$C^P \equiv (m_H^P - m_H^A - r_H)/2,$$

where m_j^P and m_j^A denote the number of pro and anti-change legislators in chamber j. Similarly, Proposition 2 shows that when pro-change legislators are not a winning coalition in the Senate, there exists C^A such that if $|\rho_1^A| \leq C^A$, there exists an EMR voting equilibrium. Specifically,

$$C^A \equiv \max\{(m_H^A - m_H^P + r_H)/2 - 1, n_H - r_H - 1 + \rho_0^P\}.$$

Proposition 1 *Suppose that pros are a winning coalition in the Senate. There exists an equilibrium in which members of the House vote informatively if and only if* $|\rho_1^P| \leq C^P$. *Any such equilibrium is an EMR equilibrium in which* $\tilde{k}$ *pros in the House vote informatively, the remaining pros vote unconditionally in favor of the proposal, and all antis in the House vote unconditionally against the proposal. The proposal passes in the Senate if and only if* $\sum_{i\in\tilde{K}} v_i \geq \rho_1^P$, *where* $\tilde{K}$ *is the set of members voting informatively.*

When instead pros do not form a winning coalition in the Senate, only a subset of antis vote informatively in the House.

Proposition 2 *Suppose that pros do not form a winning coalition in the Senate. There exists an equilibrium in which members of the House vote informatively if and only if* $|\rho_1^A| \leq C^A$. *Any such equilibrium is an EMR equilibrium in which* $\hat{k}$ *antis in the House vote informatively, the remaining antis vote unconditionally against the proposal, and pros vote unconditionally in favor of the proposal. The proposal passes in the Senate if and only if* $\sum_{i\in\hat{K}} v_i \geq \rho_1^A$, *where* $\hat{K}$ *is the set of members voting informatively.*

Before going to the proofs, we need to introduce an additional definition.[2] For a set $\mathcal{J}$ of members of the House, and given $\{\mathbf{s}_J : t(\sigma_{\mathcal{J}}(\mathbf{s}_{\mathcal{J}})) = t\} \neq \emptyset$, we define $\tau_{s_{\mathcal{J}}}(t, \sigma_{\mathcal{J}}) \equiv t - t_{\mathcal{J}}^u$, where $t_{\mathcal{J}}^u$ is the (net) tally of votes of members of $\mathcal{J}$ voting uninformatively; i.e., $\tau_{s_{\mathcal{J}}}(t, \sigma_{\mathcal{J}})$ is the (net) tally of *signals* of individuals voting informatively in $\mathcal{J}$ that is consistent with a vote tally t given strategy profile $\sigma_{\mathcal{J}}$.

Proof of Propositions 1 and 2. Suppose then that σ^* is a EMR voting equilibrium. Then there exists an (even) integer θ, $r_H - 1 \leq \theta \leq n_H - 1$, such that $t(\sigma_1^*(\mathbf{s}_1, \mathbf{v}_H)) \leq r_S - 1$

[2]The proof is taken from Iaryczower (2008), and is included here for convenience.

$\forall \mathbf{s}_1$ whenever $t_H(\mathbf{v}_H) \leq \theta - 1$, and $t(\sigma_1^*(\mathbf{s}_1, \mathbf{v}_H)) \geq r_S$ $\forall \mathbf{s}_1$ whenever $t_H(\mathbf{v}_H) \geq \theta + 1$. If pros are (are not) a winning coalition in the Senate, the binding incentive compatibility constraints in the Senate are that pros (cons) in the Senate are willing to (i) vote in favor of the proposal unconditionally following any history $\mathbf{v}_H$ such that $t_H(\mathbf{v}_H) \geq \theta + 1$, and (ii) against the proposal unconditionally following any history $\mathbf{v}_H$ such that $t_H(\mathbf{v}_H) \leq \theta - 1$.

First we prove Proposition 1.

1. Suppose that pros have a winning coalition in the Senate. Since $\beta(x, y)$ is strictly increasing in x and y, the incentive constraints are binding at the boundaries. Therefore condition (i) is equivalent to $\beta(\tau_H(\theta - 1, \sigma_H), 1) \leq \pi^P$, or $\tau_H(\theta - 1, \sigma_H) \leq \rho_1^P - 1$. Similarly, condition (ii) is equivalent to $\beta(\tau_H(\theta + 1, \sigma_H), -1) \geq \pi^P$, or $\tau_H(\theta + 1, \sigma_H) \geq \rho_{-1}^P$. Since $\tau_H(t, \sigma_H) = \tau_H(t - 1, \sigma_H) + 1$ for any t, the θ-EMR strategy profile is an equilibrium in the Senate if and only if

$$\rho_{-1}^P - 1 \leq \tau_H(\theta, \sigma_0) \leq \rho_1^P \tag{1}$$

Consider next the problem of a representative i (in the House) voting informatively. Suppose for now that i is a pro (we will then show this has to be the case). i does not have incentives to deviate if and only if $\beta(\tau_{H,-i}(\theta, \sigma_{H,-i}) - 1, 0) \leq \pi^P \leq \beta(\tau_{H,-i}(\theta, \sigma_{H,-i}) + 1, 0)$. For i voting informatively, $\tau_{H,-i}(t, \sigma_{H,-i}) = \tau_H(t - 1, \sigma_H) + 1 = \tau_H(t, \sigma_H)$. Thus these conditions can be written as $\beta(\tau_0(\theta, \sigma_H) - 1, 0) \leq \pi^P \leq \beta(\tau_0(\theta, \sigma_H) + 1, 0)$, or equivalently

$$\rho_0^P - 1 \leq \tau_H(\theta, \sigma_H) \leq \rho_0^P \tag{2}$$

Next, note that since ρ_m^P is decreasing in m, then $\rho_0^P > \rho_1^P$ and $\rho_0^P < \rho_{-1}^P$. It follows that (2) is satisfied whenever (1) is; i.e., if the cut point θ is incentive compatible in the Senate when pros are a winning coalition in the Senate, then a pro bill member of the House has incentives to vote informatively.

Note moreover that if pros are a winning coalition in the Senate, then it cannot be that in an EMR voting equilibrium cons in the House vote informatively. For suppose they do. By the logic of the previous point, then i voting informatively does not have incentives to deviate iff $\rho_0^P - 1 \leq \tau_H(\theta, \sigma_H) \leq \rho_0^P$. Now, by (1), $\tau_H(\theta, \sigma_0) \leq \rho_1^P$, and since $\rho^P(\cdot)$ is decreasing and $\rho_0^P < -1$, then $\rho_1^P \leq -2 < \rho_0^P - 1$.

2. Next, note that there exists some integer θ satisfying (1) only if $\rho_{-1}^P - 1 \leq \rho_1^P$. But this in turn is satisfied if and only if

$$\rho_{-1}^P - \rho_1^P = 2 \ln \left(\frac{\tilde{q}}{1 - \tilde{q}} \right) / \ln \left(\frac{q}{1 - q} \right) \leq 1 \Leftrightarrow q \geq \frac{\tilde{q}^2}{\tilde{q}^2 + (1 - \tilde{q})^2}$$

When this condition is satisfied we can set either $\tau_H(\theta, \sigma_0) = \rho^P_{-1} - 1$ or $\tau_H(\theta, \sigma_0) = \rho^P_1$. So write $\tau_H(\theta, \sigma_0) = \rho^P_1$. Because $\tau_H(t, \sigma_0) = t - t^u_H$,

$$\theta = \rho^P_1 + t^u_H$$

3. From the fact that individuals voting informatively are pros we can conclude that antis must be voting against the proposal unconditionally, and that pros that are not voting informatively must be voting for the proposal unconditionally.

Suppose instead that at least one anti, i', votes for the proposal unconditionally, and let t^u_H be the net tally of members of the House voting uninformatively. Then $\tau_H(t_H) = t_H - t^u_H$. Suppose that after a $s_{i'} = -1$, i' deviates and votes against the proposal. Conditional on reaching the Senate, i' is taken as a partisan. The deviation therefore only matters if i' is standard pivotal in the House; i.e., if $t_{H,-i} = r_H - 1$ (and it does matter here, since the outcome following $\mathbf{v}_H$ such that $t_{H,-i} = r_H$ is A with positive probability). This is a profitable deviation if $\beta(\tau_{H-i}(r_H - 1) - 1, 0) < \pi^A \Leftrightarrow \tau_{H-i}(r_H - 1) < \rho^A_0$, or $r_H < \rho^A_0 + t^u_H$, in which case we are done. So assume instead that $r_H \geq \rho^A_0 + t^u_H$. By (1), $\tau_H(\theta, \sigma_0) = \theta - t^u_H \leq \rho^P_1$, so $t^u_H \geq \theta - \rho^P_1$. Substituting, $r_H \geq \theta + \rho^A_0 - \rho^P_1$. Now, since $\rho^A_0 > 1$ and $\rho^P_0 < -1$ by hypothesis, and ρ^P is decreasing, then $\rho^A_0 - \rho^P_1 \geq 2 - \rho^P_1 \geq 1$. Then $r_H > \theta + 1$, which is a contradiction with the feasibility requirement that $\theta \geq r_H - 1$.

From this it follows in turn that pros that are not voting informatively must be voting for the proposal, for otherwise $\tau_H(t_H; \sigma_H) = t_H + n_H - k$, and thus $\tau_H(\theta; \sigma_H) = \theta + n_H - k \geq r_H - 1 + n_H - k > \rho^P_1$, which given that $\rho^P_1 < 0$, follows because $r_H \geq 1$ and $n_H \geq k$.

4. From the previous point, $t^u_H = m^P_H - k - m^A_H$. Thus $\theta = \rho^P_1 + m^P_H - m^A_H - k$. For θ to be well defined, we need that $t^u_H - k + 1 \leq \theta \leq t^u_H + k - 1$. Substituting for θ, the first inequality boils down to $k \geq -\rho^P_1 + 1$. The second inequality is never binding. For feasibility, we need $\theta \geq r_H - 1$ ($\theta \leq n_H - 1$ is not binding). Substituting for θ, this implies $k \leq m^P_H - m^A_H + 1 + \rho^P_1 - r_H$.

5. A pro member i' voting for the proposal unconditionally does not to have a profitable deviation if and only if $t^u_H \leq r_H - \rho^P_0$, and an anti member i'' voting against the proposal unconditionally does not to have a profitable deviation if and only if $t^u_H \geq r_H - \rho^A_0 - 1$. As in the previous point, the relevant point is that the inference is conditional on being standard pivotal in the House.

For the first part, note that i' has a profitable deviation iff $\beta(\tau_{H-i}(r_H - 1) - 1, 0) < \pi^P \Leftrightarrow \tau_{H-i}(r_H - 1) < \rho^P_0$. Since i' is voting for A in equilibrium, then $\tau_{H-i}(t) = t - (t^u_H - 1)$, so

$\tau_{H-i}(r_H-1) = r_H - t_H^u$. Thus i' does not have a profitable deviation iff $t_H^u \leq r_H - \rho_0^P$. Similarly, i'' has a profitable deviation iff $\beta(\tau_{H-i}(r_H-1)+1, 0) > \pi^A \Leftrightarrow \tau_{H-i}(r_H-1)+1 > \rho_0^A$. Since i'' is voting against the proposal in equilibrium, then $\tau_{H-i}(t) = t - (t_H^u + 1)$, so $\tau_{H-i}(r_H-1) = r_H - t_H^u - 2$. Thus i'' does not have a profitable deviation iff $t_H^u \geq r_H - \rho_0^P - 1$.

Substituting, these imply that $k \geq m_H^P - m_H^A + \rho_0^P - r_H$ and $k \leq m_H^P - m_H^A + 1 + \rho_0^A - r_H$ respectively. The condition in point 6 above implies the second inequality. The first inequality is consistent with the condition in point 6 if $\rho_0^P - \rho_1^P \leq 1$, which holds since $q \geq \tilde{q}$.

6. Then either there are $k^* = m_H^P - m_H^A + 1 + \rho_1^P - r_H$ informative votes, which given the constraint that $k \geq -\rho_1^P + 1$ requires $-\rho_1^P \leq (m_H^P - m_H^A - r_H)/2$, or $k^* = m_H^P - m_H^A + \rho_0^P - r_H$ informative votes, which requires $(-\rho_1^P - \rho_0^P + 1)/2 \leq (m_H^P - m_H^A - r_H)/2$.

Proposition 2 follows from the same logic:

1. Point 1 follows unchanged until the last paragraph, exchanging pros and antis, and substituting π^P with π^A, and ρ^P with ρ^A. The argument for the last paragraph is symmetric to the previous one. It follows that the IC in the Senate is $\rho_{-1}^A - 1 \leq \tau_H(\theta, \sigma_H) \leq \rho_1^A$, and individuals voting informatively in the House must be antis (their IC is implied by the IC in the Senate).

2. Follows unchanged substituting ρ^P with ρ^A.

3. Remains unchanged. It follows that antis not voting informatively must be voting against the proposal unconditionally, and pros must be voting for the proposal unconditionally.

4. From the previous point, $t_H^u = m_H^P - (m_H^A - k)$. Thus $\theta = \rho_1^A + m_H^P - m_H^A + k$. For θ to be well defined, we need that $t_H^u - k + 1 \leq \theta \leq t_H^u + k - 1$. Substituting for θ, the first inequality boils down to $k \geq 1 - \rho_1^A$, and thus is never relevant (given $\rho_1^A \geq 1$). The second inequality boils down to $k \geq \rho_1^A + 1$. For feasibility, we need $\theta \geq r_H - 1$. Substituting for θ, this implies $k \geq r_H - 1 - \rho_1^A - m_H^P + m_H^A$. For $\theta \leq n_H - 1$, we need $k \leq 2m_H^A - 1 - \rho_1^A$.

5. Follows unchanged until the third paragraph. But here $t_H^u \leq r_H - \rho_0^P$ becomes $k \leq r_H - \rho_0^P - m_H^P + m_H^A$, and $t_H^u \geq r_H - \rho_0^A - 1$ becomes $k \geq r_H - \rho_0^A - 1 - m_H^P + m_H^A$. The second inequality is implied by the condition in point 4 above, since ρ^A is decreasing.

6. From 4 and 5 above, it follows that there is an equilibrium with k informative votes if

and only if (A1) $k \geq \rho_1^A + 1$, (A2) $k \geq r_H - 1 - \rho_1^A - m_H^P + m_H^A$, (A3) $k \leq 2m_H^A - 1 - \rho_1^A$, and (A4) $k \leq r_H - \underline{\rho}(0) - m_H^P + m_H^A$. There exists a k satisfying A1-A4 if and only if

$$\rho_1^A \leq \max\left\{(m_H^A - m_H^P + r_H)/2 - 1, n_H - r_H - 1 + \rho_0^P\right\} \tag{3}$$

First, note that A1 implies A2 if (M1) $\rho_1^A \geq (m_H^A - m_H^P + r_H)/2 - 1$, while otherwise A2 implies A1. Moreover, A3 implies A4 if (M2) $\rho_1^A + 1 - \rho_0^P \geq n_H - r_H$, while otherwise A4 implies A3.

If [M1] and [M2], there is a k satisfying A1-A4 iff $\rho_1^A \leq m_H^A - 1$. This is consistent with [M1] iff $r_H \geq n_H$, which is not satisfied for non-unanimous voting rules in the House. If [not M1] and [not M2], there is a k satisfying A1-A4 iff $\rho_1^A + 1 - \rho_0^P \geq 0$, which always holds. If [M1] and [not M2], there is a k satisfying A1-A4 iff $\rho_1^A + 1 + \rho_0^P \leq m_H^A - m_H^P + r_H$, which is implied by [not M2]. If [not M1] and [M2], there is a k satisfying A1-A4 iff $n_H \geq r_H$, which always holds.

Therefore, we have the following. If $\rho_1^A \leq \min\{(m_H^A - m_H^P + r_H)/2 - 1, n_H - r_H - 1 + \rho_0^P\}$, then [not M1] and [not M2], and there is a k satisfying A1-A4. If this condition does not hold but (3) holds, then either [M1] and [not M2], or [not M1] and [M2], and in both cases there is a k satisfying A1-A4. ■

S.2 Descriptive Statistics and Model Checks

Table S.1: Descriptive Statistics of Independent Variables

Covariate	Mean	Std. Dev.	Range
Majority Party	0.537	0.494	0 - 1
Leadership	0.040	0.196	0 - 1
Seniority	5.420	3.951	1 - 25
Committee Membership	0.134	0.341	0 - 1
Margin of Victory	0.375	0.246	0 - 1
Unopposed	0.047	0.211	0 - 1
Last Period	0.120	0.325	0 - 1
Newspaper Reading	3.647	1.828	0 - 7
Lack of Familiarity with the Incumbent	0.359	0.322	0 - 1
Number of Cosponsors	24.309	53.283	0 - 328
Minority Cosponsors	0.166	0.274	0 - 1
Presidential Position	1.976	0.656	1 - 3
Key Vote	0.204	0.403	0 - 1
Number of Words	15,097	24,474	109 - 213,934
Multiple Committees	0.271	0.4445	0 - 1
Issue Experience	210.145	187.177	0 - 1,083
Divided Government	0.619	0.486	0 - 1
Majority Surplus	13.306	13.305	3 - 49
Number of Bills		818	
Number of members of Congress		926	

Table S.2: Distribution of Roll Calls by Congress and Area

Congress	**Policy Area**									
	Defense	Economic Activity	Education & Labor	Government Operations	Health	International Affairs	Judiciary	Transportation	Other	Total
102	9	16	10	17	4	8	5	7	24	**100**
103	8	11	11	18	2	4	5	8	28	**95**
104	10	15	16	19	3	7	12	6	24	**112**
105	6	19	11	14	5	12	3	3	21	**94**
106	7	21	11	30	7	7	11	4	23	**121**
107	8	20	8	12	5	5	5	4	17	**84**
108	8	25	11	20	9	4	8	4	22	**111**
109	11	17	10	16	3	4	9	1	30	**101**
Total	**67**	**144**	**88**	**146**	**38**	**51**	**58**	**37**	**189**	**818**

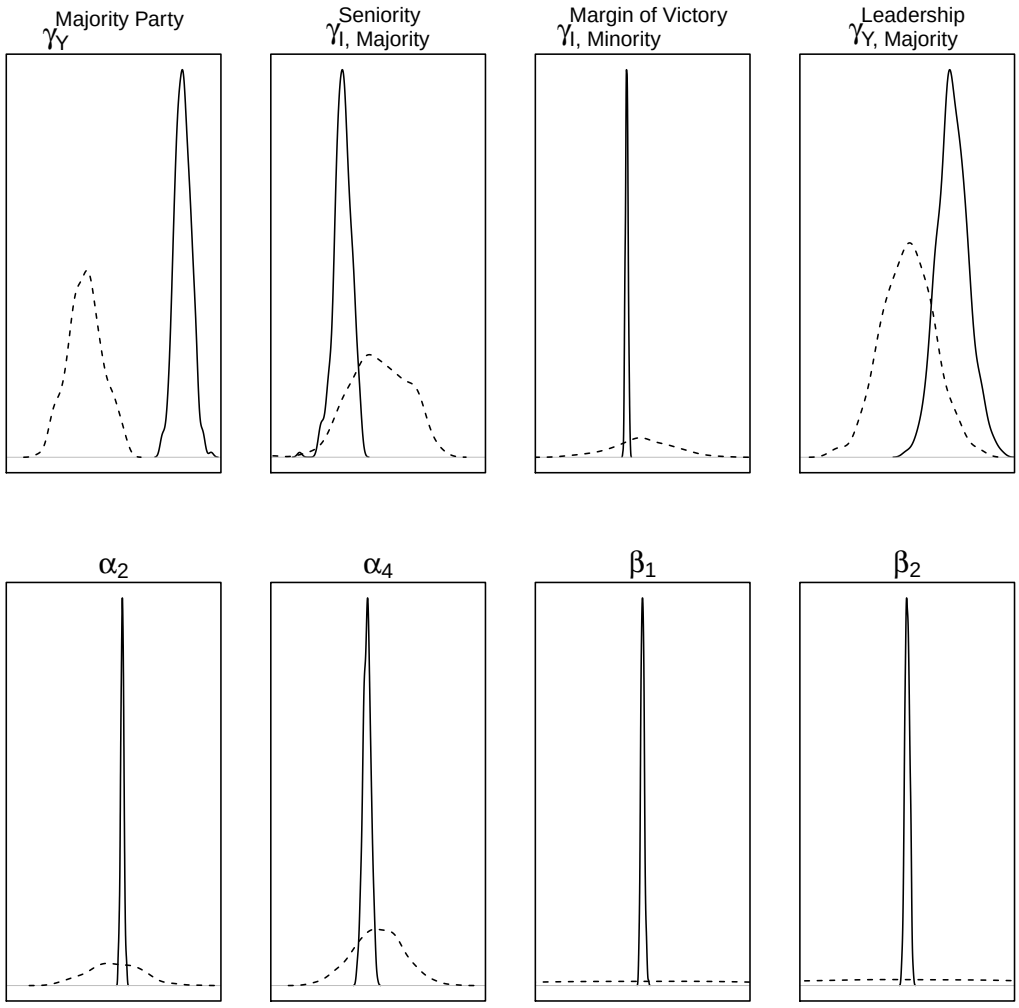

Figure S.1: Prior and Posterior Distributions of Selected Regression Parameters. Solid (dashed) lines correspond to the posterior (prior) distributions for the coefficients of some of the covariates included in $\mathbf{x}_t$, $\mathbf{w}_t$ and $\mathbf{z}_i$. Substantial overlap between the priors and posteriors indicates weak identifiability (Garrett and Zeger, 2000).

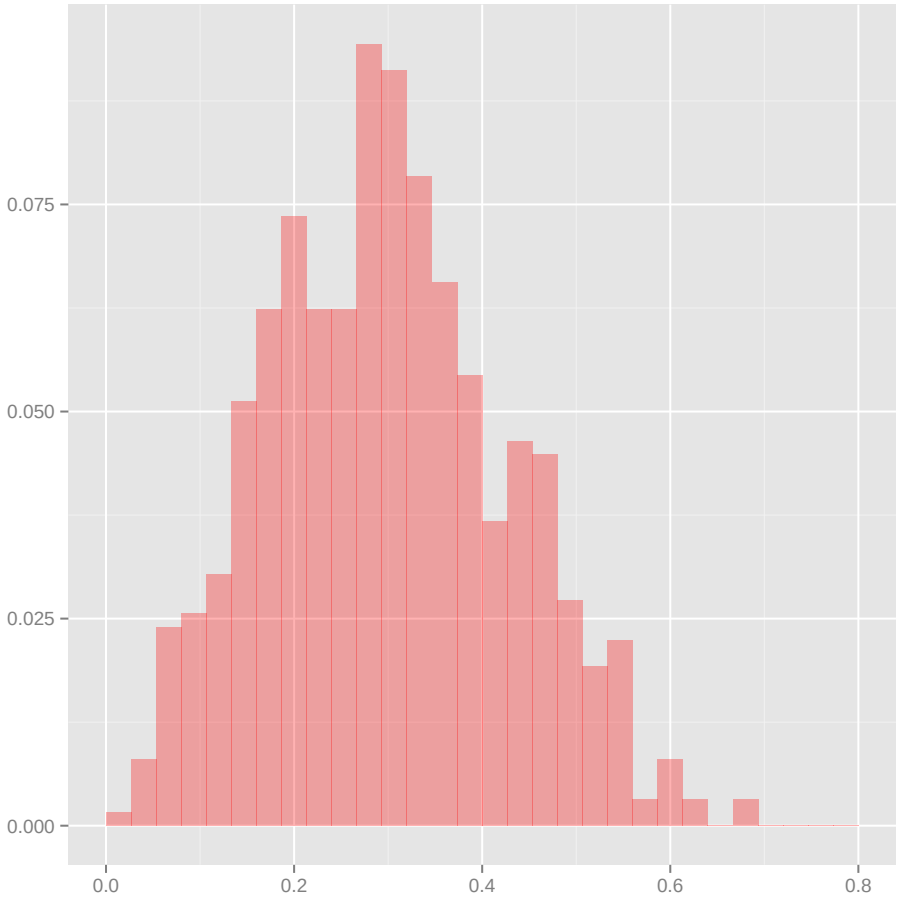

Figure S.2: Posterior predictive distribution p-values. The histogram plots the distribution of $\sum_{Rep} I\left(\sum_{t=1}^{T} y_{i,t}^{Rep} > \sum_{t=1}^{T} y_{i,t}\right) / \sum_{Rep} 1$. Very small (e.g., less than 0.025) or large (higher than 0.975) values indicate that the - conditionally - independent Bernoulli distribution assumed for legislators' votes is not appropriate (Elliot, Gallo, Ten, Bogner, and Katz, 2005). Less than 0.3% of MCs in our sample have such extreme PPD p-values.

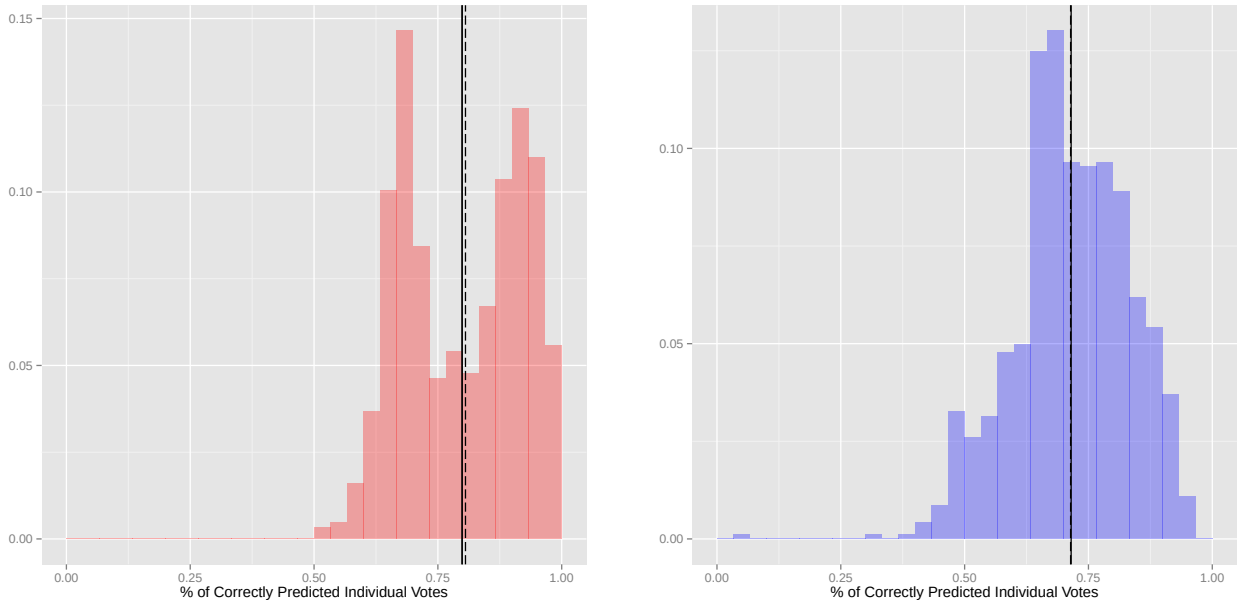

Figure S.3: Distribution of correctly predicted individual votes. The histogram in the left panel represents the distribution of the statistic $\sum_{Rep}\left(\frac{\sum_{t=1}^{T} I(y_{i,t}^{Rep}=y_{i,t})}{T}\right)/\sum_{Rep} 1$ computed from our estimates, for each of the MCs in our sample. The right panel plots the distribution of correctly predicted individual votes obtained using OC point estimates. Solid (dashed) vertical lines correspond to the mean (median) proportion of correctly predicted votes under each model.

S.3 Variations Across Congresses and Policy Areas

Besides the individual and bill-specific traits considered in the text, it is natural to allow particular features of each Congress or of the policy area under consideration to affect members' beliefs about the quality of the proposal. In fact, to the extent that MCs' attitudes towards the bill can be directly influenced by these contextual forces, they can also induce direct systematic changes in the distribution of behavioral types. Our empirical model accounts for these two kinds of systematic variation through the use of congress- and policy area- random effects.

Our estimates, which we summarize in Figure S.4, confirm that there is in fact some variation in both prior beliefs and in the distribution of behavioral types across congressional sessions and policy areas. It is interesting to note, in particular, that members' prior belief that legislation is of high quality declines markedly in the 104th and 105th Congresses, when control of the House switched from Democratic to Republican. This finding is in line with popular and academic accounts of the Republican Revolution stressing the centralization of proposal power under GOP leadership, and the adoption of a distinct ideological edge by the both the elite and rank and file (Aldrich and Rohde 2000; Dodd 2001). The results in Figure S.4 also suggest, however, that the partisan context preceded the Republican Revolution, as the proportion of legislators voting informatively in the 102nd and 103rd Congresses is comparatively low.

The right panel also shows systematic differences across policy areas. Interestingly, the figure indicates that prior beliefs about the technical merit of the proposals and rates of informative voting tend to be lower than average in policy areas commonly characterized as subject to predominantly partisan decision-making, like Education and Labor and Judiciary and Health (Bowling and Ferguson, 2001; Canes-Wrone and Shotts, 2007).

Figure S.5 indicates that the accuracy of legislators' private information about the quality of the proposals varies considerably over Congresses and policy areas as well. The precision of the signals is relatively low (below 0.85) in the 102nd - 104th Congresses and rises afterward (up to 0.9 in the 108th and 109th sessions). Similarly, the posterior mean of q ranges from 0.81 in International Affairs and 0.83 in Economic affairs to 0.89 in Education, Health and Government Operations. Still, q averages 0.86 across all Congresses and areas, suggesting - as noted in the text - that the private information about the quality of the proposals that is dispersed across individuals is quite important.

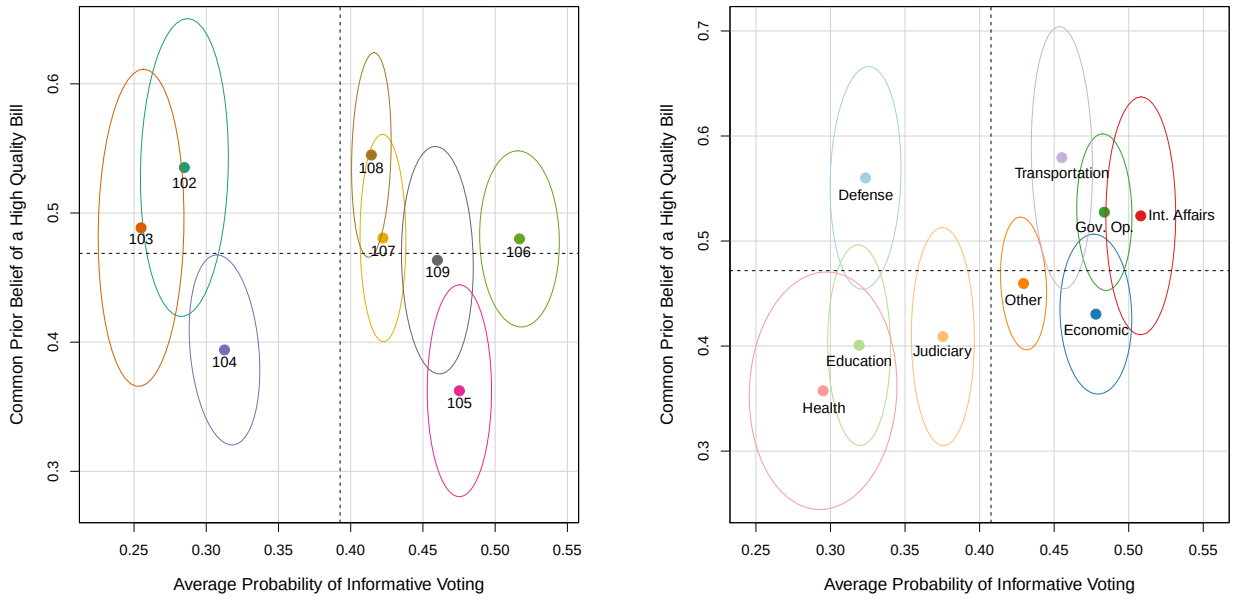

Figure S.4: Prior beliefs about the quality of legislation and percentage of informative voting across Congresses (left panel) and policy areas (right panel). The solid circles represent point estimates of the prior probability that the proposal is of high quality and of the average probability of informative voting. Solid lines represent 90% credible regions, while dashed lines correspond to the average probabilities across all congresses and areas.

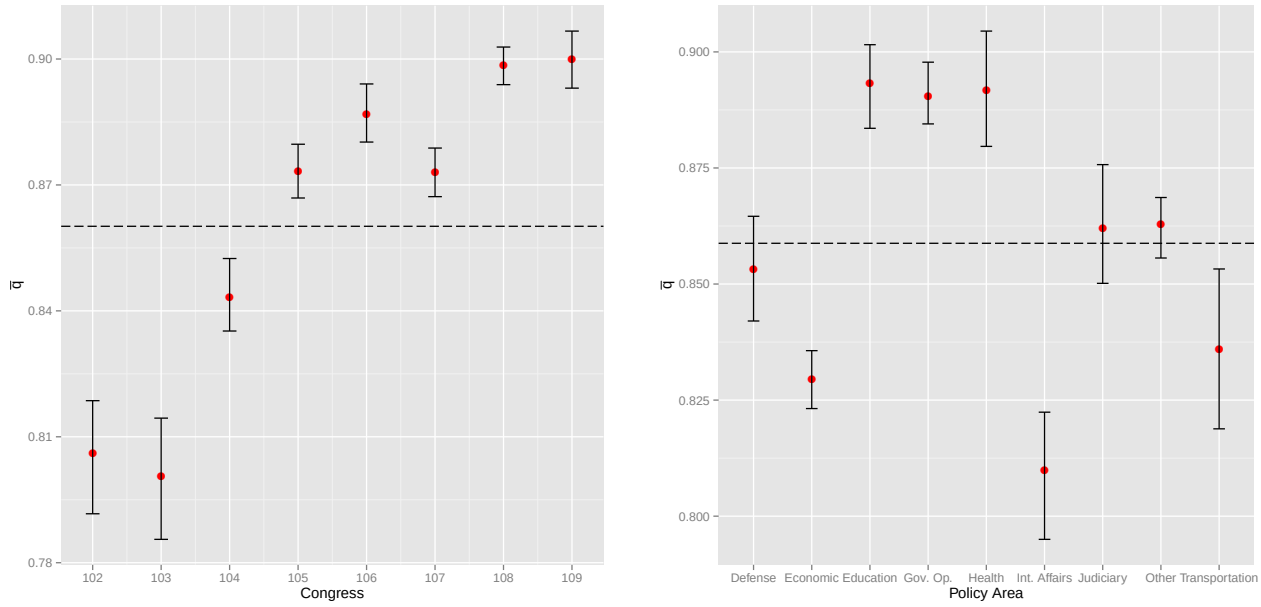

Figure S.5: Posterior summaries for the precision of MCs' private information. Solid circles represent the posterior mean of q in each Congressional session (left panel) and policy area (right panel). Vertical lines represent the 90% highest posterior density intervals. Dashed horizontal lines give the posterior mean of q across all Congresses and areas.

S.4 Average Predictive Comparisons for $P(\tilde{y}_t = 1)$

Figure S.6 summarizes average predictive differences (Gelman and Hill, 2007; Gelman and Pardoe, 2007) in the probability that a bill originated in the House is approved in the Senate, for selected individual and bill-specific covariates included in $\mathbf{x}_t$ and $\mathbf{z}_i$.

Given the possitive relationship we found between the net informative tally and $P(\tilde{y}_t = 1)$ we would expect that, for a given vote tally (and keeping everything else constant), individual characteristics positively (negatively) correlated with the probability of classifying MCs as type I should also be positively (negatively) correlated with the probability that a bill originated in the House is approved by the Senate. This is broadly the pattern we observe in the left hand side panel of the figure. Among the "institutional" variables, *Leadership*, which is strongly negatively correlated with the proportion of majority members voting informatively, is associated with a 1.15% decrease in $P(\tilde{y}_t = 1)$. Similarly, *Committee Membership*, which tends to increase the probability of voting uninformatively - both in favor and against the initiative - is associated with a 0.67% decline in the probability that House bills pass in the Senate. Finally, a one standard deviation increase in the number of terms served by House members is correlated with a 0.15% decrease in $P(\tilde{y}_t = 1)$. As for the regressors capturing relevant aspects of the electoral environment faced by MCs, we find that a one standard deviation increase in the margin of victory - which reduces the propensity of minority members to vote informatively - is associated with a 0.40% decline in the probability that House bills are approved in the Senate. In the case of the other "electoral" variables, the 90% highest posterior density intervals for the average predictive differences all include zero.

The right hand side panel of Figure S.6, in turn, shows that those characteristics found to be positively (negatively) correlated with representatives' prior beliefs about the quality of the proposal are also positively (negatively) associated with $P(\tilde{y}_t = 1)$. In this sense, House bills that receive the explicit support of the President are almost 5% more likely to be approved by the Senate than bills that do not receive the executive's public endorsement and 10% more likely to pass than those that are explicitly opposed by the administration. Likewise, a one standard deviation increase in the proportion of cosponsors belonging to the opposition is associated with a 2.2% rise in $P(\tilde{y}_t = 1)$. Roll call votes classified as *Key Votes* by Congressional Quarterly, in contrast, are almost 3 percentage points less likely to pass in the Senate than other, less salient initiatives.

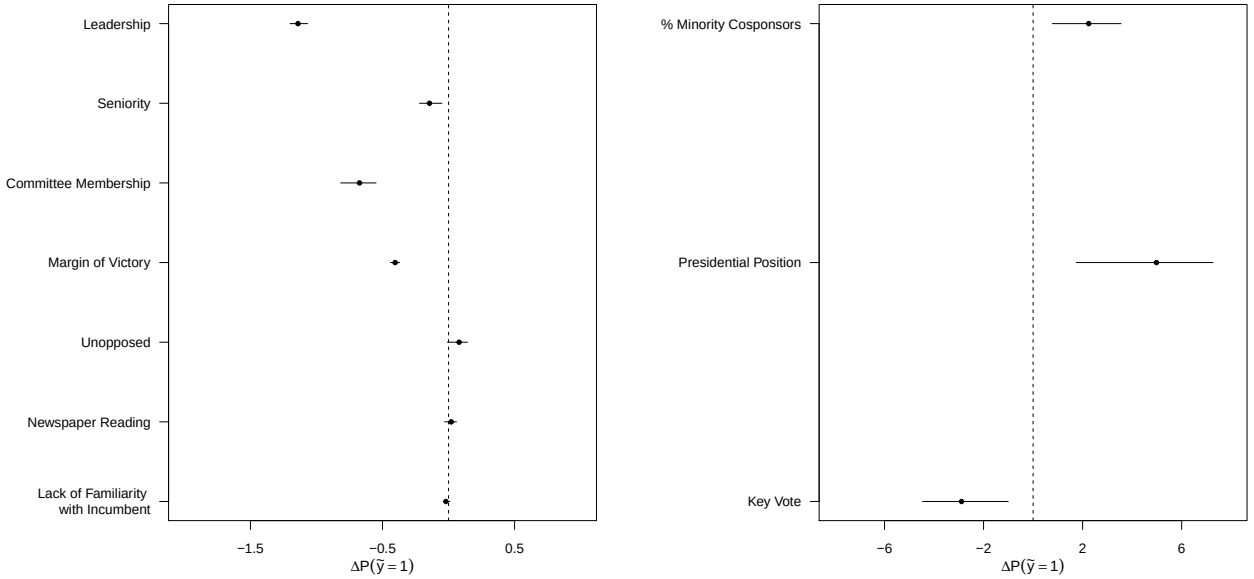

Figure S.6: The solid circles represent the expected change in $P(\tilde{y}_t = 1)$ associated with a one-unit change in the covariates (a one unit increase in the categorical variables, a one-standard deviation increase for continuous predictors). Horizontal lines give the 90% highest posterior density intervals.

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