Clueless Politicians: On Policymaker Incentives for Information Acquisition in a Model of Lobbying

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We develop a model of policymaking in which a politician decides how much expertise to acquire or how informed to become about issues before interest groups (IGs) engage in monetary lobbying. For a range of issues, the policymaker (PM) prefers to remain less informed about policy than may be socially optimal, even when acquiring expertise or better information is costless. Such a strategy leads to more-intense lobbying competition and larger political contributions. We identify a novel benefit of campaign finance reform, showing how contribution limits decrease the incentives that PMs have to remain under-informed on the issues on which they vote. The analysis goes on to allow for a fully general information strategy in the spirit of Bayesian Persuasion. In the case of symmetric IGs, a PM's optimal strategy maximizes the probability he is "on the fence" when deciding between policies. (*JEL* C72, D72)

1. Introduction

We present a game theoretic model of policymaking and lobbying. In the model with symmetric interest groups (IGs), political contributions flow in greater quantity to politicians who are "on-the-fence" between policies than to those who have strong preferences over which policy they prefer. Because of this, a politician may have an incentive to under-invest in learning about policy or developing expertise if by doing so they can remain on-the-fence and maximize contributions.

The model involves a three-stage game, played between one IG in support of a policy reform, one IG in support of the status quo, and a policymaker (PM) who cares about both the merits of implemented policy and attracting political contributions. In the first stage, the PM chooses an information collection strategy through which he learns about the merits of the reform. In the second stage, the IGs, each favoring an alternative

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policy outcome, engage in a standard monetary lobbying game. The IGs simultaneously offer the PM political contributions in exchange for the implementation of their preferred policy. In the third stage, the PM chooses the policy that offers the greatest weighted combination of expected policy benefits and promised political contributions.

The theoretical novelty of our environment comes from giving the PM control over his own exposure to information or amount of expertise ahead of what is otherwise a standard monetary lobbying game (e.g., Snyder 1991; Grossman and Helpman 1994). While others have considered IGs' incentives to produce information ahead of a monetary lobbying game (e.g., Bennedsen and Feldmann 2006; Dahm and Porteiro 2008a, 2008b), we are the first to consider a PM's own incentives to devote the time and effort necessary to become informed about policy such an environment. Through this framework, we make a series of contributions to the lobbying literature.

First, we highlight the connection between a PM's ability to distinguish policies based on their merits and the amount of political contributions received from IGs. While Snyder (1991) and others show how lobbying contributions are higher for those who are indifferent between policies, we show how this indifference (and the flow of contributions) depends on PM information or expertise. The main intuition is as follows. A politician who is unable to distinguish policies based on their merits is more likely to choose policy based on political contributions. With an on-the-fence politician, lobbying competition between symmetric IGs is most fierce, and as a result, payments from IGs are maximized. In contrast, an informed politician who knows one policy is best requires fewer political contributions to vote in its favor. Such a politician faces less intense lobbying and collects fewer political contributions.[1]

Second, we show that when a PM can do so, he may limit his exposure to evidence or under-invest in acquiring information as information tends to decrease contributions.[2] This is true even when it is costless for the PM to become better informed. The aversion to information is strongest on issues where IGs have a relatively high willingness to pay for their desired policy, and the politician cares relatively little about choosing the best policy (perhaps because his constituents do not care about or are unable to distinguish good and bad policies on the issue). On these issues, the

1. Our story is consistent with empirical evidence that contributors give more money to politicians who are likely undecided about how to vote (Stratmann 1992).

2. There are reasons to believe that politicians have at least some control over their exposure to information. There is ample evidence that PMs tend to be time constrained, unable to devote time, and attention to fully understanding every policy on which they must vote. Although we abstract from multiple policy decisions, the evidence suggests that understanding any given policy decision is an active choice made by the politician, who must choose to spend his limited time and attention. See the qualitative accounts in Bauer et al. (1963); Hansen (1991), and discussion motivating the theoretical work in Cotton (2009, 2012) and Cotton and Dellis (2016).

monetary gains from more competitive lobbying will dominate the cost to a politician of potentially choosing a bad policy.

Third, we provide a series of theoretical contributions to the lobbying literature. Not only is ours the first model of lobbying to allow a PM control over his exposure to information ahead of a monetary lobbying game, it is also the first to incorporate fully general information collection strategies (a la Bayesian Persuasion, Kamenica and Gentzkow 2011). After illustrating the basic intuition for the main results in a simple model, we then allow for a fully general treatment of the information production decision made by the PM, following a Bayesian persuasion approach: the PM designs a signal, which reveals information about the reform's quality. The PM can choose to become perfectly informed (in which case he perfectly observes the quality of reform), to remain completely uninformed (in which case his beliefs equal his priors), or to choose any partially informative signal.[3] In the general analysis, a PM not only chooses *whether* to collect information or acquire expertise; he also chooses the type and informativeness of the information he collects. For issues of high enough political importance, the PM prefers to become fully informed. For other issues, however, the PM's optimal information strategy leaves him less than fully informed about policy in expectation. In the case of symmetric IGs, the optimal strategy maximizes the probability that he is left "on the fence" between policies.

The tradeoff between information and policy is best highlighted in the special case where the PM is ex ante indifferent between reform and the status quo. In this case, the PM starts off on the fence. We show how increasing the Blackwell informativeness of the PM's signal simultaneously leads to better policy and a decrease in political contributions. Here, the PM prefers to either become fully informed, or to remain clueless, and therefore indifferent, about policy.

Fourth, we consider the implications of our analysis for campaign finance reform. Our analysis identifies a novel benefit of campaign contribution limits: they decrease the incentives PMs have to remain strategically ignorant or uninformed. This is because a contribution limit constrains the financial gain associated with being uncertain about policy, and encourages the PM to become informed about a larger range of issues. By encouraging politicians to become better informed, contribution limits can lead to better policy choices and higher constituent welfare.

3. The choice of information collection strategy lends itself to a variety of reasonable interpretations. First, it may represent the expertise a politician acquires about an issue, either individually or by hiring expert staff. A politician with greater expertise can better judge the merits of different policy proposals, and more accurately compare the quality of alternative proposals given available evidence. Second, the choice of information collection strategy may represent a politician's evidence collection efforts. For example, it may capture the size and methodology of a poll measuring constituent support for the reform. It may also represent the amount of time spent and the direction of inquiry when discussing policy with experts, or studying the issue through one's own staff or the Congressional Research Service.

The main results are robust to a series of extensions, including the introduction of IG asymmetry into the model. We allow opposing IGs to have differences in, for example, their willingness to pay for policy. In this alternative environment, a politician again becomes fully informed on politically important issues and less informed on less-pressing issues or issues where the potential for rent extraction are highest. In the general information production environment, remaining less informed about an issue involves searching for evidence to offset the monetary advantage of the IG with the higher willingness to pay. Just as in the main analysis, this involves under-collection of information to maximize the expected lobbying competition between the IGs. Again, a contribution limit increases the range of issues for which the politician becomes better informed.

The main difference between the symmetric and asymmetric environments involves the specific design of the optimal information collection strategies, rather than what those strategies are trying to accomplish. In the symmetric game, a politician's optimal strategy involves maximizing the probability of being on-the-fence between policies, because doing so leads to the greatest degree of lobbying competition. In the asymmetric game, being on-the-fence no longer maximizes the degree of lobbying competition. Rather lobbying competition is maximized when the politician finds partially informative evidence in favor of the weaker IG's policy. An ex post belief that leans in favor of the weaker group's policy handicaps the contest, offsetting the stronger group's underlying advantage, and leading to a more-competitive lobbying game.[4] In the asymmetric model, on issues that are not too important and where IG differences are not too large, the politician prefers an imperfectly informative strategy that maximizes the probability of such ex post beliefs. Despite these technical differences, the underlying conclusions continue to hold. A politician has an incentive to under-collect information in an effort to collect higher political contributions, and contribution limits can lead the politician to become better informed about policy.

The rest of the paper is organized as follows. Section 2 reviews the literature. Section 3 introduces the formal model. Section 4 solves for equilibrium and presents the main results. Section 5 considers the impact of a contribution limit. Section 6 allows for asymmetric IGs. Section 7 concludes.

2. Literature Review

Traditional models of lobbying fall into one of two categories. First are the models in which IGs provide political contributions to politicians in exchange for policy outcomes. These include seminal work by Tullock

4. See Cotton (2016) for an application of handicapped lobbying contests in the context of buying access, and see Siegel (2014) presents a framework for dealing with handicapping in asymmetric contests.

(1980), Hillman and Riley (1989), and Grossman and Helpman (1994). Snyder (1991) and Groseclose and Snyder (1996) show that politicians who are on the fence may collect larger political contributions in such environments; but they do not consider endogenous politician beliefs or information collection.[5] Second are the persuasion models in which IGs produce or communicate relevant information about the merits of alternative policies. These include seminal work by Milgrom and Roberts (1986), Austen-Smith and Wright (1992), and Austen-Smith (1994). More recently, the literature has developed models in which lobbying involves the provision of both political contributions and information. Austen-Smith (1995) and Lohmann (1995) develop models in which political contributions provide a costly means of signaling one's private, unverifiable information about the state of the world. In Austen-Smith (1998) and Cotton (2009, 2012), political contributions buy access to a politician, where access is required in order to share private information.[6]

More similar to the current paper are the models of Bennedsen and Feldmann (2006), Dahm and Porteiro (2008a, 2008b), and Felgenhauer (2013) in which IGs first produce information about the merits of policy, and then (potentially) engage in monetary lobbying. The key difference between these papers and ours is that in the earlier papers, IGs determined how informed the PM became about policies. In our framework, the politician chooses how informed to become.[7] Our assumption is consistent with the idea that IGs cannot force a PM to become an expert on an issue if the PM himself chooses not to take the necessary time and effort to do so. Additionally, we show that when the PM chooses how informed to become, campaign finance reform often has the opposite effect as it does in Dahm and Porteiro (2008a), the one paper in this literature to consider political contribution limits. When IGs control PM information, contribution limits can discourage information provision by the IGs and lead to worse policy outcomes. In our framework where the PM himself determines how informed to become, contribution limits tend to encourage the collection of more information and lead to better policy.

Our approach to incorporating information into a lobbying game is unique compared with the rest of the literature. We assume that the politician chooses how informed to become prior to a standard monetary lobbying game. The assumption that PMs themselves can collect information is consistent with qualitative accounts of the policymaking process

5. You (2017) builds a model in which firms in an industry first lobby together, with total expenditure directly determining the amount of government resources directed toward their industry, and then lobbying competitively to capture their share of these resources.

6. Recent work has considered how politicians allocate access to special interests through lobbyists (e.g., Groll and Ellis 2014; Hirsch and Montagnes 2015).

7. Felgenhauer (2013) considers how the level of politician expertise affects the decisions of IGs to provide more *information*. When it introduces monetary contributions into the model, they follow the IG's choice of informational lobbying strategy, similar to the models by Bennedsen and Feldmann (2006) and Dahm and Porteiro (2008a, 2008b).

(e.g., Bauer et al. 1963; Hansen 1991), although it is rarely incorporated into formal models of lobbying. An exception is Cotton and Dellis (2016), in which a PM can rely on IGs for information or collect information on his own. That model, however, does not consider political contributions or monetary influence.

Hall and Deardorff (2006) develop a model of lobbying as legislative subsidy, where lobbying activities on an issue decrease the costs and efforts required for a politician to implement or pass legislation on that issue. In that environment, higher lobbying activities reduce politician effort, potentially leading to more-efficient policymaking. In our environment, the connection points in the opposite direction: politicians reduce their efforts (to collect information and understand issues) in an attempt to increase lobbying activities, leading to less-informed policymaking.

The academic literature has not reached a consensus on the welfare effect of campaign finance reform. The literature shows how campaign contribution limits may be detrimental because they reduce the incentives that IGs have to produce evidence (Dahm and Porteiro 2008a), decrease the signaling value of political contributions (Cotton 2009), reduce campaign advertising budgets that are necessary to inform voters about candidate quality (Coate 2004b), or encouraging the PM to engage in additional rent seeking activity (Riezman and Wilson 1997; Drazen et al. 2007). The literature also shows how limits may be beneficial because they discourage corrupt behavior by PMs (Prat 2002a, 2002b; Coate 2004a; Cotton 2009), or incentivize information provision by IGs (Austen-Smith 1998; Cotton 2012). Our paper identifies a novel benefit of campaign finance reform, showing that contribution limits decrease the incentives that PMs have to remain uninformed or ignorant of the issues on which they vote.

Although our analysis focuses on a setting of political influence, our framework also provides a contribution to the growing literature on general signal design in strategic environments. Kamenica and Gentzkow (2011) considered the case where a single agent designed a signal in order to persuade a decision maker to take a potentially favorable action. Boleslavsky and Cotton (2015b, 2018) and Gentzkow and Kamenica (2017) extend the framework to consider an environment where multiple agents compete through information production. Boleslavsky et al. (2017) bring prices into the framework, assuming that a firm produces a signal about product quality before engaging in price competition with another firm. Roesler and Szentesz (2017) consider the optimal information exposure for a consumer who chooses whether to purchase an item from a monopolist firm who adjusts its price in response to the consumer's information strategy. From a theoretical perspective, our analysis extends Roesler and Szentesz (2017) to consider a setting with two agents and price competition; although in our game the agents are IGs rather than firms, and price competition takes the form of political contributions. Our analysis shows how a decision maker may prefer to be uninformed than fully informed, and that the optimal information collection strategy may be one that maximizes the probability that the decision maker's posterior beliefs leave him completely indifferent between different choices.

Finally, our paper is related to other agency models in which a principal may be better off remaining less informed. Kessler (1998) illustrates this possibility in a standard principal agent framework. Our analysis shows how the intensity of lobbying competition between IGs is reduced as the PM becomes more informed. This has a similar flavor to results found in other literatures. For example, Boleslavsky and Cotton (2015a) show how policy moderation by political candidates is reduced as voters becomes more informed about candidate quality, Moscarini and Ottaviani (2001) show how price competition between firms is reduced as consumers become better informed and better able to distinguish products, and Roesler and Szentesz (2017) show that a buyer may be better off being less informed than perfectly informed in a contracting environment.

3. Model

A PM must choose whether to keep the status quo ($p=0$) or implement reform ($p=1$) on a given policy issue. Keeping the status quo guarantees the PM a policy payoff of $u_0 = 0$. Implementing reform provides the PM a positive policy payoff equal to $1-\theta \in (0, 1)$ in state $\tau=1$ when reform is "good," and provides the PM a negative policy payoff equal to $-\theta$ in state $\tau=0$ when reform is "bad." Thus,

$$u_1(\tau) = (1-\theta)\tau - \theta(1-\tau).$$

The reform is good with probability $\alpha \in (0, 1)$ and bad with probability $1-\alpha$. The PM is ex ante uncertain about τ, although α is common knowledge. Denote the ex ante expected benefit of implementing reform by

$$\hat{q} \equiv (1-\theta)\alpha - \theta(1-\alpha) = \alpha - \theta.$$

In the initial stage of the game, the PM can acquire information about the benefit of implementing reform. Following a Bayesian Persuasion approach, we model the PM's information collection strategy as a design of the random variable S, jointly distributed with reform type τ. Prior to the PM choosing policy, his signal S produces a realization s that is informative about the benefit of implementing reform. Consistent with the literature on Bayesian persuasion, the design of S and its realization s are publicly observed. In the Online Appendix, we show that our results are robust to an alternative game in which the signal realization is privately observed by the PM. The PM's choice of S may be interpreted as a choice of how extensively to search for evidence in favor of or against reform. The type and intensity of information collection procedure (e.g., hearings, surveys, polls, meetings, and research) determines the likelihood of different posterior belief realizations.

An “on-the-fence” PM has beliefs that make him indifferent between the reform and the status quo. Such a PM is indifferent between the policies based on expected merit.

There are two IGs, who can engage in monetary lobbying following the realization s and prior to the PM implementing policy. The lobbying game is standard for the literature [e.g., a simplified version of Snyder (1991) or Grossman and Helpman (1994)]. The IGs are advocates for different policies. We denote an IG by the policy it supports, with $j \in \{0, 1\}$. IG_j receives policy utility v whenever $p = j$, and receives policy utility 0 otherwise. The two IGs simultaneously offer payments to the PM in exchange for policy outcomes. IG_j offers payment c_j, which it commits to pay the PM if he implements $p = j$. The PM observes the payment offers c_0 and c_1, and chooses a policy to maximize his overall utility from payments and policy.

Initially, we consider a setting in which any contribution $c_j \geq 0$ is feasible. In later sections, we consider the impact of a contribution limit $\overline{c}$, which imposes a limit on the maximum contribution, restricting $c_j \in [0, \overline{c}]$.

Overall utility of the three players depends on policy and payments. The PM earns

$$U_{\mathrm{PM}}(p, c_0, c_1|\tau) = (\lambda u_1(\tau) + c_1)p + c_0(1 - p).$$

Parameter $\lambda > 0$ captures issue importance. IG_0 and IG_1, respectively, earn

$$U_0(p, c_0) = (v - c_0)(1 - p) \text{ and } U_1(p, c_1) = (v - c_1)p.$$

In summary, the game takes place in the following order. First, the PM chooses an information collection strategy, represented by the design of a random variable S. He then observes a realization of S. Second, the IGs simultaneously offer c_0 and c_1. Third, the PM chooses policy.

We solve for the Perfect Bayesian Equilibrium of the game. We assume that a PM who is indifferent between reform and the status quo implements the policy supported by the priors.

3.1 General Representation of the Information Collection Process

We first consider a setting in which the PM chooses between becoming fully informed or remaining uninformed. We then consider a general information environment where we place minimal structure on the PM’s choice of S. For that analysis, it is helpful to represent the game as one of Bayesian persuasion.

Without loss of generality, the choice of random variable S may be represented by the choice of two independent random variables S_1 and

S_0, where an independent realization of S_τ is observed when the state is τ. We place no restrictions on the design of S_1 and S_0, except that for technical reasons we assume that both signals have a finite number of discontinuities and mass points, and that except at mass points, S_1 and S_0 have differential densities and support over an interval. Without loss of generality, we focus on pairs of random variables that satisfy the monotone likelihood ratio property, which restricts attention to random variables where higher realizations are more likely to be generated in state $\tau = 1$ when reform is "good." Any random variable S satisfying these restrictions is *valid*. This characterization of the PM's information collection process is fully general. It allows for the PM choosing to collect no information (which is equivalent to setting $S_1 = S_0$), choosing to become fully informed (which is equivalent to choosing S_1 and S_0 with disjoint support), or anything in between.

There are no direct costs associated with collecting information. The PM can choose a fully uninformative signal, a fully informative signal, or anything in between at zero costs. This allows us to abstract from issues of costly information, and focus instead of the strategic incentives for remaining uninformed. When the PM in our framework chooses to remain less than fully informed, it is not because becoming informed is costly. Although we abstract from the costs associated with information, it is unlikely that the PM can acquire information at the last minute before a vote. As Stratmann (1998, 2005) shows, political contributions often are made around or soon after the passage of legislation. This suggests that the timing of our game, in which the PM acquires information prior to political contributions being made, is accurate. For now, we assume that the PM's signal realization is publicly observed. This is consistent with the idea that the realization is the outcome of public polls, studies, or hearings.

Any choice of S corresponds to a posterior belief distribution Q. This posterior belief random variable summarizes the informational content of signal S: any signals generating the same posterior belief random variable are payoff equivalent for all players.

A posterior belief random variable generated by a signal must have certain properties. First, because its realization represents the benefit of implementing reform, the support of Q is a subset of the unit interval $[-\theta, 1-\theta]$. Second, according to the law of total expectation, the expected value of the posterior belief random variable must be equal to the prior belief, that is, $E[Q] = \hat{q}$. According to Kamenica and Gentzkow (2011), this is the only restriction on the random variable Q.[8]

Lemma 1. For any random variable Q with support in the unit interval $[-\theta, 1-\theta]$ and expected value $\hat{q}$, there exists a valid signal S for which Q is

8. See Boleslavsky and Cotton (2015b) for the adaptation of the Kamenica and Gentzkow (2011) proof for a binary environment.

the distribution of the PM's posterior belief. For any valid signal S, there exists a unique random variable Q with support $[-\theta, 1-\theta]$ and expected value $\hat{q}$ representing the distribution over posterior beliefs generated by S.

Lemma 1 considerably simplifies the analysis of this game. Instead of focusing on the PM's choice of signals S_1 and S_0, we can instead focus on the choice of random variable Q, with support in the unit interval $[-\theta, 1-\theta]$ and expectation $\hat{q}$. This choice represents the ex ante distribution of the PM's posterior beliefs about the benefits of reform, and is equivalent to a choice of one of many signals that generate the same distribution of posterior beliefs. Given that only Q, and not the specific choice of S, is important for the analysis, we can reinterpret the game as one in which the PM chooses Q.

4. Analysis

We first determine the equilibrium of the monetary lobbying subgame, and then consider the PM's information strategy accounting for its impact on lobbying.

4.1 Monetary Lobbying

Let q denote the PM's posterior beliefs about the benefits of reform following information collection (i.e., the realization of Q). The subgame equilibrium of the monetary lobbying game involves

$$c_0 = v,\ \ c_1 = \max\{v - q\lambda, 0\},\ \ p = 1 \ \text{ when } \ q > 0,$$

$$c_0 = \max\{v + q\lambda, 0\},\ \ c_1 = v,\ \ p = 0 \ \text{ when } \ q < 0,$$

$$c_0 = v,\ \ c_1 = v,\ \ p = \mathbb{1}_{\{\hat{q}>0\}} \ \text{ when } \ q = 0,$$

where $\mathbb{1}_{\{\hat{q}>0\}}$ represents an indicator function that equals 1 if $\hat{q} > 0$ and equals 0 otherwise.

When $q = 0$, the PM is on the fence, unable to differentiate policies based on their merits, and his policy decision depends on monetary contributions from IGs. Specifically, the PM will implement the policy supported by the IG that offers higher contributions. In this case, monetary competition between the IGs is most intense, and in equilibrium both IGs offer the highest feasible payment of v. Therefore, when $q = 0$, the equilibrium outcome of the monetary lobbying subgame involves $c_0 = c_1 = v$. Our tie breaking assumption leads the PM to implement the policy supported by his priors in equilibrium.

As q moves away from 0, the PM begins to favor one of the policies. He favors reform when q is positive, and the status quo when q is negative. In these cases, the equilibrium involves the IG involved with the policy not supported by the posterior beliefs offering v for their policy to be implemented, and the favored IG offering just enough to keep the PM in favor of their policy. Because the PM starts off in favor of their policy, the

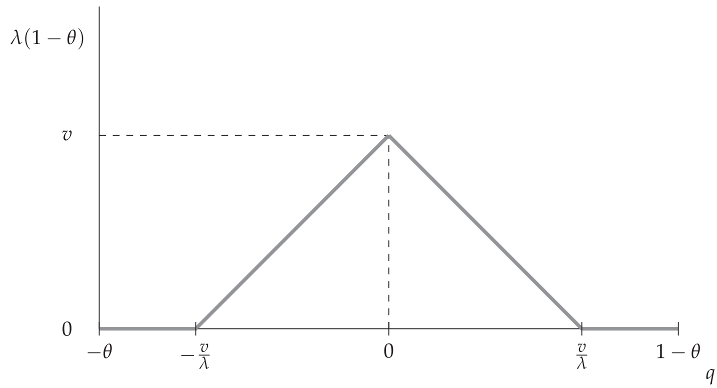

Figure 1. Equilibrium Contributions for Any Feasible Posterior Belief, q.

favored IG is able to maintain the PM's support with an offer less than v. The further from 0 is q, the bigger the favored group's advantage, and the smaller its needed contribution in order to have its policy implemented.

When the potential monetary payment is sufficiently large or the importance of policy is low (i.e., when $v/\lambda \geq |q|$), the PM collects political contributions in equilibrium. For more important issues, and cases where the potential payments are small, the PM always prefers to implement the policy supported by the evidence, even if the favored IG offers no contribution, as long as one group's advantage is sufficiently large (i.e., when $|q| \geq v/\lambda$).

4.2 Information Strategy

In the body of the paper, we provide a graphical analysis to motivate the results regarding the PM's optimal choice of information strategy. Appendix A provides a more formal mathematical analysis.

As a starting point, it is helpful to illustrate the PM's total expected utility as a function of his posterior belief about the expected value of reform, $q \in [-\theta, 1-\theta]$. We first illustrate equilibrium contributions and expected policy utility as functions of q in Figures 1 and 2, respectively, and then aggregate these into total PM utility in Figure 3. The figures are for the case where $v/\lambda < \min\{1-\theta, \theta\}$. Thus, in this illustrative case, IG value is not too large, and the PM cares a sufficient amount about policy. We will discuss the other parameter cases later.

Although contributions are maximized when $q = 0$, both the PM's expected policy payoff and the PM's total expected utility are weakly increasing in q, and maximized at $q = 1-\theta$.

4.3 Full Information or No Information

Before determining the PM's optimal information collection strategy, we consider a simple environment in which the PM chooses between becoming fully informed or collecting no information.

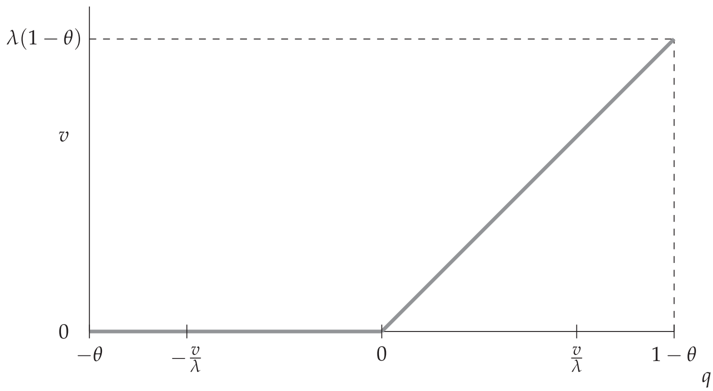

Figure 2. The PM's Expected Policy Payoff for Any Feasible Posterior Belief, *q*.

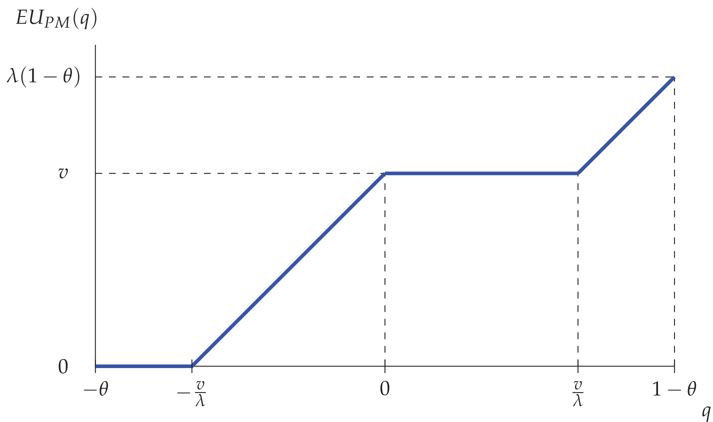

Figure 3. The PM's Expected Payoff for Any Feasible Posterior Belief, *q*.

The PM anticipates how his posterior beliefs will influence behavior in the later stages of the game. Figure 4 illustrates the PM's expected payoff from the two choices as functions of the priors $\hat{q}$.

When the PM chooses no information, his posterior beliefs equal his priors, with $q = \hat{q}$, and his expected payoff is given by the solid line in Figure 4.

When the PM chooses full information, with probability α it becomes known that the reform is good resulting in a PM payoff of $1 - \theta$, and with probability $1 - \alpha$ it becomes known that the reform is bad, resulting in a PM payoff of 0. On average, when the PM becomes fully informed, his expected payoff as a function of his priors is given by the thick, dashed line in Figure 4.

The PM prefers no information to full information in regions where the solid line is higher than the dashed line. This corresponds to the cases where the priors are sufficiently close to 0. Intuitively, this makes sense,

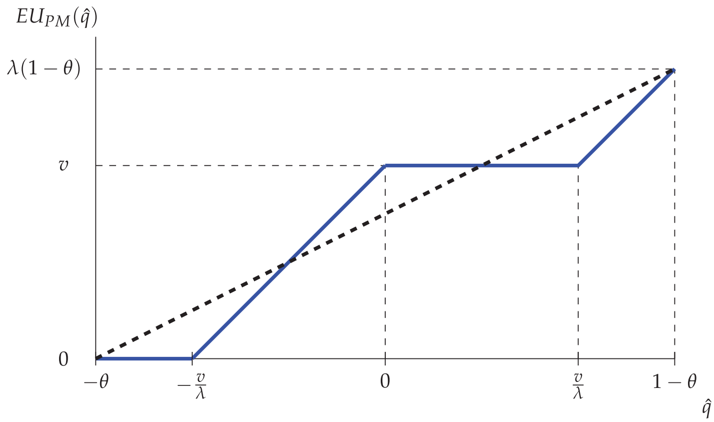

Figure 4. The PM's Expected Payoff from No Information Collection (solid line) and from Full Information Collection (dashed line) as a Function of the Prior.

as $\hat{q} = 0$ corresponds to the case where the PM is indifferent between the policies, and where monetary competition between the IGs (and therefore the incentive for remaining uninformed) is maximized.

Such a region in which the PM prefers no information to full information exists as long as the IG's willingness to pay for policy, v, is sufficiently high relative to λ, the relative importance the PM places on policy. When v is sufficiently low, or λ is sufficiently high, the PM prefers to become fully informed than to remain uninformed.

Proposition 1. Consider the game in which the PM chooses between no information and full information. The PM collects no information when the potential monetary payments are sufficiently high relative to his potential policy utility. For each $\hat{q}$, there exists a unique threshold $T > 0$ such that in equilibrium the PM collects no information if $v/\lambda \geq T$, and becomes fully informed when $v/\lambda < T$.

When choosing whether to become fully informed, the PM trades off the policy benefits with the potential costs from a reduction in political contributions. When the PM cares enough about policy relative to the potential monetary payments from the IGs, he prefers to become fully informed. In other cases, where the returns to higher monetary contributions outweigh the costs of worse policy, the PM prefers to remain uninformed.

4.4 General Information Strategy

In this section, we do not restrict the PM's information strategy. In the first stage, he chooses a distribution, Q, over posterior beliefs. The only restrictions on Q are that it has support within the range of feasible posteriors, $[-\theta, 1-\theta]$, and that the expected value of Q equals the prior $\hat{q}$.

As Lemma 1 established, such a choice of Q captures all valid information processes.

In the following discussion, we consider three parameter cases, depending on the relative value of v and λ. Within each case, we illustrate $EU_{\text{PM}}(q)$ for all $q \in [-\theta, 1-\theta]$, and the concave closure of EU_{PM}. Denote the concave closure by function $\overline{U}$, formally defined as the supremum of the convex hull of EU_{PM}; it is the minimum concave function that is at all q weakly greater than EU_{PM}. Value $\overline{U}(\hat{q})$ corresponds to the maximum expected realization of EU_{PM} that can be generated by a distribution Q over posterior beliefs that maintains $EQ = \hat{q}$.[9] Achieving $\overline{U}(\hat{q})$ involves a choice of Q that concentrates probability mass on the closest values of q to $\hat{q}$ such that $\overline{U}(q) = EU_{\text{PM}}(q)$, with probabilities on each realization set to maintain $EQ = \hat{q}$. The PM can do no better than choosing an information strategy Q that results in expected payoffs $\overline{U}(\hat{q})$.

In Case 1, illustrated in Figure 5, we assume the same relative parameter values that were used in the previous graphs. Notice that the concave closure of the PM's expected utility function includes the point on the function where the PM is on the fence regarding policy, that is, where $q = 0$.

In Case 1, we have already shown that for some range of priors, the PM prefers to remain uninformed than to become fully informed about policy; and for other priors, he prefers full information to no information. When the PM has more control over his information strategy, he no longer prefers to remain uninformed or to become fully informed in this situation. Rather, the PM's optimal information strategy involves a distribution over posterior beliefs that result in an expected payoff along the concave closure of the function. When the priors favor reform, with $\hat{q} > 0$, such an information strategy involves the PM sometimes learning for sure that the reform is good, and otherwise being on-the-fence about policy:

$$Q = \begin{cases} 0 & \text{with probability } (1-\alpha)/(1-\theta) \\ 1-\theta & \text{with probability } (\alpha-\theta)/(1-\theta) \end{cases}$$

When the priors favor the status quo, with $\hat{q} < 0$, such an information strategy leads to the PM sometimes learning for sure that the reform is bad, and otherwise being on-the-fence about policy:

$$Q = \begin{cases} 0 & \text{with probability } \alpha/\theta \\ -\theta & \text{with probability } (\theta-\alpha)/\theta \end{cases}$$

9. See Kamenica and Gentzkow (2011) for a formal result establishing this in their Corollary 2.

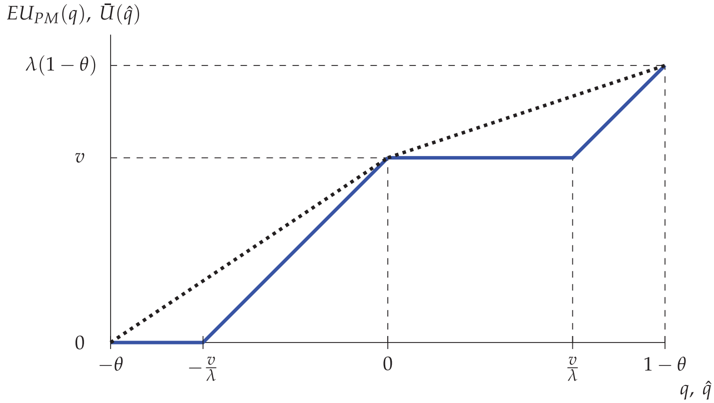

Figure 5. Case 1: The Concave Closure (dotted line) of the PM's Expected Payoff Function (solid line) Includes the on-the-Fence Point.

Such Q lead to the potential payoffs for the PM as a function of the priors being defined by the concave closure of the PM expected utility function (the dotted line).

Intuitively, such information strategies involve the PM searching for information that confirms his priors with just enough intensity that failure to find such evidence leaves him on the fence. In the case where the priors favor reform, the optimal information strategy is consistent with the PM observing the outcome of a binary signal, which always produces a "bad" realization when reform is bad, and produces a noisy signal that sometimes says "good" and sometimes says "bad" when reform is actually good. This means that a PM who observes a good realization is certain that the reform is good, but one that observes a bad realization is uncertain about the reform's true quality. In the case where the priors favor the status quo, the optimal information strategy is also consistent with a binary signal, but one in which the ex post noise is on the opposite outcome. Such a signal always produces a "good" realization when reform is good, and produces a noisy signal that sometimes says "good" and sometimes says "bad" when reform is actually bad. This means that a PM who observes a bad realization is confident that reform is bad, but one who observes a good realization is left uncertain about reform quality.

In Case 2, illustrated in Figure 6, the PM cares less about policy, or the IGs care more, to the extent that the concave closure of the function does not include the on-the-fence point.

In this case, the information strategy involves the PM becoming fully informed. In this case,

$$Q = \begin{cases} -\theta & \text{with probability } 1-\alpha \\ 1-\theta & \text{with probability } \alpha \end{cases}$$

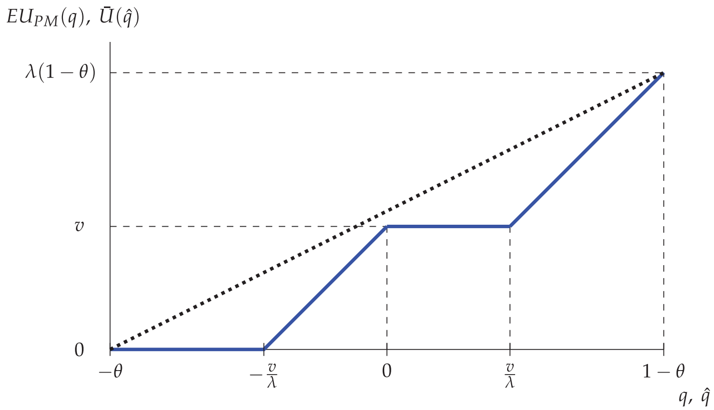

Figure 6. Case 2 (lower v or higher λ): The Concave Closure (dotted line) of the PM's Expected Payoff Function (solid line) Does Not Include the on-the-Fence Point.

Such a strategy leads to the expected payoffs for the PM as a function of the priors being defined by the concave closure of his expected utility function. That is, if the potential payments from IGs (given by v) are sufficiently low, or the PM cares enough about policy (λ is sufficiently high), then the PM can do no better than to become fully informed.

Case 3 moves v and λ in the opposite direction as Case 2. Now, we consider the possibility that the potential payments (given by v) are high relative to policy importance (λ). As these factors change, v/λ eventually grows such that $v/\lambda > \max\{\theta, 1-\theta\}$, in which case the PM's expected utility as a function of q is given in Figure 7. Notice that in this case, the concave closure of EU_{PM} is equal to the function itself. This means that for any choice of Q such that $EQ = \hat{q}$, the expected value of EU_{PM} can be no greater than $EU_{\text{PM}}(\hat{q})$.

Therefore, when the PM cares sufficiently little about policy, or when the IGs have sufficiently high willingness to pay for policy, the PM do no better than when he acquires no information.[10] The following proposition summarizes the PM's information collection strategy.

Proposition 2. In equilibrium:

• When the PM cares sufficiently little about policy, he is indifferent between all information collection strategies that with probability 1 lead to

10. In this case, the PM is indifferent between all feasible Q that always generate a posterior beliefs with the same sign as his priors. Such strategies will continue to generate an expected payoff equal to $EU_{\text{PM}}(\hat{q})$. The most straightforward information strategy of this type is no information collection. However, many other strategies, including strategies in which the PM maximizes the probability of being on the fence, are also consistent. This indifferent between all such strategies is due to the assumption that payoffs are linear in monetary transfers.

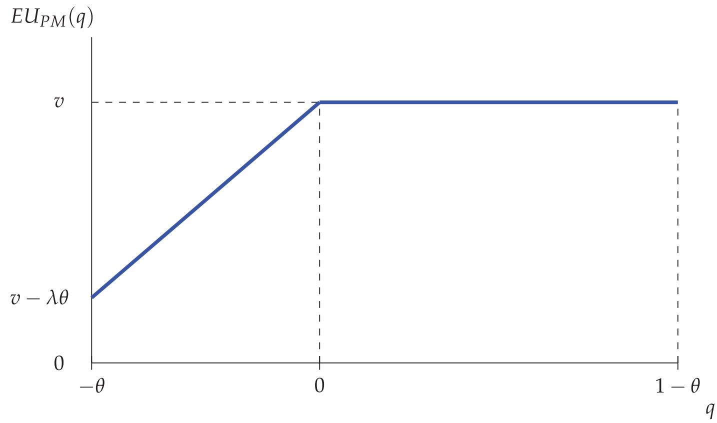

Figure 7. Case 3: The PM's Expected Payoff Function Equals Its Concave Closure When $v/\lambda \geq \max\{\theta, 1-\theta\}$.

the implementation of the policy supported by his priors, including a strategy of collecting no information. This is the case when $0 \leqslant \hat{q}$ and $1-\theta \leqslant v/\lambda$, or $\hat{q} < 0$ and $\theta \leqslant v/\lambda$.

• For intermediate levels of policy importance, the PM chooses an information strategy that maximizes the probability he is on the fence when choosing policy (i.e., the probability that $q = 0$). This is the case when $0 \leqslant \hat{q}$ and $\theta(1-\theta) < v/\lambda < 1-\theta$ or $\hat{q} < 0$ and $\theta(1-\theta) < v/\lambda < \theta$.

• When the PM cares enough about policy, he becomes fully informed and implements the best policy. This is the case when $v/\lambda \leqslant \theta(1-\theta)$.

When $v/\lambda > \theta(1-\theta)$, the PM's concerns over collecting political contributions leads him to remain less than fully informed. In equilibrium, the PM always implements the policy supported by the priors, and his ability to (costlessly) collect information has no effect on equilibrium policy outcomes. Only when the PM cares enough about policy (i.e., $v/\lambda \leqslant \theta(1-\theta)$) does he collect information that that has a potential to overturn the priors. In equilibrium, the PM becomes fully informed and implements the best policy and no payments are made from either IG to the PM.

When the PM prefers to remain less than fully uninformed about the benefits of reform, he often prefers to collect information in a way that maximizes the probability of generating information that offsets any favoritism inherent in his priors, and leaves him completely indifferent between the policies. That is, he chooses an information collection strategy that leaves him on the fence when comparing the policies. In other situations, he is indifferent between a strategy that maximizes the probability of being on the fence, and one that involves no information collection.

4.5 A Special Case: When Priors Are on the Fence

The general analysis considered above allows for the PM to initially favor one policy over the other. In this subsection, we focus on the case where

$\theta = \alpha$. It follows that $\hat{q} = 0$ and the PM is initially indifferent between the policies (i.e., on the fence).

In this case, the analysis is simplified by the fact that any information collection will introduce ex post asymmetries. When the PM collects no information, he has posterior belief $q = \hat{q} = 0$ and is indifferent between policies. As illustrated in Figures 1 and 2, posterior belief $q = 0$ maximizes political contributions and minimizes policy payoff. A more informative strategy leads to ex post asymmetries, sometimes inducing posterior belief $q > 0$ and sometimes inducing posterior belief $q < 0$. As illustrated in Figures 1 and 2, such a strategy strictly decreases expected political contributions and strictly increases the PM's expected policy payoff.[11]

Lemma 2. In the case when $\theta = \alpha$, consider two alternative information strategies Q and Q', where Q second-order stochastic dominates Q' over support $[-\theta, 1 - \theta]$ and $E[Q] = E[Q'] = \hat{q}$. Here,

1. the PM's information collection strategy is more Blackwell informative under Q' than under Q,
2. the PM's expected policy utility $E[\max\{q, 0\}]$ is strictly higher under Q' than under Q, and
3. the PM's expected payment is strictly lower under Q' than under Q.

This result clearly illustrates the tradeoff between better policy outcomes and higher revenue that often prevents the PM from becoming fully informed.

As the quality of his information increases, there are two direct effects. First, better information makes it more likely that he has correct beliefs about which policy alternative is the highest quality. Second, better information tends to increase *how much* better one policy looks compared with the other. In this way, more information increases the ex post asymmetries between the expected qualities of the policy alternatives. As the difference between the policy alternatives increases, it effectively becomes less expensive for an IG to ensure that the PM implements the ex post more promising policy. In this way, asymmetry decreases the competitive pressures between the IGs and decreases total political contributions. Increasing the PM's ability to distinguish policies strictly increases his ability to identify and implement the better policy, but also strictly decreases political contributions. When the PM chooses how informed to become on the

11. When the PM is initially not on the fence (i.e., when $\hat{q} \neq 0$), a more informative strategy may increase expected political contributions. As illustrated in Figure 1, when $v/\lambda < 1 - \theta$ and $\hat{q} = v/\lambda$, collecting no information leads to posterior belief $q = \hat{q} = v/\lambda$ and zero political contributions. A more informative signal leads to a more dispersed distribution of posterior beliefs and may increase expected political contributions. For example, an information collection strategy that produces posterior beliefs $q = 0$ and $q = 1 - \theta$ results in positive expected political contributions.

issue, he weighs the expected tradeoff between worse policy outcomes and higher political contributions.

When the priors favor neither policy, the PM always prefers to either remain fully uninformed, or to become fully informed. The incentive to conduct a partial search for evidence no longer exists, as the benefit of such an information collection strategy came from it maximizing the probability the PM is indifferent between the policies. When the PM starts off indifferent, collecting no information maximizes the probability of being on the fence.

Proposition 3. Assume $\theta = \alpha$. The PM remains uninformed and sells policy to the highest bidder when $v/\lambda > \theta(1-\theta)$. The PM becomes fully informed and always implements the best policy when $v/\lambda \leqslant \theta(1-\theta)$.

5. Contribution Limits

In this section, we consider a contribution limit $\overline{c}$. When the limit is higher than v, it is never binding and does not change equilibrium behavior. When $\overline{c} < v$, neither IG can offer a contribution in excess of $\overline{c}$. This changes the above analysis only in that throughout we replace v, which indicates an IG's maximum willingness to pay for policy, with $\overline{c}$, which indicates the IG's maximum allowed payment.

This means that imposing a contribution limit has a similar effect to a decrease in v in the above analysis. It can move us from Case 1, in which the PM prefers to maximize the probability of being on-the-fence, to Case 2, in which the PM prefers to become fully informed. Specifically, with a contribution limit, the PM becomes fully informed if and only if $\overline{c}/\lambda \leqslant \theta(1-\theta)$.

Proposition 4. Any contribution limit $\overline{c} \leqslant \theta(1-\theta)\lambda$ leads to the PM becoming fully informed and implementing the first best policy. When $\overline{c} > \theta(1-\theta)\lambda$, the PM becomes less than fully informed, and always implements the policy supported by his priors in equilibrium.

If $v/\lambda > \theta(1-\theta)$, then without a contribution limit, the PM's desire to collect political contributions provides a disincentive for information collection, and in equilibrium PM always implements the policy supported by the priors. When this is the case, a contribution limit of $\overline{c} \leqslant \theta(1-\theta)\lambda$ strictly improves policy outcomes by reducing the disincentive for information collection. Under such a limit, the PM chooses to become fully informed, which results in the first best policy being implemented in equilibrium.

We may imagine a policymaking environment in which the PM faces an array of issues, which may differ in terms of potential policy payoffs $\theta \in [0, 1]$, the likelihood $\alpha \in (0, 1)$ of reform being beneficial, or issue importance $\lambda > 0$ and $v > 0$. Any combination of these parameters may be feasible. In such an environment, decreasing $\overline{c}$ increases the range of issues for which $\overline{c} \leqslant \theta(1-\theta)\lambda$ is satisfied and thus the PM decides to become fully informed.

To formalize this point, assume that at the time a contribution limit is implemented, there is uncertainty about which issue (or issues) the PM will need to make a decision on in the future. Suppose the potential issues differ in λ, which is distributed on R_+ according to some continuous distribution. λ is realized after $\overline{c}$ is set, but before the PM chooses how much information to acquire. We refer to this as the game with multiple issues.

Corollary 1. In the game with multiple issues, imposing a stricter contribution limit (decreasing $\overline{c}$) strictly increases the share of issues on which the PM becomes fully informed.

6. IG Asymmetries

Until now, the analysis has assumed that the two IGs are symmetric. In some cases, however, one of the IGs may have a higher willingness to pay for policy. In the Online Appendix, we provide a complete analysis of such an environment. Here, we briefly summarize the results.

The qualitative results from the previous analysis continues to hold as long as the asymmetries between the IGs is not too large. In the asymmetric game with a simple information strategy, the PM prefers to remain uninformed for issues of low political importance since doing so leads to higher political contributions. For issues of high political importance, the PM prefers to become fully informed.

In the asymmetric game with general information strategy, the PM prefers an information collection strategy that maximizes the probability of a highly competitive monetary lobbying game. Here, the contribution-maximizing strategy involves generating evidence that partially favors the disadvantaged (e.g., poorer) IG, in order to offset the wealth advantage of the other group and generate a highly competitive lobbying contest between the disadvantaged and advantaged group. This is perfectly consistent with the main point of the analysis. The PM wants to maximize the level of competition between IGs during the lobbying stage of the game. To achieve this, he suboptimally collects information, even when he could collect better information at no cost. Contribution limits can increase information collection and lead to better policy.

This is the case unless one of the IGs has such a large financial advantage that information can never affect outcomes. When the asymmetries between the IGs is sufficiently large, the politician will in equilibrium always implement policy in favor of a rich IG, even when he is convinced that the rich group's policy is bad. In this case, the PM no longer faces a tradeoff between policy quality and political contributions. A fully informed PM receives the highest payment from the advantaged IG because collecting full information maximizes the probability that the PM finds evidence to definitively prove that the advantaged group's preferred policy is bad.

7. Discussion

In this paper, we take a new approach to incorporating information into a model of lobbying. Instead of assuming that IGs determine a PM's exposure to information, we instead assume that the PM himself chooses how much expertise or information to acquire. A PM who chooses to remain ignorant will not become informed, no matter how much an IG wants to communicate evidence. After the PM chooses an information collection strategy, IGs engage in a traditional monetary lobbying game.

We do not believe that our model describes all aspects of interactions between IGs and politicians. The real world policymaking environment is much more complicated than the one we capture with our analysis. However, by focusing on a simple model, we highlight a potentially harmful aspect of the interaction between IGs and politicians that has been overlooked by past models. Our analysis shows how concerns over political contributions may lead PMs to under-collect information or under-develop expertise, remaining less-informed about policy than constituents would like.

Within this context, we identify a novel argument in favor of campaign finance reform: Contribution limits decrease the incentive that politicians have to be less informed. By limiting the potential monetary return to remaining less informed, a contribution limit encourages a PM to learn more about an issue and improve policy outcomes. Our analysis suggests that the incentives that PMs have to become more informed on issues is maximized when campaign contributions are banned. We acknowledge, however, that our model abstracts from beneficial uses of political contributions, such as signaling support for a policy, or helping politicians fund informative campaigns and communicate with voters. As such, our results shouldn't be interpreted as evidence that contributions should be fully banned, only that campaign finance reforms have the additional beneficial effect: they encourage politician information collection, an effect not previously highlighted in the literature.

The main results of our analysis are robust to a variety of alternative assumptions. In the Online Appendix, for example, we present an alternative version of the game in which the PM privately learns about the state of the world, while focusing on the case in which the PM is ex ante unbiased, and the signal structure is less general.[12] Future work may extend our analysis to consider settings in which IGs also have the potential to

12. In unreported analysis, we consider costly information acquisition, alternative monetary lobbying frameworks, and the possibility that the politician can hide his information collection efforts or the level of expertise he acquires. The cases are included in Li (2015)'s dissertation.

produce information, and where a legislature of PMs work together to implement policy.

Appendix A

In Appendix A, we prove Lemma 1, Proposition 1, and Proposition 2, and then walk through the analysis from Section 4.5.

Proof of Lemma 1. The proof to Lemma 1 is adapted from Boleslavsky and Cotton (2015b), which itself is a binary state-space adaption of the related proof from Kamenica and Gentzkow (2011).

Consider random variable Q, with support on the unit interval and density $f(x)$, and expected value $\hat{q} = -\theta(1-\alpha) + (1-\theta)\alpha = \alpha - \theta$. Consider also two random variables S_1 and S_0, with densities $f_1(x)$ and $f_0(x)$, where

$$f_1(x) = \frac{x+\theta}{\hat{q}+\theta} f(x) = \frac{x+\theta}{\alpha} f(x), \quad f_0(x) = \frac{1-\theta-x}{1-\theta-\hat{q}} f(x) = \frac{1-\theta-x}{1-\alpha} f(x)$$

for all $x \in [-\theta, 1-\theta]$, and $f_1(x) = f_0(x) = 0$ for all other x. Furthermore, $\int f_1(x)\mathrm{d}x = \int f_0(x)\mathrm{d}x = 1$.

The posterior belief that $\tau = 1$ generated by realization x of joint distribution $S = (S_1, S_0)$:

$$\Pr(\tau = 1|x) = \frac{\alpha f_1(x)}{\alpha f_1(x) + (1-\alpha) f_0(x)} = \frac{(x+\theta)f(x)}{(x+\theta)f(x) + (1-\theta-x)f(x)} = x + \theta$$

Therefore, the expectation that $\tau = 1$ given x is simply $x + \theta$. The likelihood ratio is monotone because $\Pr(\tau = 1|x)$ is monotone in x. The density of Q is given by

$$f(x) = \alpha f_1(x) + (1-\alpha) f_0(x)$$

For the information collection strategy S, the posterior belief about the expected value of reform has density $f(x)$. Thus, for the information collection strategy constructed, Q is the ex ante distribution over posterior beliefs. Thus, for any Q, we can construct an information collection strategy S which generates it.

Next, consider any valid random variable $S = (S_1, S_0)$ with densities $f_1(x)$ and $f_0(x)$, and supports X_1 and X_0. For all x in X_1 but not in X_0, $\Pr(\tau = 1|x) = 1$ and $E(q|x) = 1 - \theta$. For all x in X_0 but not in X_1, $\Pr(\tau = 1|x) = 0$ and $E(q|x) = -\theta$. For all x in both X_1 and X_0,

$$\Pr(\tau = 1|x) = \frac{\alpha f_1(x)}{\alpha f_1(x) + (1-\alpha) f_0(x)} \in (0, 1),$$

and

$$E(q|x) = \Pr(\tau = 1|x)(1-\theta) - (1 - \Pr(\tau = 1|x))\theta = \Pr(\tau = 1|x) - \theta \in (-\theta, 1-\theta).$$

Let Q be the distribution over all $E(q|x)$ generated by S. It follows that

$$\begin{aligned} E[Q|S] &= \int (\alpha f_1(x) + (1-\alpha) f_0(x))(\Pr(\tau = 1|x) - \theta)\mathrm{d}x \\ &= \int (\alpha f_1(x) + (1-\alpha) f_0(x)) \frac{\alpha f_1(x)}{\alpha f_1(x) + (1-\alpha) f_0(x)} \mathrm{d}x - \theta \\ &= \int \alpha f_1(x) \mathrm{d}x - \theta \\ &= \alpha - \theta \\ &= \hat{q}. \end{aligned}$$

Hence, any valid S generates a posterior belief realization with support $[-\theta, 1-\theta]$ and expected value $\hat{q}$.

Proof to Proposition 1

If the PM remains uninformed, he expects equilibrium payoffs of:

(a) v when $\hat{q} \geq 0$ and $\hat{q} \leqslant v/\lambda$.
(b) $\lambda\hat{q} = \lambda(\alpha - \theta)$ when $\hat{q} \geq 0$ and $\hat{q} > v/\lambda$.
(c) $v + \lambda\hat{q} = v + \lambda(\alpha - \theta)$ when $\hat{q} < 0$ and $\hat{q} \geq -v/\lambda$.
(d) 0 when $\hat{q} < 0$ and $\hat{q} < -v/\lambda$.

At $\lambda = 0$, $EU_{\mathrm{PM}} = v$. When $\hat{q} \geq 0$, the PM's expected payoff is first constant at v and eventually strictly increasing in issue importance λ. When $\hat{q} < 0$, the PM's expected payoff is first decreasing in issue importance λ falling from v to 0, and then it remains constant at 0.

If the PM becomes fully informed, he implements the first best policy in equilibrium. When $\tau = 1$, then his payoff is v if $\lambda(1-\theta) \leqslant v$ (in which case he collects contributions), or $\lambda(1-\theta)$ if $\lambda(1-\theta) > v$ (in which case he collects no contributions). When $\tau = 0$, then his payoff is $v - \lambda\theta$ if $\lambda\theta < v$ (in which case he collects contributions), or 0 if $\lambda\theta > v$ (in which case he collects no contributions). He expects equilibrium payoffs of:

1. $\alpha v + (1-\alpha)(v - \lambda\theta) = v - (1-\alpha)\lambda\theta$ when $v/\lambda \geq \max\{\theta, 1-\theta\}$.
2. αv when $v/\lambda < \theta$ and $v/\lambda \geq 1-\theta$.
3. $\alpha\lambda(1-\theta) + (1-\alpha)(v - \lambda\theta) = (1-\alpha)v + \lambda(\alpha - \theta)$ when $v/\lambda \geq \theta$ and $v/\lambda < 1-\theta$.
4. $\alpha\lambda(1-\theta)$ when $v/\lambda < \theta$ and $v/\lambda < 1-\theta$.

Payoff 1 is strictly increasing in v and strictly decreasing in λ. Payoff 2 is strictly increasing in v and independent of λ. Payoff 3 is strictly increasing in v and strictly increasing in λ when $\hat{q} > 0$, and strictly decreasing in λ when $\hat{q} < 0$. Payoff 4 is strictly increasing in λ and independent of v.

When $\theta > 1 - \theta$, payoffs 1, 2, and 4 are relevant. In this case, the PM's expected payoff starts off at v when $\lambda = 0$, and then falls to αv as λ increases from 0 to v/θ. It remains constant at αv as λ continues to increase until $\lambda = v/(1 - \theta)$, after which the PM's expected payoff is strictly increasing in λ. The payoffs are continuous in all $\lambda > 0$.

When $\theta < 1 - \theta$, payoffs 1, 3, and 4 are relevant. In this case, the PM's expected payoff starts off at v when $\lambda = 0$, and is decreasing in λ up until $\lambda = v/(1 - \theta)$. For all λ from $v/(1 - \theta)$ to v/θ, the PM's expected payoff is strictly increasing in λ if $\hat{q} > 0$ and strictly decreasing in λ if $\hat{q} < 0$. The PM's expected payoff is strictly increasing in all $\lambda > v/\theta$. The payoffs are continuous in all $\lambda > 0$.

When $\theta = 1 - \theta$, only payoffs 1 and 4 are relevant, with the PM's payoffs first decreasing and then increasing in λ.

Notice that the PM's payoff 1 when fully informed is strictly less than either payoff A or C when uninformed. This means that whenever λ is close enough (but not equal to) to 0, the PM prefers to remain uninformed.

Notice also that payoff 4 when fully informed is strictly higher than payoff B or D when uninformed. This means that whenever λ is high enough, the PM prefers to become fully informed.

Next, we show that for $\lambda > 0$ there is single crossing of the payoff functions in the case of full information and the case of no information.

Consider the case where $\hat{q} < 0$. For this case, the PM's payoff is strictly decreasing in λ and then 0 when uninformed, and first strictly decreasing in λ and then strictly increasing in λ when fully informed. We know from the above analysis that payoff C is greater than payoff 1 for any λ. Therefore, the payoff from remaining uninformed starts off above the payoff from full information. Single crossing of the two functions is guaranteed from the fact that the payoff from being uninformed starts out above and ends up below the payoff function under full information, the fact that the payoff function when uninformed is linear in λ, and the fact that the payoff from full information is convex.

Next, consider the case where $\hat{q} \geq 0$. When the PM is uninformed, his payoff is constant at v until $\lambda = v/\max\{\theta, 1 - \theta\}$. Payoff v is greater than his payoff from full information when λ is low, and below his payoff from full information when $\lambda = v/\max\{\theta, 1 - \theta\}$. For all $\lambda > v/\max\{\theta, 1 - \theta\}$, his payoff from being uninformed remains below his payoff from full information. This implies that the payoff functions cross between λ small and $\lambda = v/\max\{\theta, 1 - \theta\}$. The constant utility from no information and the concavity of the payoff function from full information on this range implies single crossing.

Proof to Proposition 2

The PM chooses Q, represented by density f, to maximize his expected utility, while anticipating how IG contributions, and his future policy choice will respond to different realizations of information.

In equilibrium, following the monetary lobbying subgame, the PM implements the policy supported by his posterior beliefs. He collects political contributions from the IG that supports his favored policy, as long as his posterior beliefs are not so favorable to one policy that IGs are unwilling to pay enough to overturn his priors. When $|q| < v/\lambda$, it is the case that the PM positive contributions in equilibrium. When $|q| > v/\lambda$, no contributions are paid. It follows that the PM expects total payoffs EU_{PM} from the ensuring subgame equal to 0 if $q \in [-\theta, -v/\lambda]$, equal to $v + \lambda q$ if $q \in [-v/\lambda, 0]$, equal to $\lambda q + v - \lambda q = v$ if $q \in [0, v/\lambda]$, and equal to λq if $q \in [v/\lambda, 1 - \theta]$.

Therefore, the PM chooses Q, which defines f, to maximize

$$\int_{\max\{-\theta,-v/\lambda\}}^{0} f(q)(v + q\lambda)\mathrm{d}q + \int_{0}^{\min\{1-\theta,v/\lambda\}} f(q)v\mathrm{d}q + \int_{\min\{1-\theta,v/\lambda\}}^{1-\theta} f(q)q\lambda\mathrm{d}q \tag{1}$$

subject to the constraints that

$$\int_{-\theta}^{1-\theta} f(q)q\mathrm{d}q = \hat{q} \text{ and } \int_{-\theta}^{1-\theta} f(q)\mathrm{d}q = 1.$$

Details for the case when $\hat{q} \geq 0$

If $v/\lambda \geq 1 - \theta$, then PM chooses Q to maximize

$$\int_{\max\{-\theta,-\frac{v}{\lambda}\}}^{0} f(q)(v + q\lambda)\mathrm{d}q + \int_{0}^{1-\theta} f(q)(q\lambda + v - q\lambda)\mathrm{d}q =$$

$$(1 - F(\max\{-\theta, -\frac{v}{\lambda}\}))v + \lambda \int_{\max\{-\theta,-\frac{v}{\lambda}\}}^{0} f(q)q\mathrm{d}q$$

subject to the constraint that $EQ = \hat{q}$.

Notice that $\lambda \int f(q)q\mathrm{d}q$ is strictly negative when integrated over $q < 0$. Thus, PM utility is maximized when Q puts no probability on realizations of $q < 0$. All distributions Q such that $EQ = \hat{q}$ and $f(q) > 0$ only if $q \geq 0$ are feasible and return the same $EU_{\text{PM}} = v$. Any such distribution is in the set of preferred distributions.

If $\theta \leqslant v/\lambda < 1-\theta$, then the PM chooses Q to maximize

$$\int_{-\theta}^{0} f(q)(v+q\lambda)\mathrm{d}q + \int_{0}^{v/\lambda} f(q)(q\lambda + v - q\lambda)\mathrm{d}q + \int_{v/\lambda}^{1-\theta} f(q)(q\lambda)\mathrm{d}q =$$

$$v + \lambda \int_{-\theta}^{0} f(q)q\mathrm{d}q + \lambda \int_{v/\lambda}^{1-\theta} f(q)(q - v/\lambda)\mathrm{d}q = \tag{2}$$

$$F(v/\lambda)v + \lambda\hat{q} - \lambda \int_{0}^{v/\lambda} f(q)q\mathrm{d}q \tag{3}$$

subject to $EQ = \hat{q}$.

Choosing any Q such that $f(q) > 0$ iff $q \in [0, v/\lambda]$ results in $\int_0^{v/\lambda} f(q)q\mathrm{d}q = \hat{q}$, and in the PM earning expected payoff of v.

From Equation (2), we can see that the PM will do even better if he can shift probability weight from realizations $q \in [0, v/\lambda]$ to realizations greater than v/λ while maintaining $EQ = \hat{q}$. The PM will be better off shifting any probability mass from realizations $q \in (0, v/\lambda]$ to an alternative distribution that produces realizations $q=0$ and $q > v/\lambda$. Concentrating probability mass on realizations on $[0, v/\lambda]$ on $q=0$ allows for the greatest shift in weight to values $q > v/\lambda$ while maintaining $EQ = \hat{q}$. By shifting to a probability distribution with realizations $q=0$ and $q > v/\lambda$, the PM can achieve expected utility $v + \lambda \int_{v/\lambda}^{1-\theta} f(q)(q - v/\lambda)\mathrm{d}q > v$. We can write the PM's optimization problem over such distributions in terms of expected q conditional on $q > v/\lambda$, denoted $\tilde{q} = E(q|q > 0)$, and the probability of $q > v/\lambda$, denoted r:

$$\max_{r,\tilde{q}} (1-r)v + r\lambda\tilde{q} \ \text{ s.t. } \ r\tilde{q} = \hat{q}.$$

The problem is maximized when $\tilde{q} = 1-\theta$ and $r = \hat{q}/(1-\theta)$. Thus, the PM prefers the binary distribution where

$$\Pr(q=0) = 1 - \hat{q}/(1-\theta) \ \text{ and } \Pr(q = 1-\theta) = \hat{q}/(1-\theta) \tag{4}$$

to all other distributions over $q \geq 0$.

Finally, the PM could shift probability mass to realizations of $q < 0$ in order to increase the mass he can put on values of $q > \hat{q}$ (including $q = 1-\theta$) while maintaining $EQ = \hat{q}$. However, from Equation (3) we see that such a shift in probability distribution will decrease the expected payoff, as it will reduce the probability mass under v/λ without decreasing the probability mass on $(0, v/\lambda)$.

Thus, when $\theta \leqslant v/\lambda < 1-\theta$, Equation (4) gives the preferred Q over all distributions of $q \in [-\theta, 1-\theta]$ conditional on $EQ = \hat{q}$. This results in expected payoff

$$v(1-\alpha)/(1-\theta) + \lambda(\alpha - \theta).$$

If $v/\lambda < \min\{\theta, 1-\theta\}$, then the PM chooses Q to maximize

$$\int_{-v/\lambda}^{0} f(q)(v+q\lambda)\mathrm{d}q + \int_{0}^{v/\lambda} f(q)(q\lambda + v - q\lambda)\mathrm{d}q + \int_{v/\lambda}^{1-\theta} f(q)(q\lambda)\mathrm{d}q =$$

$$v(1-F(-v/\lambda)) + \lambda\int_{-v/\lambda}^{0} f(q)q\mathrm{d}q + \lambda\int_{v/\lambda}^{1-\theta} f(q)(q - v/\lambda)\mathrm{d}q \qquad (5)$$

subject to $EQ = \hat{q}$.

When choosing a distribution over $q \geq -v/\lambda$, the PM faces the same incentives as he did in the case where $\theta \leqslant v/\lambda < 1-\theta$. The PM will still prefer a distribution over $q=0$ and $q = 1-\theta$ to all other distributions on this support. The difference in this case is that the PM may prefer to shift probability mass to some $q < -v/\lambda$, which was not feasible when $v/\lambda > \theta$.

From Equation (5), it follows that the PM would never put probability mass on $q \in [-v/\lambda, 0)$, as he could shift this mass to values of $q \geq 0$ while maintaining $EQ = \hat{q}$ and improve his expected payoff. Additionally, it follows that the PM would prefer to shift probability mass from $q \in (-\theta, -v/\lambda)$ to $q = -\theta$ and $q = 1-\theta$ while maintaining $EQ = \hat{q}$, as this will also increase the PM's expected payoff. This, combined with the analysis of $q \geq 0$ from the case where $\theta \leqslant v/\lambda < 1-\theta$, implies that the PM chooses between the distribution given by Equation (4), and a distribution that shifts probability mass from $q=0$ to $q=-\theta$ and $q = 1-\theta$. If this later option is preferred, the PM engenges in the collection of full information and earns expected payoff $EU_{\mathrm{PM}} = \alpha(1-\theta)\lambda$. The PM prefers to become fully informed when

$$\alpha(1-\theta)\lambda > \frac{1-\alpha}{1-\theta}v + \lambda(\alpha-\theta) \Longleftrightarrow v/\lambda < \theta(1-\theta).$$

Notice that $\theta \in [0,1]$ means that $v/\lambda < \theta(1-\theta)$ implies that $v/\lambda < \min\{\theta, 1-\theta\}$.

Details for the case when $\hat{q} < 0$

If $v/\lambda \geq \max\{\theta, 1-\theta\}$, then PM chooses Q to maximize

$$\int_{-\theta}^{0} f(q)(v+q\lambda)\mathrm{d}q + \int_{0}^{1-\theta} f(q)(q\lambda + v - q\lambda)\mathrm{d}q = v + \lambda\int_{-\theta}^{0} f(q)q\mathrm{d}q =$$

$$v + \lambda\hat{q} - \int_{0}^{1-\theta} f(q)q\mathrm{d}q$$

subject to the constraint that $EQ = \hat{q}$.

Given $\hat{q} < 0$, the PM earns $v + \lambda\hat{q}$ from any distribution Q such that $f(q) > 0$ only if $q \leqslant 0$. Any such distribution is optimal for the PM when $\hat{q} < 0$. Any distribution putting probability on $q > 0$ reduces EU_{PM}.

If $\theta \leqslant v/\lambda < 1 - \theta$, then PM chooses Q to maximize

$$\int_{-\theta}^{0} f(q)(v + q\lambda)\mathrm{d}q + \int_{0}^{v/\theta} f(q)(q\lambda + v - q\lambda)\mathrm{d}q + \int_{v/\theta}^{1-\theta} f(q)q\lambda\mathrm{d}q =$$

$$\hat{q}\lambda + vF(v/\lambda) - \lambda\int_{0}^{v/\lambda} f(q)q\mathrm{d}q$$

subject to the constraint that $EQ = \hat{q}$.

For the above expression for EU_{PM}, we see that the PM can earn $v + \hat{q}$ from any Q such that $f(q) > 0$ only if $q \leqslant 0$. A distribution that puts positive mass on realizations $q > 0$ results in a lower payoff. Thus, the PM prefers the concentrate all probability mass on $q \leqslant 0$.

If $(1 - \theta) \leqslant v/\lambda < \theta$, then the PM earns $EU_{\mathrm{PM}} = 0$ for any realization $q \leqslant -v/\lambda$, $EU_{\mathrm{PM}} = v + q\lambda < v$ for any realization $q \in [-v/\lambda, 0]$, and $EU_{\mathrm{PM}} = v$ for any realization $q \geq 0$.

In this case, the PM will never prefer a distribution with positive mass on $q > 0$. If Q involves $q > 0$ with positive probability, then the PM could shift this mass some probability mass from realizations $q < \hat{q}$ to 0, improving EU_{PM} while maintaining $EQ = \hat{q}$. Given this, the PM chooses a distribution Q with support $[-\theta, 0]$ to maximize

$$\int_{-v/\lambda}^{0} f(q)(v + q\lambda)\mathrm{d}q = v + \hat{q}\lambda - \int_{-\theta}^{-v/\lambda} f(q)(v + q\lambda)\mathrm{d}q \tag{6}$$

subject to $EQ = \hat{q}$.

From Equation (6), we see that the PM will never prefer a distribution with a positive probability of $q \in [-v/\lambda, 0)$. Suppose there is a realization q' with positive probability where $-v/\lambda \leqslant q' < 0$; then the PM can shift mass from q' to $q = 0$ and $q > -v/\lambda$ to increase EU_{PM} while maintaining $EQ = \hat{q}$.

Thus, the PM's optimal distribution puts probability mass on $q = 0$ and $q > -v/\lambda$. We can rewrite the PM's optimization problem in terms of $\tilde{q} = E(q|q < -v/\lambda)$ and $r = \Pr(q < -v/\lambda)$:

$$\max_{\tilde{q},r}(1 - r)v \;\; \text{s.t.} \;\; \tilde{q}r = \hat{q},$$

which is maximized at $\tilde{q} = -\theta$ and $r = -\hat{q}/\theta$. Thus, in the case where $1 - \theta \leqslant v/\lambda < \theta$, the PM's optimal distribution is

$$\Pr(q = -\theta) = -\hat{q}/\theta \;\; \text{and} \;\; \Pr(q = 0) = 1 + \hat{q}/\theta, \tag{7}$$

which returns $EU_{\mathrm{PM}} = (1 + \hat{q}/\theta)v$.

If $v/\lambda < \min\{\theta, 1-\theta\}$, then the PM earns $EU_{\mathrm{PM}} = 0$ for any realization $q \leqslant -v/\lambda$, $EU_{\mathrm{PM}} = v + q\lambda < v$ for any realization $q \in [-v/\lambda, 0]$, $EU_{\mathrm{PM}} = v$ for any realization $q \in [0, v/\lambda]$, and $EU_{\mathrm{PM}} = q\lambda$ for any $q > v/\lambda$.

The analysis of the optimal q is unchanged from the previous case for realizations of $q \leqslant v/\lambda$. Here, however, there is the possibility of realizations $q > v/\lambda$, which was not a possibility when $v/\lambda > 1-\theta$. From the above analysis, we know that the PM prefers Equation (7) to any other distribution over $[-\theta, v/\lambda]$. Here, the PM can choose that distribution, or he can shift probability mass from realizations of $q = 0$ to put additional weight on $q = -\theta$ and weight on $q > v/\lambda$. Keeping the probability mass on 0 results in $EU_{\mathrm{PM}} = v$ from these realizations. Shifting it to $q = -\theta$ and $q > v/\lambda$ results in expected payoffs equal to $r\tilde{q}\lambda$, where we redefine $\tilde{q} = E(q|q > v/\lambda)$ and $r = \Pr(q > v/\lambda)$. The shift in distribution must maintain the same expected value as the original realization $q = 0$, and thus $r\tilde{q} - (1-r)\theta = 0$ or $r(\tilde{q} + \theta) = \theta$. Payoff $r\tilde{q}\lambda$ is maximized with respect to the constraint by a choice of $\tilde{q} = 1-\theta$ and $r = \theta$. Therefore, the PM prefers a full information strategy with $q \in \{-\theta, 1-\theta\}$ to any distribution in which $q \in [v/\lambda, 1-\theta)$. The full information strategy again returns expected payoff $EU_{\mathrm{PM}} = \alpha(1-\theta)\lambda$.

The PM prefers full information when it yields a higher expected payoff than when Q is defined by Equation (7), which is the case when

$$\alpha(1-\theta)\lambda > (1 + \hat{q}/\theta)v \Longleftrightarrow \alpha(1-\theta)\theta > (\theta + \alpha(1-\theta) - \theta(1-\alpha))v/\lambda \Longleftrightarrow$$

$$v/\lambda < \theta(1-\theta),$$

the same condition under which the PM prefers fully informative signals when $\hat{q} \geq 0$.

Details for the Case When Priors Are on the Fence

Here, we walk through the additional analysis for the case analyzed in Section 4.5 where $\theta = \alpha$. In this case, the PM's expected equilibrium policy payoff is

$$E[\max\{q, 0\}] = \int_0^{1-\theta} f(q)q\,\mathrm{d}q = \int_{-\theta}^{1-\theta} qf(q)\,\mathrm{d}q - \int_{-\theta}^{0} qf(q)\,\mathrm{d}q = \int_{-\theta}^{0} F(q)\,\mathrm{d}q,$$

noting that the final transformation follows from integration by parts and the fact that $\int_{-\theta}^{1-\theta} qf(q)\mathrm{d}q = \hat{q} = 0$.

Suppose that the PM chooses a posterior belief random variable Q' with CDF $F'(q)$, and Q' is second-order stochastic dominated by Q. With second-order stochastic dominance, we have $\int_{-\theta}^{0} F(q)\mathrm{d}q \leqslant \int_{-\theta}^{0} F'(q)\mathrm{d}q$. This implies that the PM expects higher policy payoff with Q'. Ganuza and Penalva (2010) establishes that for the case of binary states, if two posterior belief random variables have the same mean and one posterior belief random variable second-order stochastic dominates the other, then the dominated posterior belief random variable is more informative in the sense of Blackwell. This implies that when the PM becomes more informed about the reform, he expects a higher policy payoff.

Acquiring more information, however, also decreases political contributions. For example, when $v/\lambda \geq \max\{\theta, 1-\theta\}$, the expected political contributions equal

$$\int_{-\theta}^{0} f(q)(v+q\lambda)\mathrm{d}q + \int_{0}^{1-\theta} f(q)(v-q\lambda)\mathrm{d}q$$
$$= v + \lambda \int_{-\theta}^{0} f(q)q\mathrm{d}q - \lambda \int_{0}^{1-\theta} f(q)q\mathrm{d}q$$
$$= v - 2\lambda \int_{-\theta}^{0} F(q)\mathrm{d}q.$$

Suppose that the PM chooses a posterior belief random variable Q' with CDF $F'(q)$, and Q' is second-order stochastic dominated by Q. By the definition of second-order stochastic dominance, we have $\int_{-\theta}^{0} F(q)\mathrm{d}q \leqslant \int_{-\theta}^{0} F'(q)\mathrm{d}q$. This implies that the PM expects lower political contributions with Q'.

One can show that this analysis carries over for the case where $v/\lambda < \max\{\theta, 1-\theta\}$. The difference is that for realizations of q such that $q \in [v/\lambda, 1-\theta]$ or $q \in [-\theta, -v/\lambda]$, political contribution is 0.

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Supplementary material

Supplementary material is available at *Journal of Law, Economics, & Organization* online.

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