Policy-Specific Information and Informal Agenda Power[1]

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Abstract

In Gilligan and Krehbiel's models of procedural choice in legislatures, a committee exerts costly effort to acquire private information about an unknown state of the world. Subsequent work on expertise, delegation, and lobbying has largely followed this approach. In contrast, we develop a model of information as policy valence. We use our model to analyze a procedural choice game, focusing on the effect of transferability, i.e., the extent to which information acquired to implement one policy option can be used to implement a different policy option. We find that when information is transferable, as in Gilligan and Krehbiel's models, closed rules can induce committee specialization. However, when information is policy-specific, open rules are actually superior for inducing specialization. The reason for this surprising result is that a committee lacking formal agenda power has an incentive to exercise informal agenda power by exerting costly effort to generate high-valence legislation.

The formal study of legislative organization was revolutionized in a series of papers by Gilligan and Krehbiel (1987, 1990). In a sharp break from the previously-prevailing norm in the literature, Gilligan and Krehbiel developed models in which the congressional committee system is primarily a division-of-labor arrangement that facilitates production of high-quality legislation, rather than a means for distribution of particularistic legislative spoils. In the models, committees are delegated the job of costly specialization by a parent chamber that cares about both ideological policy outcomes and the production of good public policy (Fenno 1973).

The models feature a classic hold up problem, based on Crawford and Sobel's (1982) canonical analysis of cheap talk. A committee invests in a costly public good, information, which enhances the quality of its recommended legislation. However, once produced, that same information can be *expropriated* by a parent chamber to achieve its own, potentially quite different, policy goals. When the floor precommits to a restrictive rule, it constrains its own ability to expropriate the information, thus enhancing the committee's incentives to invest in information acquisition.

The Gilligan and Krehbiel models are based on a powerful but narrow notion of the common good in policy making. In the models, legislators are uncertain about the link between policies and outcomes. Committees then acquire information about that link. When legislators are risk averse, the resulting uncertainty reduction acts as "a collective benefit that is conceptually and mathematically distinct from distributive consequences..." (Gilligan and Krehbiel 1990, p. 536).

In a vast body of formal literature since the 1980s, uncertainty reduction, expertise, and the common good have become essentially synonymous, regardless of whether the empirical domain is institutional design, lobbying, debate, or delegation.[1] But this advancement has come with costs. Models of incomplete information and signaling are difficult and cumbersome. For analytical tractability, they require assumptions regarding the nature of uncertainty and expertise that, as

[1] Some high-profile examples include Austen-Smith (1990), Diermeier (1995), Baron (2000), and Battaglini (2002).

noted by Callander (2008a), are technically restrictive, substantively non-trivial, and better suited for some forms of policy expertise than others. The models generically feature many equilibria, necessitating the use of equilibrium refinement and selection criteria that are complex and debatable. Finally, the complexity of signaling models makes them exceedingly difficult to build upon.

With these issues in mind, we propose a simple valence-based model of good public policy, and analyze committee specialization as the production of policy valence. The concept of valence has been used primarily in electoral models, as a reduced-form representation of candidate-specific characteristics, such as charisma or competence, that appeal to all voters.[2] In our legislative model, valence serves as a reduced-form representation of universally desirable policy characteristics.

Our use of a valence model to analyze the effects of policymaking procedures is a sharp departure from the previous literature, because even papers that question or criticize some features of the canonical model retain the assumption that actors care only about spatial policy outcomes (Bendor and Meirowitz 2004, Callander 2008a). Our modeling choice is motivated by the fact that congressional committees, staff, and lobbyists exert considerable effort to actively design complex legislation that must meet a number of criteria to be successful. Among other things, policies must be coherently-designed, appropriate to local circumstances, cost-effective, and practical to implement given the resources and constraints of a sprawling federal bureaucracy. These considerations, which are not spatial in nature, naturally suggest a simple model of policy valence.

The only previous model to analyze the institutional implications of policy valence is Londregan's (2000) analysis of policy making in Chile.[3] Londregan's key insight is that the ability to

[2] See Ansolabehere and Snyder (2000), Groseclose (2001), and Aragones and Palfrey (2002). Endogenous valence acquisition occurs in some recent electoral models, e.g., Caillaud and Tirole (2002), Meirowitz and Tucker (2007), and Ashworth and Bueno de Mesquita (2008).

[3] Callander (2008b) uses a valence-based model of policy development, but his focus in that paper is on two-candidate electoral competition, rather than policymaking institutions.

generate high-valence policies provides players, in particular the President, with informal agenda power. We build upon this work by modeling multiple forms of valence, endogenizing its production, and analyzing how the informal agenda power identified by Londregan interacts with formal agenda power, i.e., legislative rules.

In our analysis, we focus on the extent to which information on how to effectively design one particular policy can be used to design alternative policies dealing with the same issue. We term this phenomenon *information transferability.* When information-as-valence is transferable across policies, an actor who expends costly effort to craft high quality legislation must take into account the possibility that other actors with different ideological objectives will expropriate his investment to achieve their own policy goals, as in the standard model. Alternatively, valence may be non-transferable; this captures the notion of *policy-specific* information.[4]

To analyze how transferability affects procedural choice in legislatures, we borrow the committee-floor procedural choice game developed by Gilligan and Krehbiel (1987), but dispense with private information about the link between policy choices and spatial outcomes. Instead, we model specialization as the production of policy valence. When valence in our model is transferable, the committee's incentive to acquire expertise is greater under a restrictive rule than under an open rule, as in Gilligan and Krehbiel. However, although restrictive rules encourage the committee to acquire expertise, they also result in non-centrist policy outcomes, as in Romer and Rosenthal (1979). Hence, the floor is willing to grant a restrictive rule only if two conditions hold: if the rule induces the committee to invest in valence production when it otherwise would not, and if the ideological preferences of the committee and the floor are sufficiently aligned.

[4] Our distinction between transferable and policy-specific valence parallels Callander's (2008a) distinction between invertible and non-invertible expertise regarding the link between policies and outcomes in the spatial model. However, Callander (2008a) uses a purely-spatial model with asymmetric information, whereas we use a spatial model with valence but no asymmetric information. Also, he analyzes delegation whereas we focus on legislative organization.

When valence is policy-specific our results are quite different. The specificity of valence protects the committee from expropriation regardless of the rule, and the effect of this protection is dramatic. We show that a closed rule is never optimal, because it *reduces* the incentive for a committee to invest in the production of valence. This surprising result arises because policy-specific valence acts as a channel through which the committee exerts informal agenda power. The greater is the committee's formal agenda power via legislative rules, the less incentive it has to use specialization to accomplish the same end. In other words, when valence is policy-specific, restrictive rules and valence are substitutable means for achieving the same end. As a consequence, open rules generate more centrist policies *and* greater specialization, turning Gilligan and Krehbiel's result on its head.

At a broader level, our analysis points out the need to reconsider the nature of policy and information in political contexts. Moreover, unlike signaling models, our model is technically simple, and therefore easy to build upon, so it provides a solid foundation for future research on policy choice and institutional design.

Information Expropriability

To illustrate the rationale behind our model of committee expertise, we begin by revisiting the canonical Crawford and Sobel (1982) informational framework. Players are uncertain about the link between a policy p and the resulting outcome x. A player's preferences $u_i(x)$ are based only on the outcome, x, so policies serve as potentially-imperfect instruments for achieving outcomes.

The canonical model assumes without loss of generality that the link between policies and outcomes is determined by some unknown state of the world ω. With considerable loss of generality, but considerable gain in analytical tractability, the model furthermore assumes that ω acts as a common additive shock, such that $x = p + \omega$. Expertise is then equivalent to learning ω.

While this restrictive setup facilitates analysis, it has the peculiar feature that information is fully *invertible* (Callander 2008a), i.e., knowledge of the outcome x' resulting from a particular policy p' enables an actor to know what outcome x'' will result from any other policy p''. The value of ω encodes all relevant knowledge of the complete mapping between policies and outcomes.

What sort of policy issue would correspond to such a model? Consider the US Congress selecting the size of the defense budget at the height of the Cold War, under uncertainty about Soviet capabilities. As a first order approximation, assume that members of Congress are either hawks or doves. Hawks believe that overwhelming military superiority over the USSR is necessary to maintain security, while doves believe that parity is sufficient.

In this example, which is inspired by Krehbiel's (1991, pp. 82-3) discussion of defense spending, a single piece of unknown information – the magnitude of Soviet capabilities – determines a legislator's utility over all possible defense budgets, because true legislator preferences are over the "force gap" between the countries, as opposed to the absolute size of the budget. If a hawkish Congressional committee under the direction of a dovish floor learns the true magnitude of Soviet capabilities, it would prefer to mislead the floor into believing that the force gap is enormous. The information is expropriable in the sense that, regardless of the actual level of Soviet capabilities, if the floor learns the true level it can use this knowledge to implement its dovish policy of parity.

Certain policy areas – e.g., those in which the appropriate scale of the government's response to a problem is increasing in the magnitude of the problem – lend themselves to this specialized structure. However, the canonical model is ill-suited to many other forms of information, particularly that which pertains to efficiency or to coordination of various components of a complicated policy. In fact, many of Krehbiel's (1991) examples of information and expertise are better described by a model of information as policy-specific valence than by the $x = p + \omega$ model:[5]

[5] The same also could be said of Krehbiel's non-political examples: buying a used car (pp. 82-3), assessing a new line of research (pp. 88-9), and designing a coherent architectural plan for a building (pp. 92-3).

- Debates in the 1980's over whether the Strategic Defense Initiative anti-missile defense system would function properly (pp. 62-3): a cost-effective, functional missile shield is a high-valence policy, i.e., everyone, even doves, would prefer it over a costly missile shield that doesn't work.

- Reforms of the Department of Housing and Urban Development (pp. 63-4): these reforms were low-valence because they harmed tenants' health and safety while costing taxpayers millions of dollars.

- Reforms to improve the functioning of the federal student loan system (pp. 85-6): these reforms were high-valence because they kept the system afloat, so that honest students could receive loans and taxpayers would not have to bail out lenders.

- A badly-designed, i.e., low-valence, insurance program for catastrophic medical care for the elderly (p. 93).

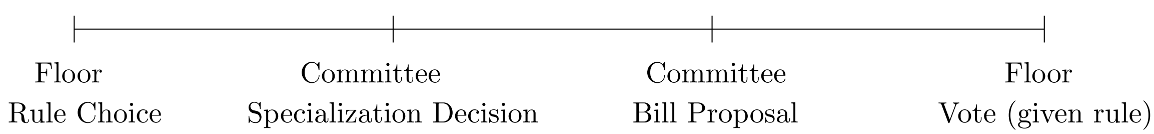
What is notable about these policy areas is that information needed to successfully implement one policy option is not readily transferable to other policies dealing with the same issue. For example, consider catastrophic medical insurance, which is a moderate policy, lying somewhere between a completely free market for medical care with no government intervention (on one extreme) and socialized medicine (on the other). If a legislator learns how to design a good program for catastrophic medical insurance, this information is not particularly useful to someone who is trying to design a system of socialized medicine. And it surely is useless to a libertarian who is working on a truly free-market health care policy. Nonetheless, everyone would prefer a well-designed catastrophic medical insurance program over a badly-designed one, so a model of policy-specific valence is appropriate for studying information in this empirical domain.

Before we turn to the model of legislative procedures – based on Gilligan and Krehbiel (1987) – that we analyze in this paper, we note that a model of policy-specific valence is a natural way to study how expertise affects several other aspects of policy-making. For example, variation in legislators' participation on different issues (Hall 1996) may be explained by variation in their desire to exert informal agenda power via the production of policy-specific valence. Similarly, a model of policy-specific valence may explain why think tanks and interest groups often present highly detailed policy recommendations, including specific wording that can be included in legislation: although it is, of course, possible to interpret their actions as equilibrium signaling behavior in a cheap-talk game, it may well be the case that their goal is to publicize well-designed, high-valence policies that promote their ideological objectives.

The Model

We present a simple four-stage sequential game, played by a committee and floor in a legislature. The structure of our model is nearly identical to the model in Gilligan and Krehbiel (1987). Figure 1 gives a timeline for the game.

Figure 1: Timeline



In the first stage, the floor publicly commits to consider the committee's bill under either an open rule or a closed rule. Under a closed rule, the committee's bill is voted on, up or down, against an exogenous status quo policy. Under an open rule, the floor may offer amendments to the committee's bill and can adopt whatever available policy best promotes its interests.

In the second stage, the committee chooses whether to invest in valence production and, in the case of policy-specific valence, chooses a *target policy* on which to invest. In the third stage, the outcome of the committee's investment is publicly revealed, and the committee refers a bill to the floor for consideration. In the fourth stage, the floor chooses policy under the rule that it chose in the first stage.

Policy in our model has two components: the ideological location and the valence, or quality, associated with the bill. Valence is valued by all players, and is simply a number $v \in [0, \infty)$, whereas ideology is a point $x \in \mathbb{R}$. Thus each bill is a point in two-dimensional real space $b = (v, x) \in \mathbb{R}^2$. Players' utility over the two dimensions is additive, with

$$U_i(b) = v - \lambda_i(|x_i - x|).$$

For each player $i \in \{f, c\}$, $\lambda_i(\cdot)$ is a spatial loss function defined over $[0, \infty)$, capturing the utility loss arising from movements away from a player's preferred ideological policy x_i. We assume that the loss functions are strictly increasing, strictly convex, twice differentiable, and that $\lambda_i(0) = \lambda_i'(0) = 0$. Note that standard quadratic preferences are a special case of our setup with $\lambda_i(d) = d^2$. Without loss of generality, we assume the floor median's ideal point is $x_f = 0$, the committee's ideal point is $x_c > x_f$, and the status quo policy q has valence normalized to 0.

Because preferences for valence are linear and additive, our setup precludes any interaction effects between ideology and valence. For example, we cannot accommodate the notion that a liberal player prefers a low-quality conservative policy because she hopes it will produce bad effects and later be altered to a more ideologically-appealing policy.[6] As in other valence models, valence is *by definition* valued by everyone.

As in Gilligan and Krehbiel (1987), only the committee has the ability to engage in costly investment. However, the product of that investment is valence rather than knowledge of an unknown state of the world ω. Our model contains no private information, and the committee's investment decision is publicly observable. The valence return is ex ante uncertain to both the

[6] However, our model can be extended to analyze some situations where the benefit that an actor receives from high-quality policies declines as the ideological location of the policy moves away from her ideal point.

committee and the floor, and once revealed is public information.

The valence production process is as follows. First, the committee selects the target policy $\tilde{x} \in \mathbb{R}$. In the case of policy-specific valence, any information the committee subsequently acquires will be tailored toward implementing $\tilde{x}$. Next, the committee decides whether to invest in costly specialization. If the committee does not invest, then the valence of the target policy is normalized to 0. If it invests, the committee pays an up front fixed cost c and receives a probabilistic valence return $\tilde{v}$ from a distribution $F(\cdot)$ with density $f(\cdot)$. For simplicity we assume $f(\cdot)$ is continuous, with full support restricted to $[0, +\infty)$, a finite expectation $E[v] < \infty$, and a nondecreasing hazard rate $\frac{f(\cdot)}{1-F(\cdot)}$. The last assumption is satisfied by many standard distributions, such as the exponential, and is only a sufficient, not necessary, condition for our results.[7]

Once the committee has observed the valence realization $\tilde{v}$, it has the opportunity to revisit its choice of policy before referring a final bill to the floor. However, the consequences of bill revision depend on the transferability of valence, which is exogenous. We model two alternative forms of valence. In the first, the valence generated in committee can be applied to all policies. Hence, it is *transferable*, and if the committee rewrites (or the floor amends) the bill to implement a policy $x' \neq \tilde{x}$ it retains $\tilde{v}$. The nature of valence in the transferable game is analogous to the $p + \omega$ model, where knowledge of ω may be used to implement any desired outcome.

The second form of valence is *policy-specific*, i.e., the return generated by the committee's investment is tailored exclusively to the target policy. Thus, the valence $\tilde{v}$ cannot be transferred to other policies, and if the committee rewrites the bill to implement some $x' \neq \tilde{x}$, the resulting bill will have a valence level normalized to 0.

Under an open rule, absent the opportunity for valence production, the unique equilibrium outcome is simply the floor's ideal point. Under a closed rule, the outcome depends on the location

[7] Moreover, our key result in Proposition 3 does not require this assumption.

of the status quo policy q. We consider the case where $0 < q \leq x_c$, i.e., the status quo is in the Pareto set between the committee and the floor. The unique Subgame Perfect Nash Equilibrium (henceforth, "equilibrium") outcome that prevails in the Romer and Rosenthal (1979) closed rule agenda setter model absent valence is simply gridlock.[8]

Preview of Results

For each variant of our model – transferable and policy-specific valence – we characterize equilibrium policy outcomes, committee investment decisions, and floor rule choices. Equilibria are unique up to these characteristics, and are solved by backward induction. We specify and compare policy outcomes in four possible subgames: valence can be either transferable or policy-specific, and the rule can be either open or closed. Here we give a brief overview of our results.

Both the floor's rule choice and the up-front cost c of valence investment influence the committee's incentive to invest in valence production. Our first key result is that when valence is transferable, the committee's incentive to invest under a closed rule is greater than under an open rule. In the canonical model, this effect arises because the protection afforded by closed rules results in more efficient information transmission. In our model, the transferability of valence makes a closed rule *necessary* for the committee to exert informal agenda power using high-valence policies, because under an open rule the floor simply expropriates any valence generated in committee and attaches it to its most preferred ideological policy.

Consequently, for intermediate values of the cost parameter c, a closed rule is necessary and sufficient to induce the committee to invest. This property is an important component of the standard informational rationale for closed rules, because closed rules result in non-centrist ideological

[8] The case $-x_c < q \leq 0 < x_c$ is identical, because the relevant bill that the committee can achieve under a closed rule is $-q$, which is between 0 and x_c. Other possible setups, $0 < x_c < q$ and $q \leq -x_c < 0 < x_c$, are similar.

outcomes. The consequence of this property is that equilibrium behavior in the transferable valence variant of our model is similar to Gilligan and Krehbiel's (1987) results, as seen in Table 1.[9]

Table 1: Results with Transferable Valence

Cost of investment	Committee's investment decision	Floor's rule choice
Low	Always invest under either rule	Open
Intermediate	Invest under closed but not under open	Closed if valence benefit exceeds ideological cost
High	Never invest under either rule	Open

When the cost of investment is intermediate and the floor's choice of rule is pivotal for the committee's investment decision, the floor selects a closed rule only if the valence gains are sufficiently attractive and the committee is sufficiently moderate. This pattern arises because extreme committees use the informal agenda power provided by valence more aggressively, resulting in greater floor losses along the ideological dimension. We show in Proposition 1 precisely how the floor weighs valence benefits against ideological costs when deciding whether to adopt a closed rule.

When valence is policy-specific, the equilibrium is dramatically different. Our key result, Proposition 3, is that a risk-averse committee's incentive to invest in valence under an open rule is actually *stronger* than it is under a closed rule. This effect arises because the committee can use policy-specific valence to exercise informal agenda power under either rule; a closed rule is no longer necessary to prevent expropriation. As a result, closed rules and valence become *substitutable means* for exercising agenda power, implying that the agenda power conferred by a closed rule reduces the marginal policy rents that can be extracted with valence.[10]

[9] Krishna and Morgan (2005) characterize a closed-rule equilibrium that pareto-dominates the one characterized by Gilligan and Krehbiel and that is better for the floor than the best open rule equilibrium characterized by Crawford and Sobel. However, as pointed out by Krehbiel (2005), this result of Krishna and Morgan's "strengthens the informational rationale for restrictive rules" in the $x = p + \omega$ model with a single committee.

[10] The idea that an actor who lacks formal authority can achieve informal authority by obtaining information

With policy-specific valence, the floor always selects an open rule (Proposition 4). This pattern of equilibrium behavior, summarized in Table 2, stands in stark contrast to both our transferable valence game and the Gilligan and Krehbiel model.

Table 2: Results with Policy-Specific Valence

Cost of investment	Committee's investment decision	Floor's rule choice
Low	Always invest under either rule	Open
Intermediate	Invest under open but not under closed	Open
High	Never invest under either rule	Open

We now solve our model, beginning with the transferable valence case and then moving to the policy-specific valence case. For each variant we first characterize the committee's behavior under each type of rule and then analyze the floor's rule choice.

Notation Before presenting our results we first introduce some notation. Recall that $\lambda_f(\cdot)$ is the floor's spatial loss function over the ideology dimension. Define $\bar{v}(x;q)$ as

$$\bar{v}(x;q) = \lambda_f(|x|) - \lambda_f(|q|) \tag{1}$$

So $\bar{v}(x;q)$ is the level of valence that makes the floor indifferent between a bill $(\bar{v}(x;q), x)$ and the status quo $(0, q)$. Note that $\bar{v}(x;q)$ inherits most of the properties of $\lambda_f(\cdot)$; in particular it is increasing and convex in x.

Now let $\bar{x}(v;q)$ be implicitly defined as the unique ideological location above x_f such that:

$$\bar{v}(\bar{x}(v;q);q) = v \tag{2}$$

about consequences of different courses of action is neither new nor unique to the legislative politics literature – see Aghion and Tirole's (1997) analysis of delegation. Our work differs substantially from previous work in that we use a valence-based modeling technology, and apply our model to legislative procedural choice in a spatial model of policy.

Given a level of valence v, the floor is indifferent between a bill $(v, \bar{x}(v;q))$ and $(0,q)$. Hence $(v, \bar{x}(v;q))$ is the most extreme bill with valence v that the floor weakly prefers to the status quo. Clearly $\bar{x}(v;q)$ is increasing in q, i.e., the floor is willing to accept more ideologically extreme bills in lieu of the status quo the greater is the attached valence.

In each subgame, the committee's equilibrium investment decision can be characterized by a unique *cost cutpoint* such that the committee chooses to invest in valence if and only if c is below this cutpoint. Higher cutpoints imply greater incentives to invest. We write $c_{cl}^{t}(x_c, q)$, $c_{o}^{t}(x_c)$, $c_{cl}^{nt}(x_c, q)$, and $c_{o}^{nt}(x_c)$ to denote the equilibrium cutpoints – subscripts refer to the rule (closed or open) and superscripts refer to the type of valence (transferable or non-transferable). In the case of policy-specific valence, to fully describe the committee's strategy it is also necessary to describe the committee's equilibrium choice of a *target policy*, which we write as $\tilde{x}^{cl}(x_c, q)$ and $\tilde{x}^{o}(x_c)$ for the policy under a closed and open rule, respectively.

Transferable Valence

We first solve our transferable valence game for the case where the floor chooses an open rule. We then solve the closed rule case, and determine the floor's optimal rule choice.

Open Rule The case of transferable valence under an open rule is straightforward. In the final stage of the game, regardless of the valence attached, the floor will amend any bill $\hat{b}$ referred by the committee to its own ideal point ($x_f = 0$) along the ideological dimension, because valence is transferable and amendments are costless.

Because the committee can do nothing to change the equilibrium policy outcome in the ideological dimension, its incentive to invest is determined only by the valence benefits. Those benefits are simply the full expected return of the investment $E[v]$, because valence is only transferred between bills, and never lost. Therefore the cutpoint for the cost of investment is $c_o^t(x_c) = E[v]$.

In summary, if valence is transferable, then under an open rule committee behavior and policy outcomes are characterized as follows. **(1)** The committee invests if and only if the cost of investing is sufficiently low, i.e., $c \leq c_o^t(x_c)$. **(2)** If the committee does not invest, the policy outcome is $(0, 0)$. **(3)** If the committee invests and the investment returns valence $\tilde{v}$, the policy outcome is $(\tilde{v}, 0)$.

Closed Rule Under a closed rule with transferable valence, our model is a straightforward variant of a Romer-Rosenthal agenda-setter game. In the final stage, the committee has referred a bill $\hat{b} = (\hat{v}, \hat{x})$ and the floor accepts the bill if and only if $\hat{v} \geq \bar{v}(\hat{x}, q)$, the valence cutoff from Equation 1 such that the floor is at least as well off as under the status quo.

We now focus on the penultimate stage. Under an open rule, valence transferability allowed the floor to expropriate any valence generated in committee for its own policy ends, so the committee could not exert informal agenda power with high-valence policies. In contrast, with the formal protection of a closed rule, the ability to transfer valence across policies is retained solely by the committee. After observing the realized level of valence it can alter the bill's ideological location to leave the floor indifferent between the referred bill and the status quo.

Formally, for each realization of valence $\tilde{v}$, the committee transfers the valence to the best ideological policy, for itself, that leaves the floor at least as well off as with the status quo. If the realized valence is sufficiently high, i.e., $\tilde{v} \geq \bar{v}(x_c; q)$ then the committee is able to implement its own ideal point. Otherwise, the farthest it can pull policy, while still getting the floor's approval, is $\bar{x}(\tilde{v}; q) = \lambda_f^{-1}(\lambda_f(q) + \tilde{v})$. The committee's optimal bill is $\hat{b} = (\tilde{v}, \hat{x})$, where $\hat{x} \equiv \min\{x_c, \bar{x}(\tilde{v}; q)\}$.

The closed rule equilibrium can be seen in Figure 2, which graphs ideological policy outcomes as a function of the valence realization in the transferable valence case. For a low realization of valence the committee proposes a policy along the ideological dimension that traces out the floor's indifference curve through the status quo policy $(0, q)$. For a high realization of valence, the committee proposes its own ideal point x_c and the floor strictly prefers the committee's proposal over $(0, q)$. The floor only enjoys the benefits of valence utility when valence is sufficiently high to sate the committee's desire to extract ideological policy rents.

If the committee invests in valence, its ex-ante expected utility is $E[v]-\int_0^{\bar{v}(x_c;q)} \lambda_c(x_c-\bar{x}(v;q))\, f(v)dv$. If it does not invest, policy is gridlocked at q and its utility is $-\lambda_c(x_c - q)$. Subtracting the latter from the former we derive the cost cutpoint determining the incentive to invest:

$$c_{cl}^{t}(x_c, q) \equiv E[v] + \int_0^{\bar{v}(x_c;q)} (\lambda_c(x_c - q) - \lambda_c(x_c - \bar{x}(v;q))\, f(v)dv + (1 - F(\bar{v}(x_c;q)))\lambda_c(x_c - q). \quad (3)$$

In summary, if valence is transferable, then under a closed rule committee behavior and policy outcomes are characterized as follows. **(1)** The committee invests if and only if the cost of investing is sufficiently low, i.e., $c \leq c_{cl}^{t}(x_c, q)$. **(2)** If the committee does not invest, the policy outcome is $(0, q)$. **(3)** If the committee invests and the investment returns valence $\tilde{v}$, the policy outcome is $(\tilde{v}, \hat{x})$, where $\hat{x} \equiv \min\{x_c, \bar{x}(\tilde{v}; q)\}$.

Rule Choice If the floor's rule choice does not affect the committee's investment decision, the floor clearly prefers an open rule, because it receives its own ideal point along the ideology dimension and valence utility at least as high as under a closed rule. Hence, as is the case for some parameter values in the Gilligan and Krehbiel model,[11] in the transferable valence game a necessary condition for the floor to prefer a closed rule is that there exist some cost parameters such that a closed rule

[11] In Gilligan and Krehbiel (1987), the floor may sometimes prefer a restrictive rule even if the rule choice is not pivotal for the committee's investment decision. However, this requires that the committee's preferences be very closely aligned with the floor. In that model the closed rule not only provides the committee with ideological rents, but is more informationally efficient, i.e., the value of the collective benefit *itself* is greater under the closed rule. This feature does not extend to our model.

induces the committee to invest when it otherwise would not, i.e., $c_{cl}^{t}(x_c, q) > c_o^t(x_c) = E[v]$. It is easy to see from Equation 3 that this condition holds regardless of the values of x_c and q.

We now solve for the floor's optimal rule choice. Suppose that $c \in (c_o^t(x_c), c_{cl}^t(x_c, q)]$, so the committee only invests under a closed rule. The floor's expected utility under a closed rule is then

$$-\int_0^{\bar{v}(x_c;q)} \lambda_f(q) f(v)\, dv + \int_{\bar{v}(x_c;q)}^{\infty} (v - \lambda_f(x_c)) f(v)\, dv. \tag{4}$$

Equation 4 has two components. When the valence realization is below $\bar{v}(x_c; q)$, the floor enjoys no valence benefits because the committee extracts them all in the form of ideological policy rents. The floor is forced to accept a policy no better than the status quo, resulting in utility $-\lambda_f(q)$. However, when the valence realization is above $\bar{v}(x_c; q)$, the committee extracts no additional ideological rents (it receives its own ideal point and is sated) and the floor enjoys the extra benefits of valence, i.e., $v - \lambda_f(x_c) > -\lambda_f(q)$. Because the floor's utility under an open rule absent investment is simply 0, the floor prefers a closed rule with investment to an open rule with no investment if and only if Equation 4 is positive.

We prove in Lemma 3, in the Appendix, that Equation 4 is strictly decreasing in x_c and approaches $-\lambda_f(q) < 0$ as $x_c \to \infty$. Intuitively these properties are obvious. A more extreme committee is less easily sated, so under a closed rule it leaves the floor with less surplus valence utility in expectation. In the limit, an infinitely extreme committee extracts all valence benefits in the form of ideological policy rents, leaving the floor no better off than with the status quo.

Because Equation 4 is strictly decreasing in x_c it achieves its maximum at $x_c = q$ (recall we have assumed $x_c \geq q$). Hence a *necessary* condition for the floor to prefer a closed rule is that $E[v] > \lambda_f(q)$, or that the full expected value of the potential valence return exceeds the utility loss of accepting the non-centrist status quo point q. When this condition holds, there exists a unique finite $x_c^* > q$ such that Equation 4 is equal to 0, since 4 is continuous, strictly decreasing, and approaching $-\lambda_f(q)$ in the limit.[12].

When $x_c > x_c^*$, the floor prefers an open rule even if a closed rule can induce valence investment. Combining these observations, we characterize the floor's optimal rule choice, as a function of the committee's ideal point, x_c, and the cost of investment, c, as shown in Figure 3.

Proposition 1 *With transferable valence, the floor strictly prefers a closed rule to an open rule if and only if both of the following conditions hold.*

1. *A closed rule will induce the committee to invest when it otherwise would not, i.e.,* $c \in \left(c_o^t(x_c), c_{cl}^t(x_c, q)\right]$.

2. *The valence benefit to the floor exceeds the ideological loss resulting from the closed rule, i.e.,* $\int_{\bar{v}(x_c;q)}^{\infty} (v - \lambda_f(x_c)) f(v)\, dv \geq \int_0^{\bar{v}(x_c;q)} \lambda_f(q) f(v)\, dv$. *Alternatively, the condition may be written as:*

   a. $E[v] > \lambda_f(q)$

   b. $x_c \in (q, x_c^*)$, *where* x_c^* *solves* $-\int_0^{\bar{v}(x_c^*;q)} \lambda_f(q) f(v)\, dv + \int_{\bar{v}(x_c^*;q)}^{\infty} (v - \lambda_f(x_c^*)) f(v)\, dv = 0$

Overall, the results in this section very closely parallel the results in Gilligan and Krehbiel (1987). In both models, specialization is beneficial to both the floor and the committee. If the cost of investment is low, the committee will always specialize, regardless of the rule chosen by the floor. On the other hand, if the cost of investment is high, the committee will never invest. For intermediate cost levels, the committee's decision about whether to exert costly effort depends on the rule under which its bill will be considered. However, as we will show below, when valence is policy-specific, the nature of the equilibrium is dramatically different, indicating that the threat of expropriation is a key factor driving the canonical results.

[12]Note that x_c^* is implicitly a function of q. We supress the notation $x_c^*(q)$.

Policy-Specific Valence

We now analyze the case of policy-specific valence. In the transferable valence game, we did not analyze the committee's initial choice of a target policy $\tilde{x}$, because valence generated by the committee's investment could be freely transferred across policies. With policy specific valence, however, the valence returned by the committee's investment $\tilde{v}$ is attached solely to the target policy $\tilde{x}$, and if either the committee or the floor chooses to alter the ideology of the bill, the fruits of the committee's investment are lost.

The committee's choice of a target policy is therefore a critical component of its strategy. If it works on an extreme policy, its bill will only beat the floor's ideal point (under an open rule) or the status quo (under a closed rule) if a high valence return is realized, which occurs with low probability. However, if the committee chooses a moderate target policy, it potentially foregoes ideological rents, because there is always a non-zero probability of valence realizations for which a more extreme policy would have beaten the best other alternative available to the floor.

We now characterize the committee's investment decisions, including its choice of a target policy. The committee's equilibrium behavior under an open rule can be treated as a special case of the closed rule, which we therefore analyze first.

Closed Rule The final stage (floor vote) under a closed rule is identical to the transferable valence case. In the penultimate stage (committee proposal), note that for any valence realization $\tilde{v}$ the committee has no incentive to amend its bill $\hat{b}$ from the target policy $\tilde{x}$. Any alternative bill that is preferred by the committee will have 0 valence because valence is non-transferable, and because $q \in (0, x_c)$ all such bills will fail against the status quo. This is in sharp contrast to the transferable valence game, where the committee chooses a different ideological location for every valence realization.

Because the committee has no incentive to alter the bill after observing the valence realization, the set of equilibrium ideological policy outcomes is binary: either the status quo prevails (if $v < \bar{v}(\tilde{x}; q)$), or the target policy prevails (if $v \geq \bar{v}(\tilde{x}; q)$).

Proceeding backward to the investment decision and the selection of the target policy, suppose first that the committee has chosen to invest. The optimal target policy then maximizes the committee's ex-ante expected utility conditional on investment. Clearly the committee will never select a target policy $\tilde{x} < q$ or $\tilde{x} > x_c$ because for any such $\tilde{x}$ it would be better off working on either q or x_c respectively. Now denote the optimum as $\tilde{x}^{cl}(x_c, q)$, which satisfies:

$$\tilde{x}^{cl}(x_c, q) = \underset{\tilde{x} \in [q, x_c]}{\arg\max} \left\{ -F(\bar{v}(\tilde{x}; q)) \lambda_c (x_c - q) - (1 - F(\bar{v}(\tilde{x}; q))) \lambda_c (x_c - \tilde{x}) + \int_{\bar{v}(\tilde{x}; q)}^{\infty} v f(v)\, dv \right\} \tag{5}$$

The first term of the maximand is the committee's ideological utility loss when the valence return $\tilde{v}$ is insufficient to beat the status quo, which occurs with probability $F(\bar{v}(\tilde{x}; q))$. The second term is the ideological utility loss when $\tilde{v}$ is sufficient to pass the target policy $\tilde{x}$, which is better for the committee than the status quo, but still (weakly) worse than its own ideal point x_c. The third term is the utility to the committee from the valence itself. Note that this is simply the conditional expectation $E[v | v \geq \bar{v}(\tilde{x}, q)]$, because the valence generated by the committee is lost when $v < \bar{v}(\tilde{x}, q)$ and the floor chooses to maintain the status quo.

We now state our first result for the case of policy-specific valence, which characterizes the optimal target policy $\tilde{x}^{cl}(x_c, q)$ under a closed rule. The Appendix has the proof of this result, as well as others not proved in the main text.

Lemma 1 *With policy-specific valence, if the committee chooses to invest its optimal closed rule target policy $\tilde{x}^{cl}(x_c, q)$ is unique, strictly interior to $[q, x_c]$, and strictly increasing in q.*

We now turn to the committee's equilibrium investment decision. When the committee chooses not to invest the status quo prevails, and its utility is $-\lambda_c(x_c - q)$. When it invests, its utility is simply the maximum of Equation 5. To derive the cost cutpoint for investment, $c_{cl}^{nt}(x_c, q)$, we substitute the optimum $\tilde{x}^{cl}(x_c, q)$ into Equation 5 and subtract $-\lambda_c(x_c - q)$.

$$c_{cl}^{nt}(x_c, q) \equiv \left(1 - F\left(\bar{v}\left(\tilde{x}^{cl}(x_c, q); q\right)\right)\right)\left[\lambda_c(x_c - q) - \lambda_c\left(x_c - \tilde{x}^{cl}(x_c, q)\right)\right] + \int_{\bar{v}\left(\tilde{x}^{cl}(x_c, q); q\right)}^{\infty} vf(v)\, dv \tag{6}$$

In summary, if valence is policy-specific, then under a closed rule committee behavior and policy outcomes are characterized as follows. **(1)** The committee invests if and only if the cost of investing is sufficiently low, i.e., $c \leq c_{cl}^{nt}(x_c, q)$. **(2)** If the committee does not invest, the policy outcome is $(0, q)$. **(3)** If the committee invests and the investment returns valence $\tilde{v}$, the policy outcome is $\left(\tilde{v}, \tilde{x}^{cl}(x_c, q)\right)$ if and only if $\tilde{v} \geq \bar{v}\left(\tilde{x}^{cl}(x_c, q); q\right)$, and $(0, q)$ otherwise.

Open Rule We now characterize the committee's investment behavior under an open rule. To simplify the analysis, we first show that in the policy-specific valence game the open rule subgame can be solved as a special case of the closed rule subgame with $q = 0$, because both subgames result in the same policy outcome after every possible bill referral by the committee.

Lemma 2 *If valence is policy-specific, then equilibrium expected payoffs for every investment decision and choice of target policy by the committee are identical between an open rule subgame and a closed rule subgame with $q = 0$.*

Applying the lemma, we can substitute $q = 0$ into the closed rule results to derive the committee's investment behavior under an open rule. Recall that the optimal open rule target policy is $\tilde{x}^o(x_c)$. For simplicity, write the valence cutoff $\bar{v}(x; 0)$ as $\bar{v}(x) = \lambda_f(x)$. Following Equation 5:

$$\tilde{x}^o(x_c) = \underset{x \in [0, x_c]}{\arg\max} \left\{ -F(\bar{v}(x))\, \lambda_c(x_c) - (1 - F(\bar{v}(x)))\, \lambda_c(x_c - x) + \int_{\bar{v}(x)}^{\infty} vf(v)\, dv \right\} \tag{7}$$

We now state a corollary to Lemma 1 for the open rule case, and offer a comparison between the closed and open rule target policies.

Proposition 2 *With policy-specific valence, if the committee chooses to invest under an open rule, its optimal target policy* $\tilde{x}^o(x_c)$ *is unique and strictly interior to* $[0, x_c]$*. Moreover,* $\tilde{x}^o(x_c) < \tilde{x}^{cl}(x_c, q)$ *for all* $q > 0$.

Proof: The first statement follows trivially from the fact that $\tilde{x}^o(x_c) = \tilde{x}^{cl}(x_c, 0)$, while the second follows from the fact that $\tilde{x}^{cl}(x_c, q)$ is strictly increasing in q, as shown in Lemma 1. ■

Intuitively we would expect the target policy under an open rule to be more moderate than that under a closed rule; the proposition demonstrates formally that this holds for any status quo point $q > 0$. Later, we will show that this is one factor that ensures that the floor prefers an open rule when valence is policy-specific.

Finally, as in the closed rule case we subtract off $-\lambda_c(x_c)$, the committee's utility if it chooses not to invest and the floor passes its own ideal point, from the maximum of Equation 7 and derive the open rule cost cutpoint $c_o^{nt}(x_c)$.

$$c_o^{nt}(x_c) \equiv (1 - F(\bar{v}(\tilde{x}^o(x_c))))\left[\lambda_c(x_c) - \lambda_c(x_c - \tilde{x}^o(x_c))\right] + \int_{\bar{v}(\tilde{x}^o(x_c))}^{\infty} v f(v)\, dv \tag{8}$$

In summary, if valence is policy-specific, then under a closed rule committee behavior and policy outcomes are characterized as follows. **(1)** The committee invests if and only if the cost is sufficiently low, i.e., $c \leq c_o^{nt}(x_c)$. **(2)** If the committee does not invest, the policy outcome is $(0, 0)$. **(3)** If the committee does invest and realizes valence $\tilde{v}$, the policy outcome is $(\tilde{v}, \tilde{x}^o(x_c))$ if and only if $\tilde{v} \geq \bar{v}(\tilde{x}^o(x_c))$, and $(0, 0)$ otherwise.

Figure 4 compares equilibrium policy outcomes under open and closed rules; the equilibria are extremely straightforward in form. Under both rules the ideological outcomes are binary, and depend on the realization of valence through a simple cutoff rule.

Rule Choice The rule chosen by the floor depends on two factors: the policy outcomes that prevail and the committee's incentive to invest under each type of rule. In the transferable valence game, the floor sometimes faced a classic tradeoff in which it had to adopt a closed rule, and sacrifice ideological rents, if it wanted to give the committee sufficient incentives to invest. For policy-specific valence, no such tradeoff exists. We prove that open rules not only generate more moderate policy outcomes (Proposition 2), but also create *greater* incentives for the committee to invest.

Proposition 3 *If valence is policy-specific, then* $c_{cl}^{nt}(x_c, q) < c_o^{nt}(x_c)$ *for all* $q > 0$. *Therefore for any cost parameter* $c \in \left(c_{cl}^{nt}(x_c, q), c_o^{nt}(x_c)\right]$, *the committee will invest under an open rule, but not under a closed rule.*

Why do the beneficial incentive effects of closed rules vanish? When valence is policy-specific, a high valence return makes the committee's chosen target policy more attractive to the floor, but crucially has no effect on the quality of the other available policy alternatives. As a result, the committee retains the ability to exert informal agenda power *absent* formal procedural rights. Regardless of the rule, the floor must accept the committee's target policy to enjoy the fruits of its valence return. This severs the link between restrictive rules and valence-driven agenda power, and they become substitutable means for achieving the same end.

Mathematically, a closed rule allows the committee to hold policy at the status quo $q > 0$, costlessly. Because utility is assumed to be concave in the ideological component of policy, the utility benefits, to the committee, of pulling policy in its direction from q by some fixed increment δ are less than the utility benefits of pulling policy from $x_f = 0$ by that same δ. Moreover, when policy begins at $q > 0$ rather than the floor's ideal point, the floor is less easily persuaded (in other words, needs to see higher valence returns) to concede to an incremental movement in policy by δ toward the committee's ideal point. Consequently, the committee's *incremental* utility benefits from exercising informal agenda power with valence are greater under an open rule. This logic is formalized in the proof of Proposition 3.

The better incentive properties of the open rule, combined with the more moderate policy outcomes it generates (Proposition 2) together imply that the floor has an *unconditional* preference for open rules when valence is policy-specific, a striking contrast with Gilligan and Krehbiel's results.

Proposition 4 *With policy-specific valence, the floor selects an open rule for all values of c, q, and x_c.*

Given our previous results, the formal argument underlying this proposition is almost trivial. When the cost of investment is either low or high, the floor's rule decision has no effect on the committee's decision to invest, and hence the floor prefers the more moderate policy produced by an open rule.

When the cost of investment is intermediate, from Proposition 3 we know that the committee invests in valence *only* under an open rule. Then under an open rule the outcome is either the floor's ideal point $x_f = 0$ with no valence, or some bill that the floor prefers over this outcome. In either case the floor is better off than under a closed rule, which guarantees that it receives the status quo policy q with no valence.

Robustness

In this section, we discuss robustness and how our key results extend to alternative model specifications. First, our model does not assume identical utility functions for the committee and the floor, only that each player has a convex loss function $\lambda_i(|\cdot|)$ along the ideological policy dimension that satisfies $\lambda_i'(0) = 0$. More importantly, we assume nothing about the relative weights that each player places on valence and the spatial component of policy. The players are constrained neither to weight ideology against valence in a particular proportion nor to place the same relative weight on valence.[13] Also, at no stage is symmetry required on the spatial component of the utility functions.

Second, the structure of the players' utility functions can be generalized. In the transferable valence game, the results are general to any arbitrary utility functions $U_f(v,x)$ and $U_c(v,x)$ that are strictly increasing in v for any x, strictly single peaked in x for any v, and have the same peak x_i for any v. As long as these conditions hold our results are robust to interactions between the two dimensions. In the nontransferable valence game a sufficient condition for our key results is that the utility functions $U_i(v,x)$ are additively separable across dimensions, i.e., they can be written as $U_i(v,x) = g_i(v) + h_i(x)$, with g_i increasing and h_i strictly concave for both players.

Third, we can use our model to analyze what happens if the committee, but not the floor, can transfer valence. Such a setup would make sense if the floor does not have access to the information that the committee generates in the course of its work on an issue. This variant of our model yields results that are similar to those from our model of policy-specific valence: open rules result in more moderate policy outcomes and are superior for inducing committee effort.

Finally, the key result in the policy-specific valence case does not hinge on the sharp discontinuity implied by fully policy-specific valence: it can be easily extended to the case of partially transferable valence, provided that valence is not *too* transferable. For example, assume a continuous valence decay function $g(\tilde{v}, |\tilde{x} - x|)$. In this specification the level of valence associated with the target policy $\tilde{x}$ is $\tilde{v}$, and the function $g(\cdot,\cdot)$ specifies the amount of valence remaining when the bill is amended to an alternative policy x. The negative incentive effects from closed rules remain provided that $g^2(\cdot,\cdot)$, the first derivative of valence with respect to movements in the ideology dimension away from the target policy, is sufficiently negative. When $\left|g^2(\cdot,\cdot)\right| > \lambda_f'(x_c)$, the result not only

[13] Let the floor's utility be $\alpha v - \lambda_f(|x - x_f|)$ and the committee's be $\beta v - \lambda_c(|x - x_c|)$, with $\alpha, \beta > 0$. Dividing through by the valence weights, the utility functions $v - \lambda_f(\cdot)/\alpha$ and $v - \lambda_c(\cdot)/\beta$ satisfy our assumptions.

remains but the formal analysis is identical.

The intuition is straightforward: if valence is only transferable to policies very close to the initial target policy $\tilde{x}$, then under an open rule the floor will only make very small (and possibly no) changes to the committee referral, because the marginal valence loss will quickly exceed the marginal ideological benefit. A similar effect occurs under a closed rule, only with the committee anticipating which tradeoffs the floor will accept.

Conclusion

To conclude, we revisit our key contributions, and discuss their implications in greater depth. For the past two decades, the Crawford and Sobel (1982) model has been so influential that formal theorists' notions of good public policy have been, with very few exceptions, based on uncertainty reduction in models of incomplete information. Despite the many advances in the past two decades, we believe that it is a mistake for scholars collectively to lock in to a single modeling technology, particularly given that for many empirical applications a valence-based model is more natural than the $x = p + \omega$ setup.

To demonstrate the utility of our approach, we tackle a question that is largely infeasible in the standard model – the effect of information transferability on procedural choice. As noted in the introduction and in our discussion of information expropriability, for many types of policies, particularly those that require careful coordination of many components of a complicated piece of legislation, information that is gathered to craft one bill cannot be readily applied to other bills elsewhere in the ideological spectrum.

When valence is transferable, our model yields results quite similar to those obtained by Gilligan and Krehbiel (1987). This fact has two implications. At a *formal* level, Gilligan and Krehbiel's results are more general than previously understood, i.e., they can be obtained in a model of information-as-valence as well as in a model of information as private knowledge of ω. However, at an *informal* level, many scholars, when talking about information, implicitly assume that the $x = p + \omega$ model applies to *any* type of policy-relevant information. This interpretation of the Gilligan and Krehbiel model simply is *not* correct, and our analysis shows that when information is policy-specific, Gilligan and Krehbiel's results do not hold – in fact, in sharp contrast to their results, open rules are superior for inducing committee effort. This result suggests a new testable comparative static for future empirical research: committees are more likely to operate under restrictive rules when the nature of their expertise is transferable than when it is policy-specific.

Finally, we note that are many possible theoretical extensions of our framework for studying specialization and expertise. For example, the model could be used to analyze multiple committees. The natural question that arises in a valence-based model of multiple committees is whether the committees will free-ride on each others' efforts or engage in an arms race to produce high-valence policies at different ideological locations. Another natural extension, suggested by [[name withheld]], is to allow a committee to decide in which sort of information – transferable or policy-specific – to invest. Ultimately, we hope that others will build upon our model to analyze other aspects of legislative organization and political processes more generally.

Appendix

Proof of Lemma 1 From Equation 5, the committee's optimal choice satisfies

$$\tilde{x}^{cl}(x_c, q) = \underset{x\in[q,x_c]}{\arg\max}\left\{-F(\bar{v}(x;q))\,\lambda_c(x_c-q) - (1-F(\bar{v}(x;q)))\,\lambda_c(x_c-x) + \int_{\bar{v}(x;q)}^{\infty} v f(v)\,dv\right\}.$$

Recall that $\bar{v}(x;q) = \lambda_f(x) - \lambda_f(q)$. The first derivative of the committee's objective function with respect to x is:

$$(1-F(\bar{v}(x;q)))\left(-\frac{f(\bar{v}(x;q))}{1-F(\bar{v}(x;q))}\left(\frac{\partial\bar{v}}{\partial x}\right)[\lambda_c(x_c-q) - \lambda_c(x_c-x) + \bar{v}(x;q)] + \lambda_c'(x_c-x)\right). \tag{9}$$

Evaluating at $x = q$ we have $\lambda_c'(x_c - q) > 0$. Evaluating at $x = x_c$ and using the fact that $\lambda_i(0) = \lambda_i'(0) = 0$ we have

$$-f(\bar{v}(x;q))\left.\left(\frac{\partial\bar{v}}{\partial x}\right)\right|_{x=x_c}[\lambda_c(x_c-q) + \bar{v}(x;q)] < 0.$$

Combined with continuity this establishes that optima exist and are strictly interior to $[q, x_c]$.

Because $f(\cdot)$ has full support, $(1 - F(\bar{v}(x;q))) > 0$ for all x. Hence from Equation 9 the derivative of the committee's ex-ante utility equals 0 iff

$$-\frac{f(\bar{v}(x;q))}{1-F(\bar{v}(x;q))}\left(\frac{\partial\bar{v}}{\partial x}\right)[\lambda_c(x_c-q) - \lambda_c(x_c-x) \;\; + \bar{v}(x;q)] + \lambda_c'(x_c-x) = 0. \tag{10}$$

To establish uniqueness it is then sufficient to show that the left hand side of Equation 10 is strictly decreasing in x. We establish this by examining it term by term.

The first part of Equation 10 is the negative of the product of three positive terms. We show that each of these three terms is nondecreasing, with at least one strictly increasing. First write the hazard rate $\frac{f(v)}{(1-F(v))}$ as $H(v)$, which we have assumed is nondecreasing in v. Then $\frac{f(\bar{v}(x;q))}{1-F(\bar{v}(q;x))} = H(\bar{v}(x;q))$ and the derivative is $\partial H/\partial v * \partial\bar{v}/\partial x \geq 0$, because $\partial\bar{v}/\partial x = \lambda_f'(x) > 0$. The next term, $\frac{\partial\bar{v}}{\partial x}$, is strictly increasing in x because $\partial^2\bar{v}/\partial x^2 = \lambda_f''(x)$, which is positive by convexity. Finally we have $\lambda_c(x_c-q) - \lambda_c(x_c-x) + \bar{v}(x;q) > 0$, whose derivative with respect to x is $\lambda_c'(x_c-x) +$

$\partial\bar{v}/\partial x > 0$. Therefore, $-\frac{f(\bar{v}(x;q))}{1-F(\bar{v}(x;q))}\left(\frac{\partial\bar{v}}{\partial x}\right)\left[\lambda_c\left(x_c-q\right)-\lambda_c\left(x_c-x\right)\ +\bar{v}\left(x;q\right)\right]$ is strictly decreasing in x.

The second part of Equation 10 is $\lambda_c'\left(x_c-x\right)$, whose derivative is $-\lambda_c''\left(x_c-x\right)<0$ by convexity of $\lambda_c\left(\cdot\right)$. Therefore the entire left hand side of Equation 10 is strictly decreasing in x, establishing uniqueness.

Finally, we establish that $\tilde{x}^{cl}\left(x_c,q\right)$ is strictly increasing in q. Consider $q<q'<x_c$. At $\tilde{x}^{cl}\left(x_c,q\right)$ we have by definition:

$$-H\left(\bar{v}\left(\tilde{x}^{cl}\left(x_c,q\right);q\right)\right)\left(\frac{\partial\bar{v}}{\partial x}\right)\left[\lambda_c\left(x_c-q\right)-\lambda_c\left(x_c-\tilde{x}^{cl}\left(x_c,q\right)\right)+\bar{v}\left(\tilde{x}^{cl}\left(x_c,q\right);q\right)\right] \qquad (11)$$
$$+\lambda_c'\left(x_c-\tilde{x}^{cl}\left(x_c,q\right)\right) \;=\; 0.$$

Now evaluate the expression above, maintaining the policy at $\tilde{x}^{cl}\left(x_c,q\right)$, but increasing q to q'. We show that shifting from q to q' makes the left hand side of Equation 11 strictly positive. Combining uniqueness of the solution and the fact that the left hand side of Equation 11 is strictly decreasing in x, it immediately follows that the optimal solution $\tilde{x}^{cl}\left(x_c,q'\right)>\tilde{x}^{cl}\left(x_c,q\right)$.

We now work on the left hand side of Equation 11. The first summand is the negative of the product of three positive terms. We show that the first and second terms weakly decrease when substituting in q', and the third term strictly decreases. This establishes that the entire first summand increases. As the second summand is simply $\lambda_c'\left(x_c-\tilde{x}^{cl}\left(x_c,q\right)\right)$, which is not a function of q, the entire left hand side expression must therefore become positive when we shift from q to q'.

First, $\bar{v}\left(\tilde{x}^{cl}\left(x_c,q\right);q\right)>\bar{v}\left(\tilde{x}^{cl}\left(x_c,q\right);q'\right)$, which implies $H\left(\bar{v}\left(\tilde{x}^{cl}\left(x_c,q\right);q\right)\right)\geq H\left(\bar{v}\left(\tilde{x}^{cl}\left(x_c,q\right);q'\right)\right)$, because $H\left(v\right)$ is nondecreasing in v. Now note that the term $\frac{\partial\bar{v}}{\partial x}$ is unchanged when we substitute in q', because it is not a function of q. Finally, $\lambda_c\left(x_c-q\right)-\lambda_c\left(x_c-\tilde{x}^{cl}\left(x_c,q\right)\right)+\bar{v}\left(\tilde{x}^{cl}\left(x_c,q\right);q\right)>\lambda_c\left(x_c-q'\right)-\lambda_c\left(x_c-\tilde{x}^{cl}\left(x_c,q\right)\right)+\bar{v}\left(\tilde{x}^{cl}\left(x_c,q\right);q'\right)$ because $\lambda_c\left(\cdot\right)$ is an increasing function. This establishes the result. ■

Proof of Lemma 2 The initial choice of rule has no effect on the set of possible target policies, the expected distribution of post-investment valence returns, or the set of feasible post-investment bill referrals. Hence, it suffices to show that every post-investment bill referral by the committee will result in the same final policy outcome when the floor behaves optimally in the final stage. This implies that the ex-ante expected floor and committee payoffs for any investment decision and choice of target policy will be identical between the two subgames.

Consider an arbitrary bill referral $(\hat{v}, \hat{x})$. Under a closed rule with a status quo point $(0, 0)$, the floor's choice set is restricted to $\{(0,0), (\hat{v}, \hat{x})\}$, where $(\hat{v}, \hat{x})$ is the committee's bill referral and may be different from the target policy with realized valence $(\tilde{v}, \tilde{x})$. Under an open rule, the floor may select from the full set $\{(0, y), \ \forall y \in \mathbb{R}\} \cup \{(\hat{v}, \hat{x})\}$. However, the floor's additional choices are irrelevant because $(0, 0)$ dominates any $(0, y)$. Hence for any bill referral $(\hat{v}, \hat{x})$ the floor's final stage choice in either game is identical, demonstrating the result. ■

Lemma 3 *If valence is transferable and the committee invests in valence under a closed rule, then the floor's ex-ante expected utility under a closed rule is decreasing in* x_c *and approaches* $-\lambda_f(q)$ *as* $x_c \to \infty$.

Proof. Let $U(x_c)$ denote the floor's equilibrium expected utility under a closed rule as a function of x_c. Consider $x_c < x_c'$, which implies $\bar{v}(x_c; q) < \bar{v}(x_c'; q)$. Then we have:

$$\begin{aligned} U(x_c) &= \int_0^{\bar{v}(x_c;q)} -\lambda_f(q) f(v)\, dv + \int_{\bar{v}(x_c;q)}^{\infty} (v - \lambda_f(x_c)) f(v)\, dv \\ &= \int_0^{\bar{v}(x_c;q)} -\lambda_f(q) f(v)\, dv + \int_{\bar{v}(x_c;q)}^{\bar{v}(x_c';q)} (v - \lambda_f(x_c)) f(v)\, dv + \int_{\bar{v}(x_c';q)}^{\infty} (v - \lambda_f(x_c)) f(v)\, dv \end{aligned}$$

and

$$\begin{aligned} U(x_c') &= \int_0^{\bar{v}(x_c';q)} -\lambda_f(q) f(v)\, dv + \int_{\bar{v}(x_c';q)}^{\infty} \left(v - \lambda_f\left(x_c'\right)\right) f(v)\, dv \\ &= \left(\int_0^{\bar{v}(x_c;q)} -\lambda_f(q) f(v)\, dv\right) + \left(\int_{\bar{v}(x_c;q)}^{\bar{v}(x_c';q)} -\lambda_f(q) f(v)\, dv\right) + \int_{\bar{v}(x_c';q)}^{\infty} \left(v - \lambda_f\left(x_c'\right)\right) f(v)\, dv. \end{aligned}$$

Now take the difference.

$$U(x_c)-U(x'_c)=\int_{\bar{v}(x_c;q)}^{\bar{v}(x'_c;q)}\left((v-\lambda_f(x_c))-(-\lambda_f(q))\right)f(v)\,dv+\int_{\bar{v}(x'_c;q)}^{\infty}\left(\lambda_f(x'_c)-\lambda_f(x_c)\right)f(v)\,dv>0.$$

In the first term, $v-\lambda_f(x_c)\geq-\lambda_f(q)$ because $v\geq\bar{v}(x_c;q)$, and in the second term $\lambda_f(x'_c)>\lambda_f(x_c)$ because $x'_c>x_c$. Thus $U(x_c)-U(x'_c)>0$, i.e., $U(x_c)$ is decreasing.

Now we show $\lim_{x_c\to\infty}U(x_c)=-\lambda_f(q)$, i.e.,

$$\begin{aligned}
&\lim_{x_c\to\infty}\left(\int_0^{\bar{v}(x_c;q)}-\lambda_f(q)f(v)\,dv+\int_{\bar{v}(x_c;q)}^{\infty}(v-\lambda_f(x_c))f(v)\,dv\right)\\
=\;&\lim_{z\to\infty}\left(\int_0^{z}-\lambda_f(q)f(v)\,dv+\int_{z}^{\infty}(v-\lambda_f(x_c))f(v)\,dv\right)\\
=\;&-\lambda_f(q)\left(\lim_{z\to\infty}F(z)\right)+\lim_{z\to\infty}\left(\int_{z}^{\infty}(v-\lambda_f(x_c))f(v)\,dv\right)=-\lambda_f(q).
\end{aligned}$$

The above steps are standard, but note that $\bar{v}(x_c;q)$ strictly convex in x_c is required for the first equality, and $E[v]<\infty$ is required for the last. ■

Proof of Proposition 3 Consider first the game under a closed rule. Associated with $\tilde{x}^{cl}(x_c,q)$ is a valence cutpoint $\bar{v}\left(\tilde{x}^{cl}(x_c,q);q\right)$ such that under a closed rule the policy $\tilde{x}^{cl}(x_c,q)$ prevails over the status quo whenever $\tilde{v}\geq\bar{v}\left(\tilde{x}^{cl}(x_c,q);q\right)$. Now let y be the unique ideological location in the interval $(0,x_c)$ that satisfies $\bar{v}\left(\tilde{x}^{cl}(x_c,q);q\right)=\bar{v}(y;0)$. Recall $\bar{v}(y;0)$ is the valence cutoff under an open rule when the target policy is y (by equivalence of the closed rule with $q=0$ and open rule games). Henceforth, we denote $\bar{v}(y;0)$ as $\bar{v}(y)$ for simplicity. So y is the unique ideological policy point between the floor and committee ideal points such that, were the committee to select it as the target policy under an open rule, it would become the final policy outcome for the *same* realizations of valence $\tilde{v}$ as $\tilde{x}^{cl}(x_c,q)$ does under a closed rule. It is easy to verify that such a y exists, is unique, and is contained in $(0,x_c)$.

Now suppose that under an open rule the committee invests and works on the target policy y. The utility from working on y must be weakly less than the utility of working on $\tilde{x}^o(x_c)$ (because the latter is optimal), and combining with Equations 7 and 8, we have:

$$
\begin{aligned}
c_o^{nt}(x_c) - \lambda_c(x_c) &\geq -F(\bar{v}(y))\lambda_c(x_c) - (1 - F(\bar{v}(y)))\lambda_c(x_c - y) + \int_{\bar{v}(y)}^{\infty} vf(v)\,dv \\
c_o^{nt}(x_c) &\geq (1 - F(\bar{v}(y)))[\lambda_c(x_c) - \lambda_c(x_c - y)] + \int_{\bar{v}(y)}^{\infty} vf(v)\,dv.
\end{aligned}
$$

Now subtract the closed rule cutpoint $c_{cl}^{nt}(x_c, q)$ in Equation 6 from both sides, recalling that $\bar{v}\left(\tilde{x}^{cl}(x_c, q); q\right) = \bar{v}(y)$ by construction.

$$
c_o^{nt}(x_c) - c_{cl}^{nt}(x_c, q) \geq (1 - F(\bar{v}(y)))\left([\lambda_c(x_c) - \lambda_c(x_c - y)] - \left[\lambda_c(x_c - q) - \lambda_c\left(x_c - \tilde{x}^{cl}(x_c, q)\right)\right]\right).
$$

Because $f(\cdot)$ has full support $(1 - F(\bar{v}(y)))$ is strictly positive, so a sufficient condition for $c_o^{nt}(x_c) > c_{cl}^{nt}(x_c, q)$ is:

$$
\lambda_c(x_c) - \lambda_c(x_c - y) > \lambda_c(x_c - q) - \lambda_c\left(x_c - \tilde{x}^{cl}(x_c, q)\right). \tag{12}
$$

Equation 12 follows from convexity of $\lambda_f(\cdot)$ and $\lambda_c(\cdot)$. We show this in two steps. First we argue that $y > \tilde{x}^{cl}(x_c, q) - q$.

$$
\lambda_f\left(\tilde{x}^{cl}(x_c, q)\right) - \lambda_f(q) = \bar{v}(\tilde{x}(x_c, q); q) = \bar{v}(y) = \lambda_f(y) < \lambda_f(y + q) - \lambda_f(q)
$$

The final inequality follows from convexity of $\lambda_f(\cdot)$ and $\lambda_f(0) = 0$. The above then shows $\lambda_f\left(\tilde{x}^{cl}(x_c, q)\right) < \lambda_f(y + q)$, implying $y + q > \tilde{x}^{cl}(x_c, q)$ since $\lambda_f(\cdot)$ is strictly increasing.

We now use $y > \tilde{x}^{cl}(x_c, q) - q$ to show the final result.

$$
\begin{aligned}
\lambda_c(x_c) - \lambda_c(x_c - y) &> \lambda_c(x_c - q) - \lambda_c(x_c - (y + q)) \\
&> \lambda_c(x_c - q) - \lambda_c\left(x_c - \tilde{x}^{cl}(x_c, q)\right).
\end{aligned}
$$

The strict inequality in the first line follows from convexity of $\lambda_c(\cdot)$. The strict inequality at the start of the second line follows from the fact that $y + q > \tilde{x}^{cl}(x_c, q)$ and $\lambda_c(\cdot)$ is increasing.■

Proof of Proposition 4 If $c > c_o^{nt}(x_c)$, then the committee does not invest in valence under either rule, and the floor unambiguously prefers an open rule. Now consider $c \in \left(c_{cl}^{nt}(x_c, q), c_o^{nt}(x_c)\right]$, so the committee invests *only* under an open rule. Under a closed rule the floor receives utility $-\lambda_f(q) < 0$. Under an open rule, the floor always receives utility at least as great as $0 - \lambda_f(0) = 0$ for any realization of $\tilde{v}$, so the floor strictly prefers an open rule.

Finally, consider $c \leq c_{cl}^{nt}(x_c, q)$, which means that the committee invests in valence under both rules. We argue that for every realization of $\tilde{v}$, on the equilibrium path the floor would be strictly better off under an open rule, so it is better off in expectation.

First, for any realization of $\tilde{v}$ such that the committee's bill is rejected under a closed rule, the floor receives utility $-\lambda_f(q) < 0$, hence it is strictly better off under an open rule.

Now consider realizations of $\tilde{v}$ such that the committee bill is accepted under both rules. Then the floor receives the valence under both rules, but a strictly more moderate policy under an open rule because, from Proposition 2, $\tilde{x}^o(x_c) < \tilde{x}^{cl}(x_c, q)$.

Finally, for realizations of $\tilde{v}$ such that the committee bill is accepted under a closed rule but rejected under an open rule, we show $\tilde{v} - \lambda_f\left(\tilde{x}^{cl}(x_c, q)\right) < 0$. Because the committee bill under an open rule $(\tilde{x}^o(x_c), \tilde{v})$ is rejected, we have $\tilde{v} < \bar{v}(\tilde{x}^o(x_c); 0) = \lambda_f(\tilde{x}^o(x_c))$. But then $\tilde{v} - \lambda_f\left(\tilde{x}^{cl}(x_c, q)\right) < \tilde{v} - \lambda_f(\tilde{x}^o(x_c)) = \tilde{v} - \bar{v}(x^o(x_c); 0) < 0$. The first inequality follows from the fact that $\tilde{x}^o(x_c) < \tilde{x}^{cl}(x_c, q)$ and $\lambda_f(\cdot)$ is increasing.■

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Figure 2: Closed Rule Outcome With Transferable Valence

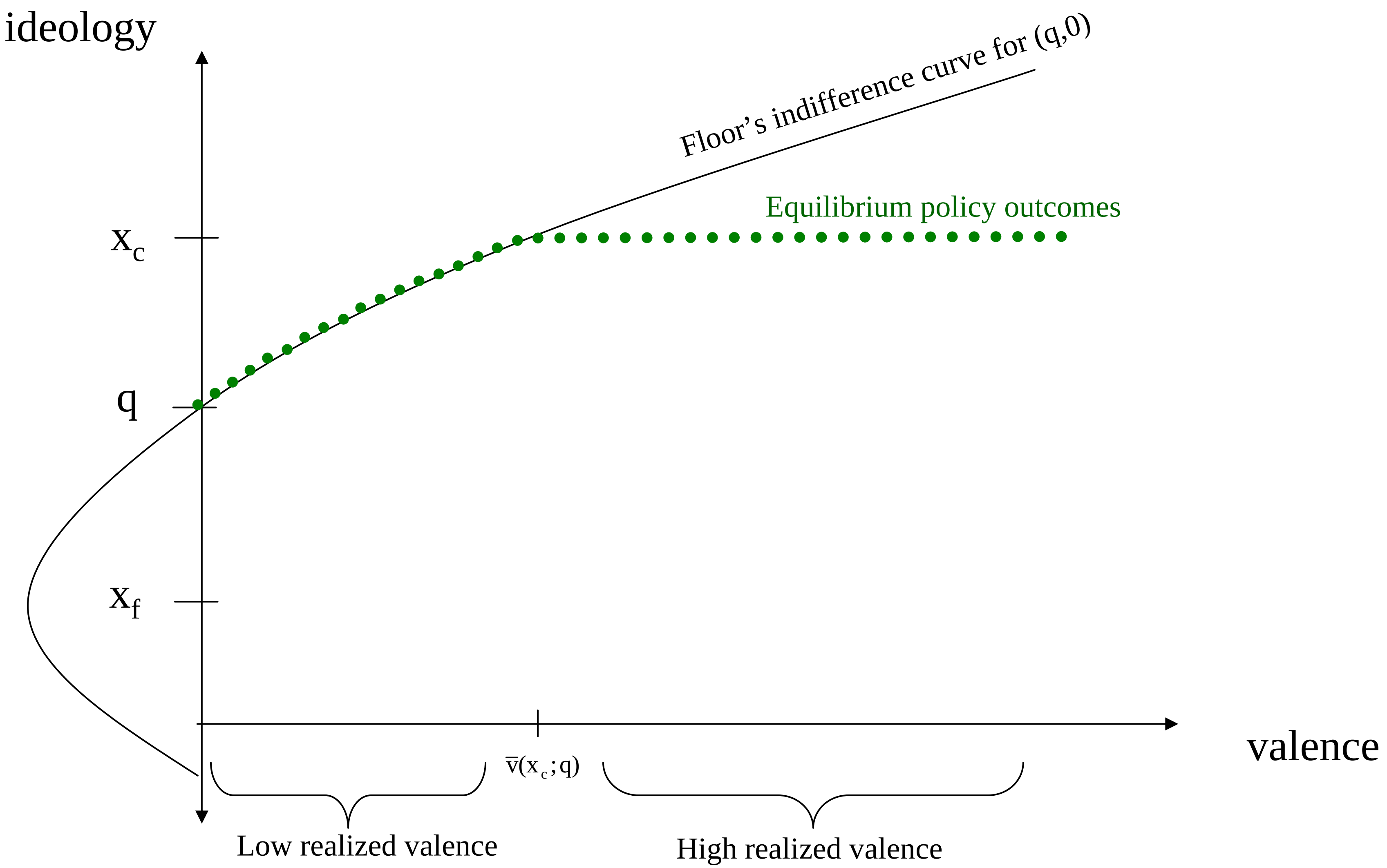
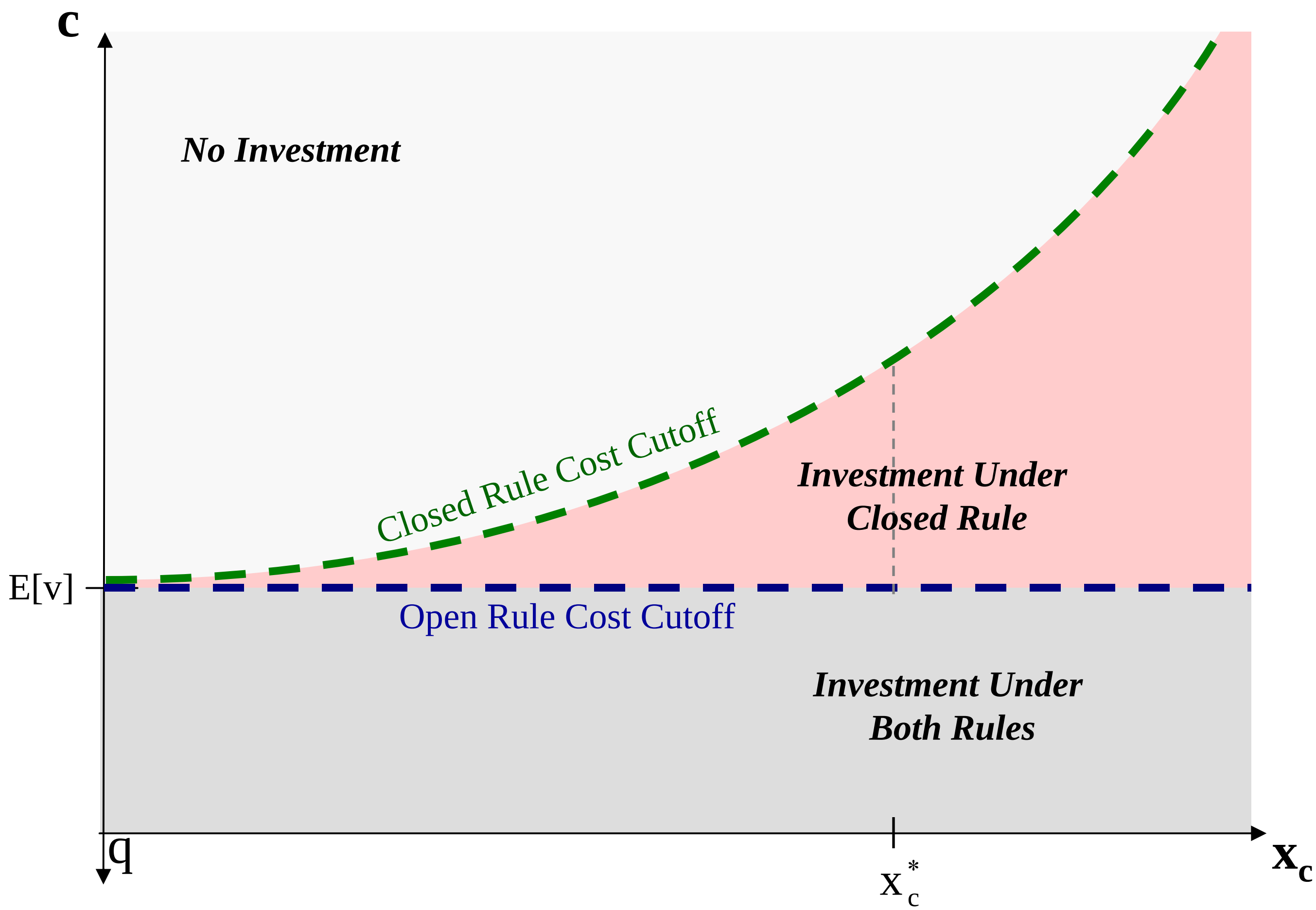


Figure 3: Investment Decisions And Outcomes With Transferable Valence

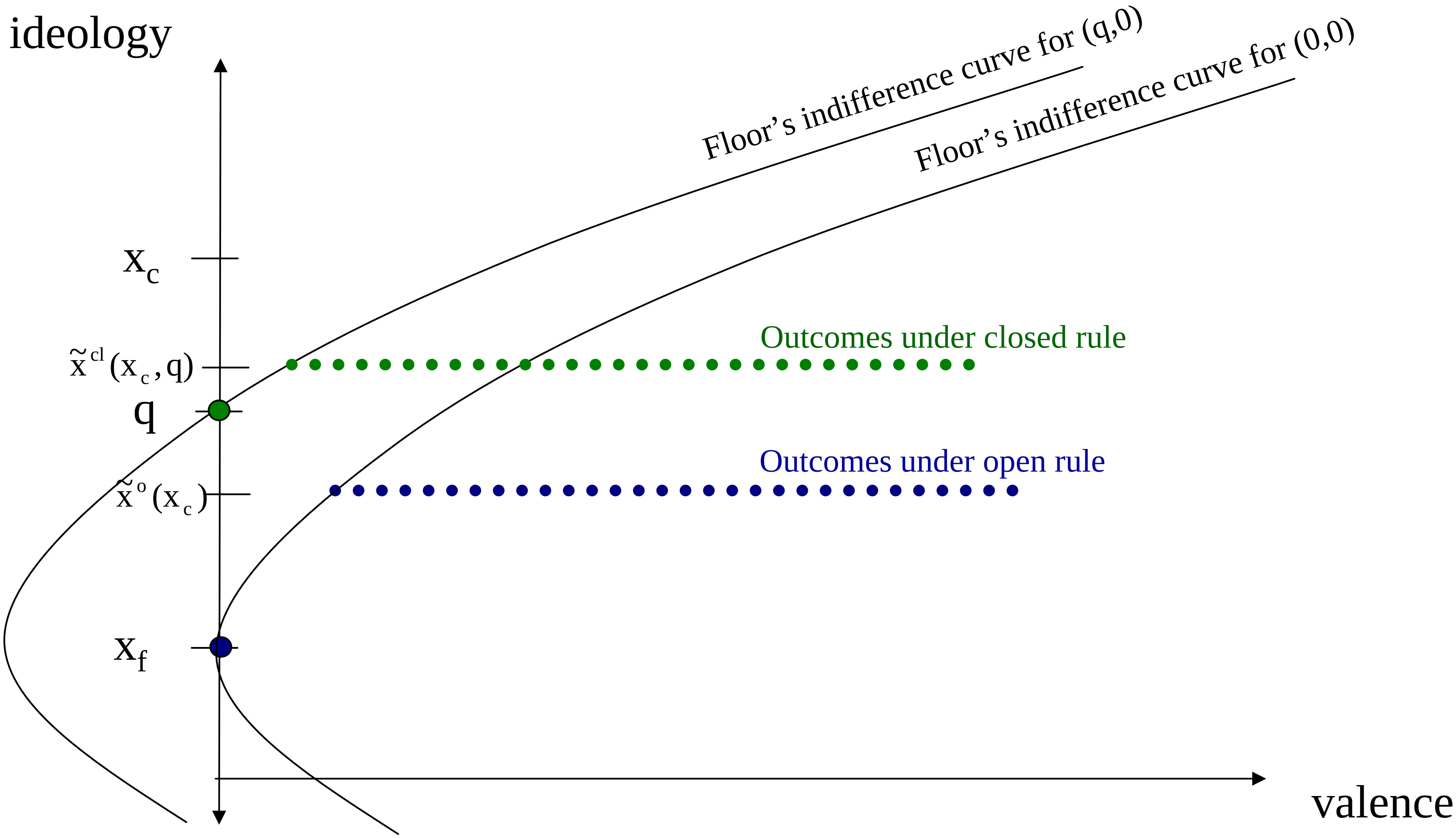


Open Rule Cost Cutoff is $c_o^t(x_c)$

Closed Rule Cost Cutoff is $c_{cl}^t(x_c, q)$

Floor selects an open rule i.f.f. $c \in (c_o^t(x_c), c_{cl}^t(x_c, q)]$ *and* $x_c < x_c^*$

Figure 4: Outcomes With Non-Transferable Valence



Target policies $\tilde{x}^{cl}(x_c, q)$ under closed rule and $\tilde{x}^{o}(x_c)$ under open rule

Under closed rule, outcome is $(0, q)$ if realized valence is low and $\left(\tilde{v}, \tilde{x}^{cl}(x_c, q)\right)$ if it is high

Under open rule, outcome is $(0,0)$ if realized valence is low and $\left(\tilde{v}, \tilde{x}^{o}(x_c)\right)$ if it is high