# Spatial Models of Legislative Effectiveness

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## Abstract

Spatial models of policymaking have evolved from the median voter theorem through the inclusion of institutional considerations such as political parties, committees, and various voting and amendment rules. Such models, however, implicitly assume that no policy is more effective than another at solving public policy problems and that all proposers are equally capable of advancing proposals. We relax these assumptions by modeling proposal "quality" and the effort needed to make better proposals. The resulting Legislative Effectiveness Model (LEM) offers three main benefits. First, it can better account for policy changes based on the effectiveness or popularity of the status quo, changing our understanding of how to overcome gridlock in polarized legislatures. Second, it generalizes canonical models of legislative politics, such as median voter, setter, negative agenda setting, and pivotal politics models, all of which emerge as special cases within the LEM. Third, the LEM offers significant new empirical predictions, some of which we initially test (and find support for) within the U.S. Congress.

## *Spatial Models of Legislative Effectiveness*

For decades, the workhorse theory of policymaking within political institutions has been the spatial model. Building on Black (1948) and Downs (1957), scholars of legislative politics have long noted how proposals near the median along a left-right ideological spectrum gain the support of a majority. Variants of such models have accounted for proposal power (Romer and Rosenthal 1978), committees as gatekeepers (Denzau and Mackay 1983), supermajority rules (Brady and Volden 1998, Krehbiel 1998), and parties as agenda setters (Cox and McCubbins 2005). Spatial models have also served as the basis for the estimation of the ideological ideal points of members of Congress (Poole and Rosenthal 1997; Clinton, Jackman, and Rivers 2004), as well as of political actors in institutions from courts (Martin and Quinn 2002) to parliaments (Hix, Noury, and Roland 2006) to state legislatures (Shor and McCarty 2011). Simply stated, spatial models have spurred countless important theoretical and empirical contributions in political science.

However, such models tend to make two implicit and related assumptions that have limited their applicability to an even broader array of political phenomena. First, spatial models tend to characterize policy proposals by their spatial locations alone, setting aside such considerations as the policies' popularity with either policymakers or the public, or even how effective policies are at addressing public policy problems. Examples of the relevance of such omitted considerations abound. For instance, focusing on the U.S. Congress, the growing unpopularity of the U.S. welfare system in the mid-1990s was enough to eventually bridge the ideological divide between House Speaker Newt Gingrich and President Bill Clinton and secure major reforms. The terrorist attacks of 9/11 showed the ineffectiveness of existing policies and brought about support for major bipartisan policy changes from the PATRIOT Act, to the

establishment of the Department of Homeland Security, to the global war on terror. And the

Great Recession beginning in 2008 left a status quo policy so untenable as to foster major policy

adoptions from automaker bailouts, to a massive stimulus package, to an overhaul of the

American financial system. Spatial models tend to address such major policy changes by

suggesting that the status quo policy received a substantial shock in a liberal or conservative

direction, thus allowing a dramatic policy change. In contrast, as we argue below, such policy

changes can be more naturally understood by accounting for the poor quality (e.g., popularity or

effectiveness) of the status quo relative to alternative policy proposals.

Second, all policy proposers in spatial models tend to be treated as equally capable. That

is, if recognized, any policymaker can offer a proposal at any point in the policy space. Yet a

growing empirical literature has recognized that policymakers are differentially effective, with

some offering proposals that are far more likely to advance through the lawmaking process than

are others (e.g., Anderson, Box-Steffensmeier, and Sinclair-Chapman 2003; Frantzich 1979;

Padro i Miquel and Snyder 2006; Volden, Wiseman, and Wittmer 2013; Weissert 1991). When

coupled with the possibility of policies having a quality dimension (as well as a spatial

dimension), the varying effectiveness of lawmakers can easily be captured in their differential

ability to enhance the quality of their policy proposals at a low cost.[1]

To address and overcome these limitations, we advance a Legislative Effectiveness

Model (LEM), with several variants. The LEM features a lawmaker who can offer a policy

proposal located in a unidimensional policy space, and can also exert effort to increase the

quality of the proposal, making it attractive to other legislators independent of its spatial location.

The extent to which a legislator might be deemed as relatively effective is captured by the costs

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[1] Two notable steps in the direction we are suggesting are Denzau and Munger (1986) and Ashworth (2005), both of which present models in which legislators vary in their abilities and competence. Neither model, however, analyzes the types of policy proposals and choices that are made as a function of these varying degrees of competence.

incurred to make a policy proposal attractive to the legislature (with more effective legislators being able to make attractive proposals at lower costs). Different versions of the model are offered to explore the effects of open and closed voting rules, varying status quo quality, multiple proposers, agenda setting, and multiple pivotal actors.

Equilibrium results across these model variants identify the conditions under which an effective lawmaker can offer successful policy proposals that deviate from the ideal point of the median legislator. The results show that legislative gridlock is not only a function of the ideological positions of pivotal actors like the floor or party medians but also related to the popularity of the status quo policy and the location and effectiveness of policy advocates. We illustrate how proposal-quality considerations can be easily added to important existing spatial models, leaving those models' results as special cases of our more general approach. Finally, we lay out some of the numerous implications of these models and test two of the more counter-intuitive predictions, finding support based on four decades of legislative proposals in the U.S. Congress.

## Modeling Proposal Quality and Legislative Effectiveness

While there has been a growing empirical literature on the effectiveness of particular policymakers, there remains little in the way of theoretical advancements in this area. This is not due to a shortage of options. Some policymakers may be particularly effective due to their skills at coalition building, their better knowledge about how policy proposals map onto real-world outcomes, enhanced resources at their disposal, or their ability to improve the quality or attractiveness of policy proposals generally. Each of these could form the basis for a theoretical model of legislative effectiveness. For example, effective lawmakers could be characterized as more likely to be recognized as the proposer in a coalition-building model such as that of Baron

and Ferejohn (1989).  An informational approach could feature effective lawmakers paying a

lower cost to acquire expertise in the sorts of models advanced by Gilligan and Krehbiel (1987).

And a resource-based model could build upon "vote buying" approaches (e.g., Snyder 1991,

Groseclose and Snyder 1996).

While we believe that each of the above could be attractive and informative, we begin the

theoretical work on legislative effectiveness here instead with the incorporation of effectiveness

in the quality of policy proposals generated within the influential spatial modeling approaches

highlighted above.  That is, we assume that effective legislators are able to make legislative

proposals in such a way that they become somewhat more attractive to *all* members of the

legislature, independent of their ideological content.  As such, we assume that legislators'

preferences are defined over the ideological location of different policies (akin to the

conventional one-dimensional spatial framework), as well as a non-ideological component of a

given policy, which we treat analytically as a quality dimension.  This quality dimension could

be policy-based or political.  For example, a policy that is well crafted to effectively solve a

public policy problem has a higher quality than one that will be plagued by implementation

hardships.  A policy that solves a problem at a lower cost has a higher quality than its high-cost

alternative.  A policy that is politically popular has a higher quality for election-minded

politicians.  Any and all of these possibilities can be conceived of as part of the quality

dimension.

More radically, any policy proposal has elements on which people differ, despite

common goals (such as greater security, lower crime, better education).  The differences are

captured in the "ideological" spatial dimension, while the commonalities are captured in the

"quality" dimension.  From this point of view, nearly all policy proposals have both components,

neither solely in the quality space where "more is better" nor in the ideological space wherein cost or effectiveness or common goals are irrelevant.

In modeling effectiveness in this manner, our work builds on the rich and rapidly developing literature that engages the roles of quality (or "valence") considerations in political competition; but we approach these issues from a relatively new perspective. Specifically, the overwhelming body of scholarship that analyzes valence in political competition diverges from our work in two notable ways. First, most of this scholarship (e.g., Aragones and Palfrey 2002; Calvert 1985; Groseclose 2001; Londregan and Romer 1993; Wittman 1983) analyzes the impact of candidate quality in electoral arenas, whereas we study the role of quality proposals in a legislative setting. This difference in institutional arenas is more than just a matter of nomenclature, given that most of these electoral models make various assumptions about candidate motivations that differ from those of actors in our model; and they are effectively silent on the impact of a status quo reversion policy, which is a central element of our theory.

A second significant difference between our approach and much of the extant literature is that we assume that legislators are able to influence the quality of their policy proposal by exerting costly effort (rather than treating it as an exogenous endowment). While several recent works have developed models of endogenous quality, their core results do not speak to several aspects of the political environment that we analyze here. Meirowitz (2008), for example, analyzes electoral competition among two candidates who can exert effort to increase voters' perceptions of their quality, and illustrates various tradeoffs between features of the electoral environment and candidates' quality advantages. His results, however, do not directly speak to how candidates choose positions, given the possibility of investment in quality. Ashworth and Bueno de Mesquita (2009) and Zakharov (2009) both develop models in which candidates make

costly investments in quality after choosing policy locations, and they identify how candidates will seek to differentiate their platforms from each other in order to limit the need for such investment. In contrast to both of these models, however, we assume that actors are policy-motivated, rather than office-motivated, which makes our approach most similar to the electoral models of Serra (2010) and of Wiseman (2005, 2006).[2] In contrast to these latter models, however, we assume that policy proposers, as well as pivotal voters, benefit from investments in proposal quality, which captures how effective legislators can generate positive benefits for the entire chamber, independent of the particular spatial proposal being offered.[3]

Finally, Hirsch and Shotts (2012) explore the role of proposal quality in a legislative setting by modeling the committee specialization decision as a quality investment decision (rather than as a signaling game, as in Gilligan and Krehbiel 1987 and Krehbiel 1991), and they identify when the floor will defer to the committee, and how this deference relates to the transferability of quality across bills. Our model differs from that of Hirsch and Shotts in that we assume that the quality investment decision is a continuous variable, rather than a discrete choice, and that quality choice is deterministic (rather than probabilistic, as in Hirsch and Shotts), such that there is a clear and transparent mapping between effort level and quality production. We believe that these assumptions are more appropriate for modeling the manner in which legislators cultivate their proposals in an effort to make them generally attractive to all members of the chamber. Moreover, we extend and link our model to the most influential spatial models of legislatures generated across recent decades.

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[2] Technically, Wiseman (2005, 2006) assumes that candidates are office-motivated, but that they can entertain offers of quality enhancement from parties (which are policy-motivated) in exchange for taking certain policy positions.
[3] Another recent contribution to the literature that engages the impact of candidate quality in electoral competition with implications for legislative politics is developed by Miller (2011) who formalizes the concept of effectiveness as the enhanced probability that a candidate can implement his policy announcement upon being elected.

**The Legislative Effectiveness Model**

Throughout the remainder of this paper, we advance and solve a series of six models, displaying how legislative effectiveness can be easily included in many of the most well-known and useful spatial models of legislative politics. We begin with a closed-rule model in which a single effective lawmaker makes a take-it-or-leave-it offer to the legislative median, relative to a status quo with quality normalized to zero. In the second model, we continue with the closed rule setting, but now allow the status quo policy itself to feature a positive or negative quality. In the third and subsequent models we turn to an open-rule setting in which all legislators (and most crucially the median) can themselves offer policy proposals, but only the effective lawmaker can enhance the quality of proposals. The fourth model introduces a second effective lawmaker who could also offer a high-quality counter-proposal. The fifth model instead allows the effective lawmaker to not only offer a proposal, but also to serve as a gatekeeper or negative agenda setter (as per a partisan committee chair), such that she can keep the status quo in place. The sixth and final model features a second pivotal actor who (along with the median) must support the policy change over the status quo in order for it to be adopted.

Across these model variants, we retain the same structure and utility functions as much as possible. Specifically, each model features the first move by an effective Lawmaker (*L*), who can offer a bill (*b*) to change the status quo (*q*), containing both a good quality ($g_b$) and a spatial element ($x_b \in X \subset \mathbb{R}^1$). Each model also features a majority rule, such that the Median (*M*) only supports *L*'s proposal if it is preferred over the status quo, with its own quality ($g_q$) and spatial position ($x_q \in X \subset \mathbb{R}^1$).

The median legislator's preferences can be represented by the following utility function:

$$U_M(y, g) = -(x_M - y)^2 + g_y,$$

where $x_M$ is the Median's ideal point, $y \in \{x_b, x_q\}$ is the policy outcome in the unidimensional

space, and $g_y$ is the quality of the final policy (either the bill or the status quo). The quadratic

loss in spatial distance between an outcome and an ideal point is a commonly used assumption in

spatial models.[4] The simple linear additive quality component is assumed to be the same for all

legislators.[5] Without loss of generality, we assume that $x_M = 0$, so the Median's utility function

can be simplified to the following expression:

$$U_M(y, g) = -y^2 + g_y.$$

Similar to the legislative Median, we assume that the Lawmaker cares about policy

location and quality. We assume that it is costless to introduce a new policy, but the Lawmaker

incurs a cost for any effort that she might exert to add to the quality of a particular policy.[6] More

formally, $L$'s preferences can be represented by the following utility function:

$$U_L(y, g, e) = -(x_L - y)^2 + g_y - \alpha e,$$

where $x_L$ is the Lawmaker's ideal point ($x_L > x_M = 0$), $\alpha \geq 1$ captures the marginal cost that $L$

must incur to add quality to a new bill, and $e \geq 0$ represents the level of effort that $L$ devotes to

producing bill quality. We assume that there is a simple linear mapping between the effort

exerted by the Lawmaker and the quality that results (i.e., $g_b = f(e) = e$). Hence, we can express

L's preferences with the following utility function:

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[4] Quadratic loss implies risk aversion. Similar results to those throughout the paper obtain for more general forms of risk aversion. This particular functional form is used for ease of calculation and illustration.

[5] Adopting a different value on quality across legislators introduces the possibility that the ordering of members in support of or opposed to a policy proposal will depend simultaneously on their spatial positions and on the quality of the proposal. Keeping the quality preferences identical across legislators allows their preference ordering to continue to be based on their spatial positions alone, thus easing the mapping of our models onto earlier canonical spatial models. Future work varying the value of quality across legislators may be quite valuable. For example, such an option would allow the exploration of partisan preferences wherein the success of policies supported by the opposing party may be valued less (or even negatively) compared to successes advanced by one's own party.

[6] Such costs might be related to the time and effort that a Lawmaker must devote to bringing together pivotal decision makers to the bargaining table, engaging in research that is then publicized to emphasize the positive aspects of the bill, and so on. Future work may explore pathways through which such costs might be altered, such as via a legislative subsidy by interest groups (Hall and Deardorff 2006) or from political parties.

$$U_L(y, g) = -(x_L - y)^2 + g_y - \alpha g_b.$$

To streamline notation, in the analysis that follows, we characterize the Lawmaker's choice of a level of quality, $g_b$, rather than the effort level that is needed to produce said quality. Given this specification, $\alpha$ captures the relative effectiveness of the Lawmaker at producing bills that are generally attractive to all members, regardless of their ideological content. If $\alpha$ is high the Lawmaker is relatively ineffective at lawmaking, whereas if $\alpha$ is low the Lawmaker is relatively effective. Moreover, we assume that the Lawmaker values the quality of the final policy in a similar manner to all other legislators.[7] Finally, as noted above, we assume that $\alpha \geq 1$, which implies that the marginal costs from producing attractive legislation are at least as high as the marginal benefits that the Lawmaker receives from said bills.[8] Additional assumptions are detailed below where they pertain to specific versions of the LEM.

## LEM-Closed Rule

The first variant of the LEM involves a "closed rule," with the following sequence of play. In stage 1, the Lawmaker decides what bill to propose, and the level of quality to attach to that bill. Then the Median votes for or against the proposal in stage 2. A vote against the proposal maintains the status quo (with spatial position $x_q$ and quality $g_q = 0$).[9] Payoffs are received at the conclusion of stage 2. The closed rule means that no amendments to the Lawmaker's proposal are permitted.

Because the LEM is a sequential game of complete and perfect information, we can derive the subgame perfect Nash equilibrium via backwards induction. The equilibrium is

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[7] Altering the value that *L* places on quality has little effect on the equilibrium results below, but makes the explication more cumbersome.
[8] If this assumption did not hold and $\alpha < 1$, the Lawmaker's problem would be trivial, as she would seek to exert an infinite amount of effort to maximize the quality associated with a new bill.
[9] The model variant in the next section allows the status quo quality to deviate from zero.

therefore derived by: (1) identifying what policies (and corresponding quality levels) the Median requires in order to induce him to vote for the new bill over the status quo; and then (2) identifying the optimal spatial and bill quality choices for the Lawmaker, given the constraints imposed by the Median's preferences, compared to what she receives from simply retaining the status quo policy. Where the status quo is preferred over the most attractive proposal that the Lawmaker is willing to offer to the Median, multiple (rejected) proposals are in equilibrium. We therefore assume that in such circumstances across all variants of the LEM the Lawmaker offers a proposal at her ideal point with no effort exerted to add quality.[10] Likewise, when $\alpha = 1$, multiple equilibrium proposals will be accepted over the status quo, and thus we assume that the Lawmaker will select the acceptable proposal with the minimum necessary quality in such circumstances. The equilibrium to this game is characterized as follows.

***Proposition 1 (Equilibrium Policies in the LEM-Closed Rule game).*** *The unique subgame perfect equilibrium of the LEM-Closed Rule game yields the following spatial policy outcomes:*

$$y^* = \begin{cases} x_L & if \ x_q \leq -x_L \ or \ x_q \geq x_L \\ |x_q| & if -x_L < x_q < -x_L/\alpha \ or \ x_L/\alpha < x_q < x_L \\ \dfrac{x_L}{\alpha} & if -x_L/\alpha \leq x_q \leq x_L/\alpha \end{cases}$$

***Proof:*** *Proofs and full characterizations of the equilibria for all propositions are given in the appendices.*

As Proposition 1 details, the equilibrium policy outcome is a function of the location of the status quo relative to the ideal points of the Median and the Lawmaker, as illustrated in Figure 1. Two special cases of the general equilibrium are also highlighted in the figure. Specifically, as shown by the solid blue line, in the case where $\alpha = \infty$, the cost of adding quality

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[10] Although not modeled here, such a proposal is consistent with the idea that legislative proposals may also be offered for their symbolic value, rather than based solely on how they lead to policy outcomes.

to the Lawmaker's proposal is prohibitively high. This then becomes a model without a quality dimension and thus reduces to a special case, specifically to Romer and Rosenthal's (1978) "setter" model. Here the Lawmaker operates as a setter. When the spatial position of the status quo is extremely high or low (on the right or left of the figure, respectively), the Lawmaker offers her ideal policy with no quality attached, and the Median "receiver" will accept this proposal as preferred over the extreme status quo. For status quo points between the Median and the Lawmaker, the Lawmaker wishes to move policy to the right, but any such proposal is rejected by the Median, resulting in the status quo being maintained. Finally, just to the left of the Median, status quo policies can be "reflected" across the Median's ideal point toward that of the Lawmaker, resulting in the Median accepting the proposal because of indifference.

[Insert Figure 1 about here]

At the other extreme in terms of legislative effectiveness, the short-dashed red line in Figure 1 illustrates the equilibrium where $\alpha = 1$. This is the case where the Lawmaker is so effective that she can add quality at a very low cost, so low in fact that she gains as much in utility from the quality she produces as she loses in utility from the effort required to produce it. As a result, no matter what status quo policy she faces, the Lawmaker can propose her ideal point and generate sufficient quality to induce the Median to accept that proposal.

In between these extremes are the more typical equilibrium proposals for a Lawmaker, as illustrated with the long black dashes. Once again, for extreme status quo policies, the Lawmaker can propose her ideal point, which is preferred by the Median over the status quo. As with the setter model, for status quo policies just to the left of the Lawmaker's ideal point, any movement to the right would be opposed by the Median unless the proposal were of sufficiently high quality. Yet, here, the status quo policy is close enough to the Lawmaker that she does not

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wish to exert the effort needed to generate a high-quality alternative proposal. A similar region exists just to the right of $-x_L$, where the reflection value is close enough to the Lawmaker's ideal point that she does not wish to add quality to bring about something better. In the middle, however, for status quo policies very close to the Median, the Lawmaker prefers a more substantial move toward her ideal point, and she is willing to exert enough effort to generate the proposal quality needed to make the Median indifferent here.

In this region, the equilibrium proposal is $x_L/\alpha$, indicating that the amount of movement away from the Median at zero and toward the Lawmaker depends on the Lawmaker's effectiveness (the cost of effort). The more effective the Lawmaker, the larger this region and the further policy is pulled toward her ideal point. Essentially, this proposal is a weighted average of the spatial preferences of the two main actors. The weight depends on the costs of formulating a high-quality proposal, with lower costs shifting policy toward the Lawmaker and higher costs shifting policy toward the Median. In many ways, this proposal is similar to the weighted average found in spatial models with side-payments (e.g., Austen-Smith and Banks 1988, Baron and Diermeier 2001).

This last result is illustrative of one of the major findings emerging from the LEM. Specifically, the possibility of adding quality to policy proposals allows an effective Lawmaker to overcome policy gridlock (which would otherwise hold the status quo policy in place), and to pull policy toward her ideal point. Both of these are significant changes from standard spatial models, which typically feature gridlock when the status quo is located between the ideal points of pivotal actors, and in which the effectiveness of the proposer is not considered at all.

**LEM-Status Quo Quality**

The above model was limited to the case in which the quality of the status quo was set equal to zero, in order to establish clearly the basic logic of the Legislative Effectiveness Model under a closed rule. In this version we generalize that initial model to allow status quo policies to also exhibit positive or negative quality. High quality could be thought of as an effective or popular status quo policy, while negative quality might follow from a recent disaster, policy crisis, or an otherwise unpopular program. All other aspects of the model take the same form as above, again with the Lawmaker offering a proposal, and the Median accepting it or rejecting it in favor of the status quo. The spatial policy equilibrium of this game is described as follows.

***Proposition 2 (Equilibrium Policies in the LEM-Status Quo Quality game).*** *The unique subgame perfect equilibrium of the LEM-Status Quo Quality game yields the following spatial policy outcomes:*[11]

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y^* = \begin{cases}
x_L & \text{if } x_q \leq -\sqrt{x_L{}^2 + g_q} \text{ or } \left(g_q < 0 \text{ and } x_q \geq \sqrt{x_L{}^2 + g_q}\right) \\
& \quad \text{or } \left(g_q \geq 0 \text{ and } x_q \geq x_L + \sqrt{g_q}\right) \\
\sqrt{x_q{}^2 - g_q} & \text{if } -\sqrt{x_L{}^2 + g_q} < x_q < {-\sqrt{x_L{}^2 + g_q\alpha^2}}/{\alpha} \\
& \quad \text{or } \left(g_q < 0 \text{ and } {\sqrt{x_L{}^2 + g_q\alpha^2}}/{\alpha} < x_q < \sqrt{x_L{}^2 + g_q}\right) \\
\dfrac{x_L}{\alpha} & \text{if } \left(g_q < 0 \text{ and } {-\sqrt{x_L{}^2 + g_q\alpha^2}}/{\alpha} \leq x_q \leq {\sqrt{x_L{}^2 + g_q\alpha^2}}/{\alpha}\right) \\
& \quad \text{or } \left(g_q \geq 0 \text{ and } {-\sqrt{x_L{}^2 + g_q\alpha^2}}/{\alpha} \leq x_q \leq {x_L}/{\alpha} - \sqrt{g_q}\right) \\
x_q & \text{if } g_q \geq 0 \text{ and } {x_L}/{\alpha} - \sqrt{g_q} < x_q < x_L + \sqrt{g_q}
\end{cases}
$$

Although this equilibrium result appears more complex, it largely takes the same form as in the LEM-Closed Rule game above. Indeed, for comparison, we illustrate that restricted

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[11] For ease of exposition, this proposition is offered for the case of $g_q \geq -{x_L{}^2}/{\alpha^2}$, wherein no imaginary numbers are involved in the equations. More generally, for $-x_L{}^2 < g_q < -{x_L{}^2}/{\alpha^2}$, the region with $y^* = {x_L}/{\alpha}$ no longer attains, and for $g_q \leq -x_L{}^2$, the equilibrium policy is $y^* = x_L$ regardless of the spatial location of the status quo.

version with $g_q = 0$, along with examples of positive and negative status quo quality in Figure 2. The zero- quality case for the status quo is shown along the black dashed lines. As before, extreme status quo policies on the left and right can be brought all the way to the Lawmaker's ideal point as the policy outcome. Somewhat more moderate policies are left at the status quo or at the reflection of that status quo to the Lawmaker's side of the Median. Finally, status quo point near the Median are adjusted toward the Lawmaker because of the Lawmaker's efforts to formulate a high-quality proposal.

[Insert Figure 2 about here]

These same sorts of outcomes occur in the case where the status quo is quite attractive (positive quality), illustrated in solid blue on the figure. Once again, despite the high quality of the status quo, its extremity on the far left and far right allow the Lawmaker to bring about a change to her ideal point. Now, however, the gridlocked region, in which the status quo is left alone extends to the right of the Lawmaker's ideal point, and even to the left of the Median given sufficient status quo quality. Because of the high quality of the status quo, the Lawmaker would need to exert a great deal of effort to make the policy sufficiently attractive to the Median in order to shift policy further toward the Lawmaker's own ideal point. Unwilling to pay this price, the Lawmaker allows the status quo to stand.

Just to the left of that gridlock region, we once again find the case in which the spatial policy outcome is the weighted average of the ideal points of the Median and the Lawmaker. Although the same spatial policy is chosen in this region as in the case of zero quality for the status quo, here the amount of effort exerted and thus the proposal's quality is greater in order to offset the quality of the status quo. Otherwise the Median would not agree to the proposal. Further left still is the region that previously involved the reflection of the status quo across the

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Median's ideal point. This reflection exists once again, yet here it is distorted to account for the enhanced quality of the status quo.[12] Specifically, the decline from $x_L$ to $x_L/\alpha$ along the solid blue curve is steeper than that along the dashed black line because the policy must be shifted more toward the Median to offset the loss in quality.

The case of a negative status quo quality is shown along the short-dashed red path in the figure. Here there are larger regions where the policy is adjusted to the one most preferred by the Lawmaker, without the need for her to add any bill quality, simply due to how unattractive the status quo is. Moreover, centrist status quo policies are now adjusted more toward the Lawmaker, who can take advantage of the poor status quo in bringing about a greater policy change.[13]

This model therefore offers three novel findings to our understanding of policy gridlock. First, the ability of lawmakers to exert effort to generate quality policies can reduce the size of the gridlock region that commonly extends from the median to the proposer in classical models of spatial policymaking under closed rules. Second, however, the status quo region is extended, even beyond the ideal points of these two pivotal actors, when the current policy itself is of high quality. For instance, although both the Lawmaker and the Median would like a policy shift to the right, the attractiveness of the status quo and the cost of formulating an equally attractive alternative combine to undermine policy change. Third, when the status quo is ineffective (of negative quality), policy change is easy. Indeed, for extremely unpopular status quo points, the proposer can secure her ideal policy no matter where the status quo was located ideologically.

We argue that this third implication of the model helps explain the significant changes in U.S. welfare policy in the mid-1990s, as well as reforms following the 2001 terrorist attacks and

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[12] This segment of the equilibrium policy outcome in the figure is slightly concave, rather than linear.
[13] In addition to these equilibrium values being closer to the Lawmaker's ideal point, they also involve a non-linear convex mapping from the status quo location to the policy outcome.

the 2008 financial crisis and recession (among countless other major policy reforms in the U.S. and beyond). This model also helps make sense of some common parlance at the time of such reforms. For example, political insider and President Obama's new chief of staff Rahm Emanuel was famously quoted in 2008 saying, "You never want a serious crisis to go to waste. And what I mean by that, it's an opportunity to do things you think you could not do before." In the LEM-Status Quo Quality game, such crises present opportunities for proposers like the president to move policy substantially in their ideological direction, even when other key actors have divergent preferences. Bridging competing ideas in the agenda setting and policy formulation literature, the LEM reveals conditions for "incremental" change (Lindblom 1959), as well as "punctuated equilibrium" results (Baumgartner and Jones 1993), perhaps caused by "triggering events" (Cobb and Elder 1972).

## LEM-Open Rule

The third version of the Legislative Effectiveness Model returns to the case of zero quality for the status quo as was presented in the LEM-Closed Rule. Now, however, instead of the Lawmaker making a take-it-or-leave-it offer to the Median, we allow for an open rule. Most straightforwardly, the open rule allows the Median to amend the Lawmaker's proposal. However, we restrict any such amended proposals to have a value of zero on the quality dimension. In other words, the effort exerted by the Lawmaker is not transferable to any other proposals. One way to think of this difference between the Lawmaker and the Median is that the Lawmaker possesses important expertise that helps bring about a better policy. Given this game structure, the Lawmaker must now consider not just the status quo policy, but also the threat of the amendment by the Median to a policy located at his ideal point, albeit with quality set to

zero. In such a circumstance, the choice of the Lawmaker is quite easy, and is characterized as follows.

**Proposition 3 (Equilibrium Policies in the LEM-Open Rule game).** *The unique subgame perfect equilibrium of the LEM-Open Rule game yields the following spatial policy outcome:* $y^* = \frac{x_L}{\alpha}.$

No matter what status quo policy she faces, the largest threat to the Lawmaker's proposal is that of being modified to the ideal point of the Median. However, that alternative is easily counteracted. As was found in the LEM-Closed Rule with the status quo at the Median's ideal point, the Lawmaker here proposes a policy at $x_L/\alpha$, exerting sufficient effort to enhance the quality of the proposal enough to win the support of the Median. As before, this equilibrium proposal is a weighted average between the positions of the Median and the Lawmaker, as illustrated in Figure 3. For a highly effective Lawmaker with low cost of effort ($\alpha$), policy is shifted toward her own ideal point, as along the short-dashed red line. In contrast, where increasing bill quality is very costly, policy is pulled toward the Median. The solid blue line shows the extreme case in which no quality can be added.

[Insert Figure 3 about here]

As one might expect, this extreme no-quality case converges to the Median Voter Theorem, wherein an open rule brings about a policy at the Median's ideal point, regardless of the location of the status quo or of the initial proposer. In contrast, the LEM-Open Rule highlights one benefit that lawmakers may receive from building up expertise or political clout and personal popularity. By being able to increase the quality of their proposals at a low cost (either due to their policy knowledge or to the desire of others to help advance their agenda items) such lawmakers can modify policies toward their own preferred outcomes, even absent

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institutional benefits such as closed rules or gatekeeping powers. This model may therefore also offer some insights into the Honeymoon period that presidents have in Congress (e.g., McCarty 1997; McCarty and Poole 1995) or how they can achieve greater policy successes as their own popularity rises (e.g., Canes-Wrone 2006).

### LEM-Multiple Proposers

The prior versions of the LEM featured only one lawmaker capable of adding quality to a policy proposal. The LEM-Open Rule allowed multiple proposals, although only one with a positive quality value. The LEM-Multiple Proposers version takes a step further. We now add a second lawmaker to the open-rule model above.[14] This lawmaker is assumed to be located at $x_{L2}$ with $x_{L2} < x_M < x_L$. Similar to the first Lawmaker, this lawmaker's utility function is:

$$U_{L2}(y, g) = -(x_{L2} - y)^2 + g_y - \alpha_2\, g_{b2}. \qquad (3)$$

The order of play now involves the original Lawmaker making the first proposal in stage 1. In stage 2, the Second Lawmaker offers a counter-proposal. In stage 3, the Median selects one of those two proposals or modifies the status quo himself (although then with zero quality).[15] Given the sequential nature of this game, only one of the lawmakers will exert effort in equilibrium to bring about a policy change. Which lawmaker makes this meaningful proposal (and where policy ends up as a result) depends on the relative effectiveness (or costs of effort) of the two lawmakers. The policy emerging in equilibrium is characterized as follows.

***Proposition 4 (Equilibrium Policies in the LEM-Multiple Proposers game).*** *The unique subgame perfect equilibrium of the LEM-Multiple Proposers game yields the following spatial policy outcomes:*

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[14] Future work adding further proposers would be welcome. However, the current model nicely captures the main dynamics that would arise, for example, from a proposal arising from a well-informed majority-party-dominated legislative committee and a possible opposition proposal from the minority party

[15] This extension shares several features of the earlier models of Wiseman (2005, 2006) and of Lax and Cameron (2007).

$$
y^* = \begin{cases}
\dfrac{x_L}{\alpha} + \dfrac{x_{L2}}{\alpha_2} - \dfrac{x_{L2}}{\alpha_2\alpha} & \text{if } \alpha_2 \geq max\left\{ \left(\dfrac{2-\alpha}{2}\right)\dfrac{x_{L2}}{x_L}, \left(1-\sqrt{\alpha}\right)\dfrac{x_{L2}}{x_L} \right\} \\[2ex]
\dfrac{x_{L2}}{2\alpha_2} & \text{if } \left(\dfrac{-\alpha}{4}\right)\dfrac{x_{L2}}{x_L} \leq \alpha_2 < \left(\dfrac{2-\alpha}{2}\right)\dfrac{x_{L2}}{x_L} \\[2ex]
\dfrac{x_{L2}}{\alpha_2} & \text{otherwise}
\end{cases}
$$

As in all versions of the LEM, the model is solved for a subgame perfect equilibrium through backwards induction. In the current version, this means the Median will only accept a proposal made by a lawmaker if it exceeds his utility from adopting his own ideal point with no quality. The Second Lawmaker will only offer a proposal with positive quality if it will be chosen by the Median and yield greater utility to himself than allowing the initial proposal to move forward unchallenged. And the first Lawmaker will therefore wish to offer a proposal with a location and quality sufficient to keep the Second Lawmaker from offering a counter-proposal while also gaining the Median's support. If generating such a high-quality proposal is too costly, a relatively ineffective first Lawmaker will not exert any effort, instead ceding proposal power to the Second Lawmaker. Such considerations yield the policy outcomes illustrated in Figure 4.

[Insert Figure 4 about here]

The dashed black line shows the case where the Second Lawmaker is much more effective than the first Lawmaker. With much lower costs ($\alpha_2/\alpha$ small), the Second Lawmaker is at such an advantage that the first Lawmaker does not wish to exert any effort on a proposal that is easily countered. Without any meaningful competition, the Second Lawmaker acts just like the sole Lawmaker did in LEM-Open Rule, here offering the weighted average ($x_{L2}/\alpha_2$) between the Median's ideal point ($x_M = 0$) and his own. The weight is now based on the Second Lawmaker's costs, and the policy is biased to the left rather than the right.

In contrast, where the initial Lawmaker is not at such a cost disadvantage, she uses both

her lawmaking effectiveness and her first-mover advantage to offer a proposal that keeps the

Second Lawmaker from making a meaningful counter-proposal. Here there are two cases,

depending on whether the constraint of the Median supporting the first Lawmaker's proposal is

binding or not. When the first Lawmaker is much more effective than the Second Lawmaker

($\alpha_2/\alpha$ large), the Lawmaker's proposal maximizes her own utility while inducing the Second

Lawmaker to exert no effort. As shown by the red dashed line in the figure, the resulting policy

is a compromise between the ideal points of the two lawmakers, weighted by the relative costs of

effort. In this case, the proposal is sufficiently attractive that the Median's constraint is not

binding – he receives more than the amount of utility he would receive from setting policy at his

own ideal point with zero quality.

Between these two cases (where $\alpha_2/\alpha$ is moderate), the first Lawmaker strikes a

compromise halfway between the ideal point of the Median and the policy the Second Lawmaker

would offer absent an initial proposal. This equilibrium proposal is illustrated by the red dashed

and dotted line in the figure. The first Lawmaker's proposal is just high enough in quality to

make the Second Lawmaker indifferent between accepting this and offering his standard counter-

proposal. Simultaneously, this proposal makes the Median indifferent between accepting this

proposal and proposing his own ideal point with no quality. The first Lawmaker prefers this

proposal over the proposal that the Second Lawmaker would offer on his own because it is closer

to her ideal point. However, as her costs of generating a quality proposal increase further, she

would prefer to allow the Second Lawmaker's preferred proposal go forward instead, as

discussed above. Finally, as shown once again with the solid blue line in the figure, we return to

the special case of the Median Voter Theorem when both lawmakers' costs are prohibitively large.

The LEM-Multiple Proposers highlights two important features of lawmaking. First, inducing competing proposals from lawmakers with diverse preferences can be beneficial to the Median and thus to the majority in a legislature.[16] For instance, in the model, the first Lawmaker's proposal shifted toward the Median, relative to what she would have offered without such competition. Second, to the extent that the effectiveness of lawmakers can be captured by their costs of enhancing the quality of proposals, more effective lawmakers are more likely to offer successful proposals. Therefore, attempts to measure the effectiveness of various lawmakers might rightly focus on whose proposals move furthest through the lawmaking process (e.g., Volden and Wiseman 2014).

## LEM-Negative Agenda Setting

The above versions of the LEM have focused on individual lawmakers making legislative proposals. Here, in the LEM-Negative Agenda Setting, we treat the majority party as the Lawmaker from the LEM-Open Rule version. We therefore return to the single-proposer version above. Yet, consistent with Cox and McCubbins (2005), we also allow the majority-party Lawmaker to act as a "negative agenda setter," using gatekeeping powers to keep status quo policies off the agenda. The Lawmaker here therefore first chooses whether to offer a proposal to change the status quo. If not, the status quo stays in place.[17] If the Lawmaker does offer a proposal, other lawmakers (and most notably the Median) may offer counter-proposals, albeit with no quality attached. Such an open rule amounts to a final vote wherein the Median selects

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[16] Substantively similar results are obtained by Hirsch and Shotts (2013) who model policymaking competition with endogenous proposal quality as a simultaneous move game.

[17] Once again, for ease of illustration, we limit this model to the case where the status quo has a zero quality value.

either the Lawmaker's proposal or a zero-quality proposal located at his own ideal point. The

equilibrium spatial policies resulting from the play of this game are as follows.

***Proposition 5 (Equilibrium Policies in the LEM-Negative Agenda Setting game).*** *The unique*
*subgame perfect equilibrium of the LEM-Negative Agenda Setting game yields the following*
*spatial policy outcomes:*

$$y^* = \begin{cases} x_q & if \ x_L - x_L\sqrt{1 - 1/\alpha} < x_q < x_L + x_L\sqrt{1 - 1/\alpha} \\ \dfrac{x_L}{\alpha} & otherwise \end{cases}$$

Put simply, this game yields the same equilibrium proposal as in the LEM-Open Rule

game, *unless* the Lawmaker would prefer the status quo over making this proposal (with its

requisite enhanced quality to win the support of the Median). This equilibrium is illustrated in

Figure 5. Once again, there are two noteworthy special cases. When the costs of effort for

generating high-quality bills are sufficiently low ($\alpha = 1$), the Lawmaker can add sufficient

quality to receive her ideal policy under all circumstances (shown along the red dashed line). At

the other extreme, when enhancing the bill quality is prohibitively costly ($\alpha = \infty$), the

equilibrium from Cox and McCubbins' (2005) negative agenda setting model emerges (shown

along the solid blue line). Here, if the Lawmaker opens the gates, policy is moved all the way to

the Median's ideal point. Therefore the Lawmaker keeps off of the agenda any status quo policy

that is closer to her ideal point than is the Median's ideal point.

[Insert Figure 5 about here]

Between these two extreme values, the Lawmaker faces a fairly simple tradeoff

consideration. She can offer the compromise weighted average that served as the equilibrium in

LEM-Open Rule. Or she can act as a negative agenda setter, keeping the status quo. These

choices are illustrated along the black dashed lines in the figure. For extreme status quo policies

on the right or left, the Lawmaker offer the compromise proposal ($x_L/\alpha$) that keeps the Median from modifying policy further. However, for status quo policies near her ideal point, the Lawmaker prefers to maintain the status quo and pay no effort costs, either because the status quo is closer to her ideal point than would be the Median-approved proposal or because the costs of adding quality would outweigh the spatial policy gains.

Compared to the canonical negative agenda-setting model without policy quality considerations, the possibility of adding quality allows a greater range of policy change and shifts policy more toward the ideal point of the Lawmaker. To the extent that this lawmaker represents the majority-party median, as in the work of Cox and McCubbins, the LEM-Negative Agenda Setting version highlights the value that political parties may place on helping their members establish policy expertise. By cultivating members who are able to improve proposals at low cost, parties can help shift policies in their preferred direction while also increasing the effectiveness of their proposals. Specialization through committee structures (e.g., Krehbiel 1991) and reliance on knowledgeable staff or lobbyists to aid in policymaking (e.g., Hall and Deardorff 2006) are both valuable activities for political parties to encourage.

### LEM-Pivotal Politics

As a final illustration of the usefulness of the Legislative Effectiveness Model, we offer a version that introduces an additional pivotal actor.[18] The LEM-Pivotal Politics returns to the assumptions of LEM-Open Rule, but now requires the support not only of the Median but also of a Pivot, located at $x_P$ with $x_P < x_M < x_L$. Pivotal actors are common in spatial models, representing such important political concerns as supermajority rules (e.g., Brady and Volden

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[18] We limit the model to a single pivot for ease of illustration. Extending to multiple pivots adds some complexity, but reveals that the pivotal politics model from Krehbiel (1998) emerges as a special case of LEM-Pivotal Politics.

1998, Krehbiel 1998), bicameralism (e.g., Riker 1992), or a host of other veto players (e.g., Tsebelis 2002). Similar to the Median, this pivotal actor's utility function is:

$$U_P(y, g) = -(x_P - y)^2 + g_y. \tag{4}$$

In this version of the model, the Lawmaker offers a proposal in stage 1. If this proposal is accepted by both the Pivot and the Median in stage 2, it becomes the final policy outcome. If not, the Median can offer an alternative zero-quality proposal in stage 3. Finally, in stage 4, the Pivot can support the Median's proposal or oppose it and keep the status quo. Equilibrium spatial policies are established as follows.

***Proposition 6 (Equilibrium Policies in the LEM-Pivotal Politics game).*** *The unique subgame perfect equilibrium of the LEM-Pivotal Politics game yields the following spatial policy outcomes:*

$$y^* = \begin{cases} x_P + \dfrac{x_L - x_P}{\alpha} & if\ \alpha \le \dfrac{x_L - x_P}{-x_P}\ or\ x_P - \dfrac{x_L - x_P}{\alpha} \le x_q \le x_P + \dfrac{x_L - x_P}{\alpha} \\[3mm] 0 & if\ \alpha > \dfrac{x_L - x_P}{-x_P}\ and\ \left( x_q \le 2x_P\ or\ x_q \ge 0 \right) \\[3mm] 2x_P - x_q & if\ \alpha > \dfrac{x_L - x_P}{-x_P}\ and\ 2x_P < x_q < x_P - \dfrac{x_L - x_P}{\alpha} \\[3mm] x_q & if\ \alpha > \dfrac{x_L - x_P}{-x_P}\ and\ x_P + \dfrac{x_L - x_P}{\alpha} < x_q < 0 \end{cases}$$

The logic of this equilibrium is most easily discerned in contrast to the case in which adding quality is prohibitively expensive for the Lawmaker ($\alpha = \infty$), yielding the logic found in Brady and Volden (1998) and Krehbiel (1998). Here, as illustrated along the solid blue lines in Figure 6, the Median modifies extreme status quo policies to his ideal point. However, status quo policies between the Pivot and the Median are stuck in gridlock, with any attempted move to the right opposed by the Pivot and any move to the left opposed by the Median. Status quo policies just to the left of the Pivot's ideal point are reflected across it, toward the Median, leaving the Pivot just indifferent between the status quo and the proposed policy change.

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As in all versions of the LEM, however, when the Lawmaker's costs of enhancing bill quality are very low ($\alpha = 1$), she can attain policy at her own ideal point (illustrated by the red dashed line in the figure) by adding sufficient quality to induce the Median and the Pivot to accept her proposal. For somewhat more costly proposal quality, the Lawmaker's proposal drifts down toward the ideal point of the Pivot (as shown along the black dashed line). Now, the policy outcome becomes the weighted average of her own ideal point and that of the Pivot ($y = x_P + \frac{x_L - x_P}{\alpha}$). The Lawmaker adds just enough quality to this proposal to make the Pivot indifferent between this outcome and the one that would attain upon rejecting this proposal (the traditional pivotal politics outcome).

When the cost of adding quality becomes still higher (i.e., when $\alpha > \frac{x_L - x_P}{-x_P}$) the weighted average takes a value below zero, and thus (for some status quo points) below what the Median could obtain on his own absent a proposal by the Lawmaker. In such circumstances, the Lawmaker exerts no effort and proposes her own ideal point. This is mainly symbolic, as it is rejected, allowing the Median to make the proposal. However, for status quo points close to the Pivot, where the Median can only facilitate a small policy change, if any, the Lawmaker can do better, both for herself and for the Median. Here, as shown along the black dashed and dotted line in the figure, she once again proposes the weighted average between her ideal point and that of the Pivot. Because this is further from the Pivot's ideal point than he would receive upon rejecting the proposal, a small increase in bill quality is needed to make the Pivot indifferent.

In sum, adding an effective lawmaker to the pivotal politics model in this way leads to a series of new predictions. First, in the canonical pivotal politics model, status quo points between the Pivot and the Median are mired in gridlock. While this is still the case for status quo

point near the median, those near the Pivot will here be adjusted by adding quality, making both the Lawmaker and the Median better off, even when adding quality is quite costly. Second, when the cost of enhancing proposal quality is quite low, the Lawmaker is always able to bring about a policy change over a zero-quality status quo, regardless of the spatial location of the status quo. But, third, whether the Lawmaker is occasionally or frequently successful depends critically on her effectiveness and on her location relative to the pivotal actors. For example, leaving policymaking to the Median is more costly to a Lawmaker who is far from the location of the Median and the Pivot. Such a Lawmaker is willing to pay the cost to add sufficient quality to bring about a policy change more to her liking than is one located closer to the Median. Therefore, as in all versions of the LEM explored here, knowing the location and the effectiveness (or costs of adding quality) of lawmakers is fundamental to understanding whether gridlock is overcome and where the final policy outcome will be located.

## Empirical Implications and Initial Tests

As shown above, the Legislative Effectiveness Model allows scholars to adapt and expand many existing spatial models of legislative politics to include bill quality as part of the proposal and to account for varying effectiveness across lawmakers. As a result, these model variants offer numerous implications for lawmaking activities within legislatures, as well as for the resulting public policies. Here we highlight four such empirical implications of the LEM, including the final one that we test with data from the U.S. Congress.

First, across many parameter values in the LEM variants, the policy outcome is located at the weighted average between the proposing lawmaker and the key pivotal actors (often the floor median). The notable implication is that policy often reflects the ideological position of the proposer, a finding that is perhaps unsurprising, but which is uncommon in many spatial models.

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For example, canonical models of policymaking with an open rule tend to result in policy outcomes at the median's ideal point regardless of who makes the proposal. In contrast, the LEM features policy pulled away from the median toward the proposer, increasingly so for more effective proposers. Although certainly important in understanding the policy outcomes that arise across countless legislative settings, this implication may be difficult to test empirically. The equilibrium proposal is high enough in quality (regardless of its location) to gain sufficient legislative support for passage. Therefore, all such proposals tend to look equivalent in terms of coalition sizes or voting patterns within the legislature. Hence, other means for testing this implication of the model would need to be developed.

Second, many scholars have been interested in the predictions about policy change or gridlock arising from various spatial models. For example, Chiou and Rothenberg (2003) assess the amount of policy change in the U.S. Congress relative to that predicted by partisan and pivotal politics spatial models. Such tests have been based on the size of gridlock regions arising in such models. The LEM offers rather different predictions for legislative gridlock. For instance, in Figure 2 we illustrate that gridlock expands significantly for high-quality status quos. Therefore, the efficacy or popularity of the current policy should be incorporated in any such tests of gridlock or policy change. As another example, the gridlock regions in Figures 5 and 6 are functions not only of pivotal and partisan actors common in earlier models, but also of the location and effectiveness of the lawmaker who makes the legislative proposal. More effective lawmakers can help overcome legislative gridlock in many such settings.

Third, at the level of each individual proposal, greater legislative success is expected to accompany proposers who can formulate high-quality bills at a lower cost. Because proposal quality can take a variety of forms, and effort costs can be offset by hardworking staffs or

interest group subsidies of effort, the LEM offers numerous related predictions. For example, if proposal quality includes the political benefits to legislators who vote in favor of a popular proposal, policy changes supported by popular presidents should be treated more favorably in Congress. Alternatively, if interest groups or committee staffs can help formulate proposals that effectively address major public policy problems while avoiding major pitfalls, lawmakers who work with a well-informed staff or a well-connected interest group should be more effective and better able to pull policy outcomes in their preferred direction all else equal.

Many of the above implications are fairly intuitive, yet they are absent in most spatial models of policymaking, which do not consider the effectiveness of lawmakers or their proposals, or of the status quo. Other predictions arising from the LEM are much more counter-intuitive. Consider a fourth set of implications, arising from the LEM-Pivotal Politics game. Suppose the pivot in that model were a committee on the majority party's side of the floor median in a two-party legislature. Therefore, the lawmaker offering proposals in the model illustrated in Figure 6 tends to be a minority-party member, located on the far side of the median from the committee. In the model, if the proposing lawmaker is close to the median, her proposals tend to be rejected in favor of those supported by the median in the standard logic of the pivotal politics model without incorporating proposal quality. However, perhaps unexpectedly, more extreme minority-party members are more successful in this model. Not content to leave policies close to the floor median, such extreme lawmakers invest more heavily in quality and are rewarded with a greater range of policy changes.

The logic resulting from this model leads to two surprising testable hypotheses. First, the proposals of extreme minority-party members should be more successful in committees than those of moderate minority-party lawmakers. And, second, upon attaining success in committee,

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minority-party lawmakers' proposals should be more likely to pass out of the legislature than are those of majority-party members.[19] This latter hypothesis comes from comparing the results arising here to those from a modification of the LEM-Pivotal Politics in which the proposer is on the same side of the median as the committee.[20] For most minority-party members, any bill they offer that is attractive in committee is also attractive on the floor, as the floor median tends to be more closely aligned with the proposer than is the committee median. In contrast, most members of the majority party are more closely aligned with the committee than with the floor. There are therefore significant ranges of status quo locations wherein a majority-party member will offer a zero-quality proposal at her ideal point. Such a proposal would not appeal to the floor median, but the closely proximate committee approves this proposal over the status quo, only to have it fall by the wayside on the floor.

Although both of these empirical implications are counter-intuitive, because they feature greater success by minority-party members on the floor and by minority-party extremists in committee, they both receive support in data from the U.S. House of Representatives across 40 years of legislative proposals. Specifically, we examine all 152,351 public bills (H.R.s) introduced into the House during the 93rd-112th Congresses (1973-2012). We code a minority-party legislator as an *extremist* if she is in the half of the minority party furthest from the majority party, based on her ideological ideal point as captured in her DW-NOMINATE score (Poole and Rosenthal 1997). Otherwise, she is considered a moderate.

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[19] This probabilistic language arises from reasonable additional assumptions about the distribution of minority- and majority-party members. Most of the minority party is located on the far side of the floor median from the committee's ideal point. Therefore, although some minority-party members' proposals (at their ideal points but with no added quality) may still pass through committee (but fail on the floor) due to the member being very close spatially to the committee and not the floor, such a situation is more likely to be true in the majority party.

[20] For space considerations, above we only discussed the case of the pivot and the lawmaker on opposite sides of the median. This alternative case is solved and characterized in the Supplemental Appendix.

Consistent with the theory, the average success rate for bills being passed out of committee for extremist minority-party sponsors is five percent, while the average success rate for more moderate minority-party sponsors is four percent, and this difference is statistically significant (p-value $< 0.001$).[21] This finding is consistent with the argument that the more ideologically extreme minority-party sponsors are willing to undertake costly investments in quality to ensure that their bills pass (in lieu of the status quo), while moderate minority-party sponsors are more satisfied with the status quo, and therefore fail to invest in bill quality.

Moreover, upon reaching the floor, minority-party members' sponsored bills achieve greater success than those sponsored by lawmakers in the majority party. Specifically, the average success rate for having bills pass the House (conditional on reaching the floor) for minority party lawmakers is 86%, whereas the comparable statistic for majority party lawmakers is 80%.[22] This difference in percentages is statistically significant (p-value $< 0.001$), and the result is consistent with the argument that minority-party members, in exerting sufficient effort to generate high-quality proposals in order to survive the committee process, nearly guarantee passage of their bills on the floor. This finding may be a surprise to many casual observers and scholars of Congress alike, who might instead expect the bills of minority-party members to be much *less* successful than those of the majority on the floor of the House. Finally, perhaps because of the quality of minority-party lawmakers' bills needed for success in committee, their bills perform very well beyond the House. Having survived the committee process, 48% of bills sponsored by minority-party members ultimately become law, compared to only 40% for

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[21] Specifically, minority-party extremists introduced 24,164 bills over our time period, of which 1,237 passed through committee. In contrast, minority-party moderates sponsored 32,761 bills, of which 1,408 passed through committee. A difference-in-proportions t-test yields *p < 0.001*.

[22] Specifically, minority-party members' bills reached the floor on 2,645 occasions, passing the House 2,267 times. In contrast, 12,972 proposals of majority-party members reached the floor, with 10,429 passing the House. A difference-in-proportions t-test yields *p < 0.001*.

majority-party lawmakers, a difference also significant at $p < 0.001$. This result holds true regardless of the party in control of the Senate or the Presidency.

## Conclusion

Some existing public policies are very unpopular. Some policy proposals are better able to address policy needs than are others. And some lawmakers are more effective than others at advancing their proposals through the lawmaking process. Although none of these claims is controversial, they have all been largely neglected in models of legislative politics. We argue that these claims are important, that they can be easily added to spatial models, and that doing so sheds new light on the policies that emerge from the lawmaking process.

Allowing policy proposers to enhance the overall quality of their proposals, we develop a series of Legislative Effectiveness Models. We show that many existing influential spatial models of legislative politics emerge as special cases of our approach. Thus little is lost from our more general approach. Moreover, we illustrate that these models are fairly easy to alter and solve, thus offering promise for their adaptability to still further legislative settings. Doing so may yield major new understandings regarding legislative politics and policymaking.

Notably, we account for significant policy changes that result when existing policies are ineffective or unpopular. We also illustrate how a lawmaker's relative effectiveness places her in a privileged position from which she can propose policies that deviate (under some circumstances, substantially) from the median voter's most preferred policies, and still achieve policy success. In contrast, we characterize circumstances under which gridlock ensues not because of conflicting ideological views but because lawmakers are unable to improve on the attractiveness of the existing policy without bearing enormous costs.

Implications of the LEM extend from the cultivation of expertise among legislators to the use of popularity and political capital by presidents to the lawmaking efforts exerted by interest groups. Testing two of the more counter-intuitive hypotheses arising from one of the variants of the LEM, we find minority-party extremists to outperform moderates in congressional committees and minority-party lawmakers to outperform those of the majority party on the floor of the House and beyond.

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# Appendix

## Proof of Proposition 1

The unique subgame perfect Nash equilibrium can be derived by backwards induction. In the final stage, the Median will accept a new proposal over the status quo if the following weak inequality holds:

$$-x_b^2 + g_b \geq -x_q^2.$$

Similar to the logic of the classic Romer-Rosenthal Setter Model, we know that for all $x_q \leq$ -$x_L$, and for all $x_q \geq x_L$, the Lawmaker can propose $x_b* = x_L$ and have it pass over the status quo without attaching any quality to the proposal.

For $-x_L < x_q < x_L$, however, the Lawmaker chooses $x_b*$ and $g_b*$ to maximize her utility subject to the constraints that the Median weakly prefers the new bill (with quality) to the status quo, and that the Lawmaker would choose to make such a costly proposal rather than accepting $-x_q$ (for $x_q < 0$, with $g_b* = 0$) or retaining the status quo (for $x_q \geq 0$). Because the Median's indifference constraint, expressed above, will hold in equality in equilibrium, it must be true that if the Lawmaker chooses to propose a new bill (with quality) to alter the status quo, then $g_b = x_b^2 - x_q^2$. Hence, the lawmaker chooses $x_b*$ to maximize the following expression:

$$-(x_L - x_b)^2 + \left(x_b^2 - x_q^2\right)(1 - \alpha),$$

$$\text{such that: } -(x_L - x_b^*)^2 + \left(x_b^{*2} - x_q^2\right)(1 - \alpha) \geq -\left(x_L - x_q\right)^2, \text{ if } x_q \geq 0,$$

$$\text{or } -(x_L - x_b^*)^2 + \left(x_b^{*2} - x_q^2\right)(1 - \alpha) \geq -\left(x_L + x_q\right)^2, \text{ if } x_q < 0;$$

where the latter inequalities ensure that the Lawmaker's participation constraint is satisfied (such that she would prefer to propose a costly bill rather than accept the status quo, or its reflection point).

Applying the calculus allows us to identify that, if the Lawmaker chooses to propose a bill with nonzero quality attached to it, $(x_b^*, g_b^*) = \left(\frac{x_L}{\alpha}, \left(\frac{x_L}{\alpha}\right)^2 - x_q^2\right)$. The Lawmaker will chose to make such a proposal for $-\frac{x_L}{\alpha} \leq x_q \leq \frac{x_L}{\alpha}$. Otherwise, she will propose the reflection point (for $-x_L < x_q < -\frac{x_L}{\alpha}$) or propose her ideal point, with zero quality—which leads to the status quo being retained (for $\frac{x_L}{\alpha} < x_q < x_L$). Putting these components together yields the equilibrium as characterized in Proposition 1.

Proofs of Propositions 2-6 follow a similar logic. They can be found in the Supplemental Appendix (to be made available online).

**Proof of Proposition 2**

The unique subgame perfect Nash equilibrium can be derived by backwards induction. In the final stage, the Median will accept a new proposal over the status quo if the following weak inequality holds:

$$-x_b^2 + g_b \geq -x_q^2 + g_q.$$

Hence, whenever the Lawmaker proposes any change to the status quo, the above inequality must be satisfied. Because quality provision is costly, if the Lawmaker proposes any policy with quality attached to it, the above expression will hold with equality in equilibrium.

To identify the equilibrium to this game, we begin by identifying the range of status quo policies for which the Lawmaker can propose her ideal point ($x_L$) and have that proposal pass over the status quo without having any quality attached to it. That is, we identify status quo locations ($x_q$) and status quo quality ($g_q$) such that the following holds:

$$-(x_L)^2 \geq -(x_q)^2 + g_q.$$

Algebraic analysis reveals that the above inequality is satisfied whenever:

$$x_q \leq -\sqrt{x_L^2 + g_q} \text{ or } x_q \geq \sqrt{x_L^2 + g_q}.$$

Hence, whenever $x_q$ is within these ranges, the Lawmaker could propose her ideal point and the Median would accept it over the status quo.

That said, for certain values of $g_q$ and locations of $x_q$, the Lawmaker might, herself, prefer to retain the status quo rather than proposing her ideal point (although it would pass). More specifically, the Lawmaker will prefer to retain the status quo over implementing her costless ideal point whenever the following inequality holds:

$$-(x_L - x_q)^2 + g_q \geq 0.$$

The above inequality is satisfied whenever:

$$g_q \geq (x_L - x_q)^2,$$

and therefore $x_L - \sqrt{g_q} \leq x_q \leq x_L + \sqrt{g_q}$, where $g_q \geq 0$.

Combining the above, $(x_b^*, g_b^*) = (x_L, 0)$ if $x_q \leq -\sqrt{x_L^2 + g_q}$, or if $x_q \geq x_L + \sqrt{g_q}$ (for $g_q \geq 0$). If $g_q < 0$, then $(x_b^*, g_b^*) = (x_L, 0)$ also if $x_q \geq \sqrt{x_L^2 + g_q}$.

For $-\sqrt{x_L^2 + g_q} < x_q < \sqrt{x_L^2 + g_q}$, the Lawmaker will not be able to obtain her ideal point as a final policy without attaching any quality to the bill. For status quo locations in this region, if she were to propose a new policy with quality attached she would seek to choose $x_b^*$, $g_b^*$ to maximize:

$$-(x_L - x_b)^2 + (1 - \alpha)(g_b)$$
$$\text{such that: 1) } -x_b^2 + g_b = -x_q^2 + g_q,$$
$$\text{and 2):} -(x_L - x_b)^2 + (1 - \alpha)(g_b) \geq -(x_L - x_q)^2 + g_q,$$

where satisfying the first constraint ensures that the Median will prefer the new policy over the status quo, and satisfying the second constraint ensures that the Lawmaker would prefer the new policy (with quality attached) to retaining the status quo.

The above constrained optimization problem can be expressed as the following Lagrangian:

$$\mathcal{L}(b, \lambda) = -(x_L - x_b)^2 + (1 - \alpha)\big(x_b^2 - x_q^2 + g_q\big) + \lambda\big(-(x_L - x_b)^2 + (1 - \alpha)\big(x_b^2 - x_q^2 + g_q\big) + \big(x_L - x_q\big)^2 - g_q\big).$$

Applying the calculus yields the following constrained optimum whenever the Lawmaker's participation constraint is not binding:

$$(x_b^*, g_b^*) = \left(\tfrac{x_L}{\alpha}, \left(\tfrac{x_L}{\alpha}\right)^2 - x_q^2 + g_q\right).$$

Given that $g_b^*$ must be weakly greater than zero, however, $(x_b^*, g_b^*) = \left(\tfrac{x_L}{\alpha}, \left(\tfrac{x_L}{\alpha}\right)^2 - x_q^2 + g_q\right)$,

can only be obtained when $-\dfrac{\sqrt{x_L^2 + g_q \alpha^2}}{\alpha} \le x_q \le \dfrac{\sqrt{x_L^2 + g_q \alpha^2}}{\alpha}$. For $x_q$ outside of this range, the binding constraint yields $g_b^* = 0$, which implies (from the Median's indifference constraint, above) that $(x_b^*, g_b^*) = (\sqrt{x_q^2 - g_q}, 0)$. The Lawmaker would prefer $(x_b^*, g_b^*) = (\sqrt{x_q^2 - g_q}, 0)$, to retaining the status quo (with quality $g_q$) within this region.

Putting these component parts together:

$$(x_b^*, g_b^*) = (\sqrt{x_q^2 - g_q}, 0) \text{ for } -\sqrt{x_L^2 + g_q} < x_q < -\dfrac{\sqrt{x_L^2 + g_q \alpha^2}}{\alpha}.$$

Moreover, for $g_q \ge 0$: $(x_b^*, g_b^*) = \left(\tfrac{x_L}{\alpha}, \left(\tfrac{x_L}{\alpha}\right)^2 - x_q^2 + g_q\right)$ for $-\dfrac{\sqrt{x_L^2 + g_q \alpha^2}}{\alpha} \le x_q \le \tfrac{x_L}{\alpha} - \sqrt{g_q}$; and $(x_b^*, g_b^*) = (x_q, 0)$ for $\tfrac{x_L}{\alpha} - \sqrt{g_q} < x_q < x_L + \sqrt{g_q}$.

If $g_q < 0$, however: $(x_b^*, g_b^*) = (\sqrt{x_q^2 - g_q}, 0)$ for $\dfrac{\sqrt{x_L^2 + g_q \alpha^2}}{\alpha} < x_q < \sqrt{x_L^2 + g_q}$; and $(x_b^*, g_b^*) = \left(\tfrac{x_L}{\alpha}, \left(\tfrac{x_L}{\alpha}\right)^2 - x_q^2 + g_q\right)$ for $-\dfrac{\sqrt{x_L^2 + g_q \alpha^2}}{\alpha} \le x_q \le \dfrac{\sqrt{x_L^2 + g_q \alpha^2}}{\alpha}$.

**Proof of Proposition 3**

The unique subgame perfect Nash equilibrium can be derived by backwards induction. Given that any legislator can propose a bill to change the status quo, in the final stage, the Median will accept a new proposal that is offered by the Lawmaker over any other proposal if the following weak inequality holds:

$$-x_b^2 + g_b \ge 0.$$

That is, the Median must weakly prefer the Lawmaker's proposal compared to a policy that is located at his ideal point, without any quality attached to it. Given that the above inequality will be binding in equilibrium, the Lawmaker will choose $x_b^*$, $g_b^*$ to maximize:

$$-(x_L - x_b)^2 + (1 - \alpha)(x_b^2).$$

Applying the calculus yields the following optimal proposal by the Lawmaker (which, she strictly prefers to propose, rather than letting the Median's ideal point become the final policy):

$$(x_b^*, g_b^*) = \left(\tfrac{x_L}{\alpha}, \left(\tfrac{x_L}{\alpha}\right)^2\right).$$

**Proof of Proposition 4**

The unique subgame perfect Nash equilibrium can be derived by backwards induction. In the final period, the Median will vote for Lawmaker 2's proposal over Lawmaker 1's proposal if:
$$-x_{b2}^2 + g_{b2} \geq -x_b^2 + g_b.$$
And the Median will vote for the winner of that pair over the status quo so long as it yields greater utility than zero (from his ideal point with zero quality).

Hence, working a step back, in period 2, if the Lawmaker at $x_{L2}$ chooses to propose an amendment to Lawmaker $x_L$'s bill, he will choose $x_{b2}^*, g_{b2}^*$ to maximize:
$$-(x_{L2} - x_{b2})^2 + (1 - \alpha_2)(g_{b2})$$
$$\text{such that: } -x_{b2}^2 + g_{b2} \geq -x_b^2 + g_b.$$
Applying the calculus and solving for the optimal proposal yields:
$$(x_{b2}^*, g_{b2}^*) = \left(\frac{x_{L2}}{\alpha_2}, \left(\frac{x_{L2}}{\alpha_2}\right)^2 - x_b^2 + g_b\right)$$
Were Lawmaker 1 to not offer a proposal providing at least zero utility to the Median, then from Proposition 3, $(x_{b2}^*, g_{b2}^*) = \left(\frac{x_{L2}}{\alpha_2}, \left(\frac{x_{L2}}{\alpha_2}\right)^2\right)$.

However, facing competition, if Lawmaker 2 were to enter and propose $(x_{b2}^*, g_{b2}^*)$, his utility would be:
$$-\left(x_{L2} - \frac{x_{L2}}{\alpha_2}\right)^2 + (1 - \alpha_2)\left(\left(\frac{x_{L2}}{\alpha_2}\right)^2 - x_b^2 + g_b\right).$$
In contrast, if Lawmaker 2 chooses not to propose an amendment with any quality attached to it (such that the bill that was proposed by Lawmaker 1 becomes policy), his utility would be:
$$-(x_{L2} - x_b)^2 + g_b.$$
Hence, in order to induce Lawmaker 2 not to offer a competing amendment (with quality attached), it must be true that whatever bill Lawmaker 1 proposes must have quality at least equal to:
$$g_b = \left(\frac{x_{L2}}{\alpha_2}\right)^2 + x_b^2 - \frac{2x_{L2}x_b}{\alpha_2}.$$
Working back to period 1, Lawmaker 1 chooses $x_b^*$, $g_b^*$ to maximize:
$$-(x_L - x_b)^2 + (1 - \alpha)(g_b)$$
$$\text{such that: 1) } g_b = \left(\frac{x_{L2}}{\alpha_2}\right)^2 + x_b^2 - \frac{2x_{L2}x_b}{\alpha_2},$$
$$\text{and 2) } -x_b^2 + g_b \geq 0.$$
Satisfying constraint (1) ensures that Lawmaker 2 would prefer not to offer a competing amendment with quality; and satisfying constraint (2) ensures that the Median is willing to accept Lawmaker 1's proposal, in comparison to a zero-quality policy located at his ideal point under the open amendment rule.

We can express this constrained optimization problem with the following Lagrangian:
$$\mathcal{L}(b, \lambda) = -(x_L - x_b)^2 + (1 - \alpha)\left(\left(\frac{x_{L2}}{\alpha_2}\right)^2 + x_b^2 - \frac{2x_{L2}x_b}{\alpha_2}\right) + \lambda\left(-x_b^2 + \left(\frac{x_{L2}}{\alpha_2}\right)^2 + x_b^2 - \frac{2x_{L2}x_b}{\alpha_2}\right).$$
Applying the calculus yields the following constrained optimum whenever the Median's indifference constraint is not binding:
$$(x_b^*, g_b^*) = \left(\frac{x_L}{\alpha} + \frac{x_{L2}}{\alpha_2} - \frac{x_{L2}}{\alpha_2\alpha}, \frac{x_L^2}{\alpha^2} + \frac{x_{L2}^2}{\alpha_2^2\alpha^2} - \frac{2x_Lx_{L2}}{\alpha^2\alpha_2}\right).$$

If the Median's indifference constraint is binding, however, then the optimal bill and quality level attached to the bill (if Lawmaker 1 proposes a bill with attached quality) is as follows:

$$(x_b^*, g_b^*) = (\frac{x_{L2}}{2\alpha_2}, \frac{x_{L2}^2}{4\alpha_2^2}).$$

Analysis reveals that the Median's indifference constraint is not binding when $\alpha_2 \geq \left(\frac{2-\alpha}{2}\right)\frac{x_{L2}}{x_L}$.

To identify the situations under which Lawmaker 1 would prefer to make a proposal (with the attached quality) rather than letting Lawmaker 2 win with the optimal amendment and corresponding quality noted above, it is sufficient to compare the utility that Lawmaker 1 would receive for each of these cases, where the Median's indifference constraint is, and is not, binding.

First, if the exogenous parameters are such that the Median's indifference constraint does not bind, Lawmaker 1 will prefer to let Lawmaker 2 propose the optimal amendment and win whenever the following inequality holds:

$$-\left(x_L - \frac{x_{L2}}{\alpha_2}\right)^2 + \frac{x_L^2}{\alpha_2^2} > -\left(x_L - (\frac{x_L}{\alpha} + \frac{x_{L2}}{\alpha_2} - \frac{x_{L2}}{\alpha_2\alpha})\right)^2 + (1-\alpha)\left(\frac{x_L^2}{\alpha^2} + \frac{x_{L2}^2}{\alpha_2^2\alpha^2} - \frac{2x_Lx_{L2}}{\alpha^2\alpha_2}\right)$$

$$\Rightarrow \alpha_2 < \left(1 - \sqrt{\alpha}\right)\frac{x_{L2}}{x_L}.$$

Similarly, if the exogenous parameters are such that the Median's indifference constraint does bind, Lawmaker 1 will prefer to let Lawmaker 2 win whenever the following inequality holds:

$$-\left(x_L - \frac{x_{L2}}{\alpha_2}\right)^2 + \frac{x_L^2}{\alpha_2^2} < -\left(x_L - (\frac{x_{L2}}{2\alpha_2})\right)^2 + (1-\alpha)\left(\frac{x_{L2}^2}{4\alpha_2^2}\right)$$

$$\Rightarrow \alpha_2 < \left(\frac{-\alpha}{4}\right)\frac{x_{L2}}{x_L}$$

Putting these components together: $\left(y^*, g_y^*\right) = (\frac{x_L}{\alpha} + \frac{x_{L2}}{\alpha_2} - \frac{x_{L2}}{\alpha_2\alpha}, \frac{x_L^2}{\alpha^2} + \frac{x_{L2}^2}{\alpha_2^2\alpha^2} - \frac{2x_Lx_{L2}}{\alpha^2\alpha_2})$ if $\alpha_2 \geq max\left\{\left(\frac{2-\alpha}{2}\right)\frac{x_{L2}}{x_L}, \left(1 - \sqrt{\alpha}\right)\frac{x_{L2}}{x_L}\right\}$; $\left(y^*, g_y^*\right) = (\frac{x_{L2}}{2\alpha_2}, \frac{x_{L2}^2}{4\alpha_2^2})$ if $\left(\frac{-\alpha}{4}\right)\frac{x_{L2}}{x_L} \leq \alpha_2 < \left(\frac{2-\alpha}{2}\right)\frac{x_{L2}}{x_L}$; and, otherwise, $\left(y^*, g_y^*\right) = (\frac{x_{L2}}{\alpha_2}, \frac{x_{L2}^2}{\alpha_2^2})$.


**Proof of Proposition 5**

We can derive the unique subgame perfect Nash equilibrium by backwards induction. If the Lawmaker makes an initial proposal, then in the final stage, the Median will accept a new proposal that is offered by the Lawmaker over any other proposal if the following weak inequality holds:

$$-x_b^2 + g_b \geq 0.$$

Under this condition, the Median weakly prefers the Lawmaker's proposal compared to a policy that is located at his ideal point, without any quality attached to it. Given that the above inequality will be binding in equilibrium, the Lawmaker will choose $x_b^*$, $g_b^*$ to maximize:

$$-(x_L - x_b)^2 + (1-\alpha)(x_b^2),$$

such that: $-(x_L - x_b)^2 + (1-\alpha)(x_b^2) \geq -\left(x_L - x_q\right)^2,$

where the satisfying the inequality ensures that the Lawmaker would strictly prefer this proposal over the status quo. Applying the calculus yields the following optimal proposal by the Lawmaker if she chooses to enter:

$$(x_b^*, g_b^*) = (\frac{x_L}{\alpha}, \left(\frac{x_L}{\alpha}\right)^2).$$

However, analysis reveals that the Lawmaker's participation constraint is binding whenever: $x_L - x_L\sqrt{1 - \frac{1}{\alpha}} < x_q < x_L + x_L\sqrt{1 - \frac{1}{\alpha}}$. That is, whenever $x_L - x_L\sqrt{1 - \frac{1}{\alpha}} < x_q <$
$x_L + x_L\sqrt{1 - \frac{1}{\alpha}}$, the Lawmaker will keep the gates closed, and retain the status quo as the final policy; whereas she will propose $(x_b^*, g_b^*) = (\frac{x_L}{\alpha}, \left(\frac{x_L}{\alpha}\right)^2)$ otherwise.


**Proof of Proposition 6**

We can derive the unique subgame perfect Nash equilibrium by backwards induction. If the Lawmaker's proposal is not accepted, then the equilibrium of the subsequent subgame is the well-understood pivotal politics equilibrium. That is, for $x_q < 2x_P$, and $x_q > x_M$, the final policy location will correspond to the Median's ideal point ($x_M = 0$). For $x_q \in [2x_P, x_P]$, the final policy will correspond to the reflection of the status quo around the pivot's ideal point (i.e., $2x_P - x_q$); and for $x_q \in [x_P, 0]$, policies will be gridlocked, meaning that the final policy will be $x_q$.

Hence, when the Lawmaker is considering whether to make her proposal, she knows that whatever proposal (and corresponding quality) that she might offer has to be weakly preferred by both the Median and the Pivot to the equilibrium policy outcome that will ensue in the pivotal politics subgame.

More specifically, for any status quo location that corresponds to a final outcome at $x_M$ in the pivotal politics subgame, for any proposed bill, $x_b$, with quality level $g_b$, it must be true that:

$$-x_b^2 + g_b \geq 0$$

(i.e., the Median weakly prefers the legislative proposal to a policy located at his ideal point). It must also be true that:

$$-(x_P - x_b)^2 + g_b \geq -x_P^2$$

(i.e., the Pivot weakly prefers the legislative proposal to a policy located at the Median's ideal point). Given that $x_P \neq x_M = 0$, one of the above expressions must be a strict inequality, in order for a new proposal to defeat the status quo. More specifically, given that the Lawmaker is located to the right of the Median, and the Pivot is located to the left of the Median, the Pivot's preferences represent the binding constraint, which implies that for any bill, $x_b$, that is proposed, the attached level of quality, $g_b$, must be equal to: $x_b^2 - 2x_P x_b$. Moreover, it must also be true that the Lawmaker would prefer to propose the bill (with quality attached) compared to simply proposing her ideal point with no quality attached, and ending up with the Median's ideal point as the final policy. That is, it must be true that: $-(x_L - x_b)^2 + g_b(1 - \alpha) \geq -x_L^2$.

Hence, the Lawmaker will choose $x_b$, $g_b$, to maximize:

$$-(x_L - x_b)^2 + g_b(1 - \alpha)$$
$$\text{such that: } g_b = x_b^2 - 2x_P x_b$$
$$\text{and } -(x_L - x_b)^2 + g_b(1 - \alpha) \geq -x_L^2.$$

Applying the calculus and solving for the optimal bill (and quality level) yields the following equilibrium proposal, if the Lawmaker chooses to propose a bill with nonzero quality (i.e., her participation constraint is not binding):

$$(x_b^*, g_b^*) = \left( x_P + \frac{x_L - x_P}{\alpha}, -\frac{(x_P - x_L - \alpha x_P)(\alpha x_P - x_L + x_P)}{\alpha^2} \right).$$

Moreover, we can identify that the Lawmaker's participation constraint binds at $x_L = x_P(1 - \alpha)$. More specifically, for $x_L \leq x_P(1 - \alpha)$, the Lawmaker would prefer to propose her ideal point without any quality attached because the $x_b^*$ that satisfies the above constrained optimization problem is less than zero. Hence, the Lawmaker will only make the above proposal when $x_L > x_P(1 - \alpha)$, and propose her ideal point with no quality attached, otherwise. Coincidently, at $x_L = x_P(1 - \alpha)$ the equilibrium proposal above matches the equilibrium from the pivotal politics game.

A similar logic follows for the other two regions of the parameter space. As noted above, for $x_q \in [2x_P, x_P]$, the equilibrium policy in the pivotal politics subgame is $(2x_P - x_q)$; and the Pivot's preferences are (again) the binding constraint. Hence, for any proposed bill, $x_b$, with quality level $g_b$ to be passed it must be true that:

$$-(x_P - x_b)^2 + g_b \geq -(x_P - (2x_P - x_q))^2$$

(i.e., the Pivot weakly prefers the legislative proposal to a policy located at the reflection of the status quo around her ideal point). Given that the above inequality will be binding in equilibrium, it must be true that any bill, $x_b$, that is proposed, the attached level of quality, $g_b$, must be equal to: $x_b^2 - 2x_P x_b + 2x_P x_q - x_q^2$. Moreover, it must be true that the Lawmaker would prefer to propose the bill (with quality attached) compared to proposing her ideal point with no quality attached, and ending up with $(2x_P - x_q)$ as the final policy. That is, it must be true that:

$$-(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - (2x_P - x_q))^2.$$

Hence, the Lawmaker will choose $x_b$, $g_b$, to maximize:

$$-(x_L - x_b)^2 + g_b(1 - \alpha)$$
$$\text{such that: } g_b = x_b^2 - 2x_P x_b + 2x_P x_q - x_q^2$$
$$\text{and } -(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - (2x_P - x_q))^2.$$

Applying the calculus and solving for the optimal bill (and quality level) yields the following equilibrium proposal, if the Lawmaker chooses to make a proposal with nonzero quality (i.e., her participation constraint is not binding):

$$(x_b^*, g_b^*) = (x_P + \frac{x_L - x_P}{\alpha}, \frac{(x_L - x_P)^2}{\alpha^2} - (x_P - q)^2)$$

Moreover, analysis reveals that the Lawmaker's participation constraint binds at $x_q = x_P - \frac{x_L - x_P}{\alpha}$. Hence, whenever $x_q \in \left( 2x_P, x_P - \frac{x_L - x_P}{\alpha} \right)$, the Lawmaker will propose her ideal point with no quality attached, which will lead to the final policy being $2x_P - x_q$; whereas whenever $x_q \in [x_P - \frac{x_L - x_P}{\alpha}, x_P]$, the Lawmaker will propose $(x_b^*, g_b^*) = (x_P + \frac{x_L - x_P}{\alpha}, \frac{(x_L - x_P)^2}{\alpha^2} - (x_P - x_q)^2)$.

Finally, for $x_q \in [x_P, 0]$, the equilibrium policy in the pivotal politics subgame is $x_q$, (and the Pivot's preferences are still the binding constraint). Hence, for any proposed bill, $x_b$, with quality level $g_b$ to be passed it must be true that:

$$-(x_P - x_b)^2 + g_b \geq -(x_P - x_q)^2$$

(i.e., the Pivot weakly prefers the legislative proposal to a policy located at the status quo). Given that the above inequality will be binding in equilibrium, it must be true that for any bill, $x_b$, that is proposed, the attached level of quality, $g_b$, must be equal to: $x_b^2 - 2x_P x_b + 2x_P x_q - x_q^2$. Moreover, it must be true that the Lawmaker would prefer to propose the bill (with quality attached) compared to proposing her ideal point with no quality attached, and ending up with the status quo as the final policy. That is, it must be true that: $-(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - x_q)^2$.

Hence, the Lawmaker will choose $x_b$, $g_b$, to maximize:

$$-(x_L - x_b)^2 + g_b(1 - \alpha)$$
$$\text{such that: } g_b = x_b^2 - 2x_P x_b + 2x_P x_q - x_q^2$$
$$\text{and } -(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - x_q)^2.$$

Applying the calculus and solving for the optimal bill (and quality level) yields the following equilibrium proposal, if the Lawmaker chooses to make a proposal with nonzero quality (i.e., her participation constraint is not binding):

$$(x_b^*, g_b^*) = \left( x_P + \frac{x_L - x_P}{\alpha}, \frac{(x_L - x_P)^2}{\alpha^2} - \left(x_P - x_q\right)^2 \right).$$

Moreover, analysis reveals that the Lawmaker's participation constraint binds at $x_q = x_P + \frac{x_L - x_P}{\alpha}$. Hence, whenever $x_q \in [x_P, x_P + \frac{x_L - x_P}{\alpha}]$, the Lawmaker will propose $(x_b^*, g_b^*) = (x_P + \frac{x_L - x_P}{\alpha}, \frac{(x_L - x_P)^2}{\alpha^2} - \left(x_P - x_q\right)^2)$; whereas whenever $x_q \in \left( x_P + \frac{x_L - x_P}{\alpha}, 0 \right)$, the Lawmaker will propose her ideal point with no quality attached, which will lead to the final policy being $x_q$.

Combining these component parts together yields the equilibrium described in Proposition 6.

## Supplemental Analysis: Equilibrium of LEM-Pivotal Politics Model when the Pivot and the Lawmaker are on the Same Side of the Median

We can derive the unique subgame perfect Nash equilibrium by backwards induction. If the Lawmaker's proposal is not accepted, then the equilibrium of the subsequent subgame is the well-understood pivotal politics equilibrium. For case when the Pivot and the Lawmaker are on the same side of the Median, there are two subcases to consider, case a, when $x_M \leq x_P \leq x_L$ and case b, when $x_M < x_L < x_P$.

Case a: $x_M \leq x_P \leq x_L$

For case a (and b, for that matter), for all $x_q \leq 0$ and all $x_q \geq 2x_P$, the relevant reversion policy will correspond to the Median's ideal point ($x_M = 0$); and the Median's preferences, rather than the Pivot's, represent the binding constraint. Hence, for any proposed bill, $x_b$, with quality level $g_b$, it must be true that in equilibrium:

$$-x_b^2 + g_b = 0$$

Hence, the Lawmaker will choose $x_b$, $g_b$, to maximize:

$$-(x_L - x_b)^2 + g_b(1 - \alpha)$$
$$\text{such that: } g_b = x_b^2.$$

Applying the calculus and solving for the optimal bill (and quality level) yields the following equilibrium proposal:
$$(x_b^*, g_b^*) = (\frac{x_L}{\alpha}, \frac{x_L^2}{\alpha^2}).$$

For all $x_q \in (0, x_P]$, the relevant reversion policy is $x_q$; and the Median's preferences are the binding constraint. Hence, for any proposed bill, $x_b$, with quality level $g_b$, it must be true that in equilibrium:
$$-x_b^2 + g_b \geq -x_q^2.$$

(i.e., the Median weakly prefers the legislative proposal to a policy located at the status quo). Moreover, it must be true that the Lawmaker would prefer to propose the bill (with quality attached) compared to simply proposing her ideal point without quality, and ending up with the status quo as the final policy. That is, it must be true that: $-(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - x_q)^2.$

Hence, the Lawmaker will choose $x_b$, $g_b$, to maximize:
$$-(x_L - x_b)^2 + g_b(1 - \alpha)$$
$$\text{such that: } g_b = x_b^2 - x_q^2$$
$$\text{and } -(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - x_q)^2.$$

Applying the calculus and solving for the optimal bill (and quality level) yields the following equilibrium proposal:
$$(x_b^*, g_b^*) = (\frac{x_L}{\alpha}, \frac{x_L^2}{\alpha^2} - x_q^2).$$

Moreover, analysis reveals that the Lawmaker's participation constraint binds at $x_q = \frac{x_L}{\alpha}$. Hence, whenever $x_q \in \left(0, \frac{x_L}{\alpha}\right)$, the Lawmaker will propose the optimal bill (with attached quality) above; whereas whenever $x_q \in \left[\frac{x_L}{\alpha}, x_P\right]$ the Lawmaker will propose her ideal point without any quality attached, which will lead to the final policy being $x_q$.

For all $x_q \in (x_P, 2x_P)$, the relevant reversion policy is $(2x_P - x_q)$; and the Median's preferences are the binding constraint. Hence, for any proposed bill, $x_b$, with quality level $g_b$, it must be true that in equilibrium:
$$-x_b^2 + g_b \geq -(2x_P - x_q)^2.$$

(i.e., the Median weakly prefers the legislative proposal to a policy located at the reflection of the status quo around $x_P$). Moreover, it must be true that the Lawmaker would prefer to propose the bill (with quality attached) compared to simply proposing her ideal point without quality and ending up $(2x_P - x_q)$ as the final policy. That is, it must be true that: $-(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - (2x_P - x_q))^2.$

Hence, the Lawmaker will choose $x_b$, $g_b$, to maximize:
$$-(x_L - x_b)^2 + g_b(1 - \alpha)$$
$$\text{such that: } g_b = x_b^2 - x_q^2 - 4x_P^2 + 4x_P x_q$$
$$\text{and } -(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - (2x_P - x_q))^2.$$

Applying the calculus and solving for the optimal bill (and quality level) yields the following equilibrium proposal:

$$(x_b^*, g_b^*) = (\tfrac{x_L}{\alpha}, \tfrac{x_L^2}{\alpha^2} - x_q^2 - 4x_P^2 + 4x_P x_q).$$

Moreover, analysis reveals that the Lawmaker's participation constraint binds at $x_q = \frac{2\alpha x_P - x_L}{\alpha}$. Hence, whenever $x_q \in (x_P, \frac{2\alpha x_P - x_L}{\alpha}]$, the Lawmaker will propose her ideal point without quality, which will lead to the final policy being $(2x_P - x_q)$; whereas whenever $x_q \in \left(\frac{2\alpha x_P - x_L}{\alpha}, 2x_P\right)$, the Lawmaker will propose the optimal bill (with attached quality) above.

Case b: $x_M < x_L < x_P$

As described above in the analysis of case a, identifying the equilibrium policies for cases where $x_q \leq 0$ and $x_q \geq 2x_P$ is straightforward.

For $x_q \in (0, x_P]$, the relevant reversion policy is the status quo ($x_q$), yet the Median's preferences are the binding constraint for $x_q \in (0, x_L)$, whereas the Pivot's preferences are the binding constraint for $x_q \in [x_L, x_P]$. Hence, for $x_q \in (0, x_L)$, for any proposed bill, $x_b$, with quality level $g_b$, it must be true that in equilibrium:

$$-x_b^2 + g_b \geq -x_q^2.$$

Moreover, it must be true that the Lawmaker would prefer to propose the bill (with quality attached) compared to proposing her ideal point without quality and ending up with the status quo as the final policy. That is, it must be true that: $-(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - x_q)^2$.

Hence, the Lawmaker will choose $x_b$, $g_b$, to maximize:

$$-(x_L - x_b)^2 + g_b(1 - \alpha)$$
$$\text{such that: } g_b = x_b^2 - x_q^2$$
$$\text{and } -(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - x_q)^2.$$

Applying the calculus and solving for the optimal bill (and quality level) yields the following equilibrium proposal:

$$(x_b^*, g_b^*) = (\tfrac{x_L}{\alpha}, \tfrac{x_L^2}{\alpha^2} - x_q^2).$$

Moreover, analysis reveals that the Lawmaker's participation constraint binds at $x_q = \frac{x_L}{\alpha}$. Hence, whenever $x_q \in \left(0, \frac{x_L}{\alpha}\right)$, the Lawmaker will propose the optimal bill (with attached quality) above, whereas whenever $x_q \in \left[\frac{x_L}{\alpha}, x_L\right]$ the Lawmaker will propose her ideal point without any quality attached, which will lead to the final policy being $x_q$.

For $x_q \in [x_L, x_P]$, the relevant reversion policy is still $x_q$, but now the Pivot's preferences are the binding constraint. Hence, for any proposed bill, $x_b$, with quality level $g_b$, it must be true that in equilibrium:

$$-(x_P - x_b)^2 + g_b \geq -(x_P - x_q)^2$$

(i.e., the Pivot weakly prefers the legislative proposal to the status quo). Moreover, it must be true that the Lawmaker would prefer to propose the bill (with quality attached) compared to simply proposing her ideal point without quality and ending up with the status quo as the final policy. That is, it must be true that: $-(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - x_q)^2$.

Hence, the Lawmaker will choose $x_b$, $g_b$, to maximize:

$$-(x_L - x_b)^2 + g_b(1 - \alpha)$$
$$\text{such that: } g_b = -2x_P x_b + x_b^2 + 2x_P x_q - x_q^2$$
$$\text{and } -(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - x_q)^2.$$

Applying the calculus and solving for the optimal bill (and quality level) yields the following equilibrium proposal, if the Lawmaker's participation constraint is not binding:

$$(x_b^*, g_b^*) = (\frac{x_L - x_P + \alpha x_P}{\alpha}, \frac{(x_L - x_P)^2}{\alpha^2} - (x_P - x_q)^2).$$

Moreover, analysis reveals that the Lawmaker's participation constraint binds at $x_q = \frac{x_L - x_P + \alpha x_P}{\alpha}$. Hence, whenever $x_q \in [x_L, \frac{x_L - x_P + \alpha x_P}{\alpha}]$, the Lawmaker will propose her ideal point without quality, which will lead to the status quo being retained, whereas whenever $x_q \in (\frac{x_L - x_P + \alpha x_P}{\alpha}, x_P]$, the Lawmaker will propose the optimal bill (with attached quality) above.

Finally, for $x_q \in (x_P, 2x_P)$, the relevant reversion policy is $(2x_P - x_q)$. When $(2x_P - x_q) < x_L$, the Median's preferences are the binding constraint, whereas when $(2x_P - x_q) > x_L$, the Pivot's preferences are the binding constraint.

Hence, when $x_q \in (2x_P - x_L, 2x_P)$, for any proposed bill, $x_b$, with quality level $g_b$, it must be true that in equilibrium:

$$-x_b^2 + g_b \geq -(2x_P - x_q)^2$$

(i.e., the Median weakly prefers the legislative proposal to a policy located at the reflection point of the status quo around the Pivot's ideal point). Moreover, it must be true that the Lawmaker would prefer to propose the bill (with quality attached) compared to simply proposing her ideal point without quality and ending up with $(2x_P - x_q)$ as the final policy. That is, it must be true that: $-(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - (2x_P - x_q))^2$.

Hence, the Lawmaker will choose $x_b$, $g_b$, to maximize:
$$-(x_L - x_b)^2 + g_b(1 - \alpha)$$
$$\text{such that: } g_b = x_b^2 - x_q^2 - 4x_P^2 + 4x_P x_q$$
$$\text{and } -(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - (2x_P - x_q))^2.$$

Applying the calculus and solving for the optimal bill (and quality level) yields the following equilibrium proposal when the Lawmaker's participation constraint is not binding:

$$(x_b^*, g_b^*) = (\frac{x_L}{\alpha}, \frac{x_L^2}{\alpha^2} - x_q^2 - 4x_P^2 + 4x_P x_q).$$

Moreover, analysis reveals that the Lawmaker's participation constraint binds at $x_q = \frac{2\alpha x_P - x_L}{\alpha}$. Hence, whenever $x_q \in [2x_P - x_L, \frac{2\alpha x_P - x_L}{\alpha}]$, the Lawmaker will propose her ideal point without any quality attached, which will lead to the final policy being $(2x_P - x_q)$; whereas whenever $x_q \in (\frac{2\alpha x_P - x_L}{\alpha}, 2x_P)$, the Lawmaker will propose the optimal bill (with attached quality) above.

When $x_q \in (x_P, 2x_P - x_L]$, for any proposed bill, $x_b$, with quality level $g_b$, it must be true that in equilibrium:

$$-(x_P - x_b)^2 + g_b \geq -(x_P - (2x_P - x_q))^2$$

(i.e., the Pivot weakly prefers the legislative proposal to a policy located at the reflection of the status quo around his ideal point). Moreover, it must be true that the Lawmaker would prefer to

propose the bill (with quality attached) compared to simply proposing her ideal point without any quality and ending up with $(2x_P - x_q)$ as the final policy. That is, it must be true that: $-(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - (2x_P - x_q))^2$.

Hence, the Lawmaker will choose $x_b$, $g_b$, to maximize:
$$-(x_L - x_b)^2 + g_b(1 - \alpha)$$
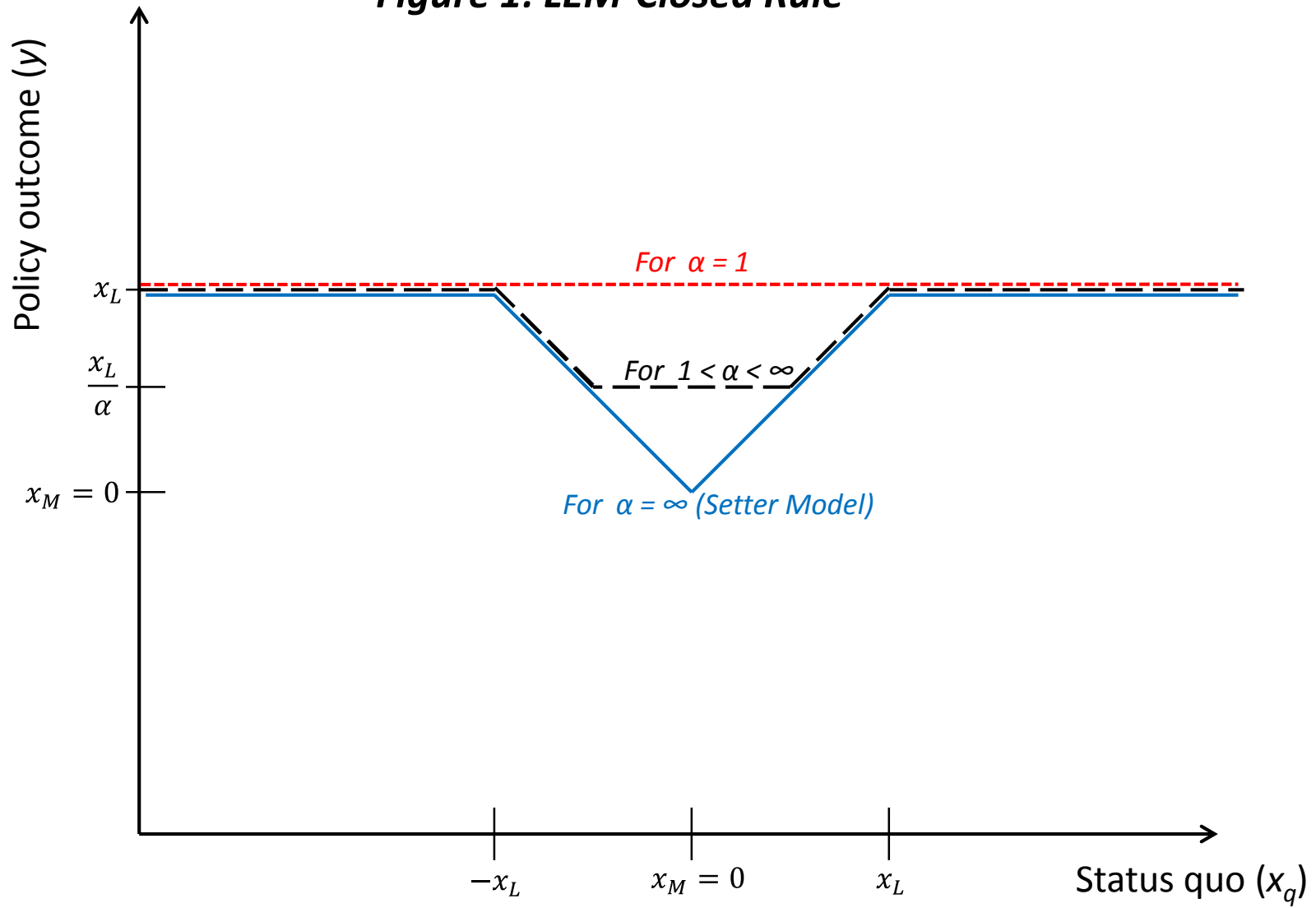$$\text{such that: } g_b = x_b^2 - x_q^2 - 2x_P x_b + 2x_P x_q$$
$$\text{and } -(x_L - x_b)^2 + g_b(1 - \alpha) \geq -(x_L - (2x_P - x_q))^2.$$

Applying the calculus and solving for the optimal bill (and quality level) yields the following equilibrium proposal, if the Lawmaker's participation constraint is not binding:
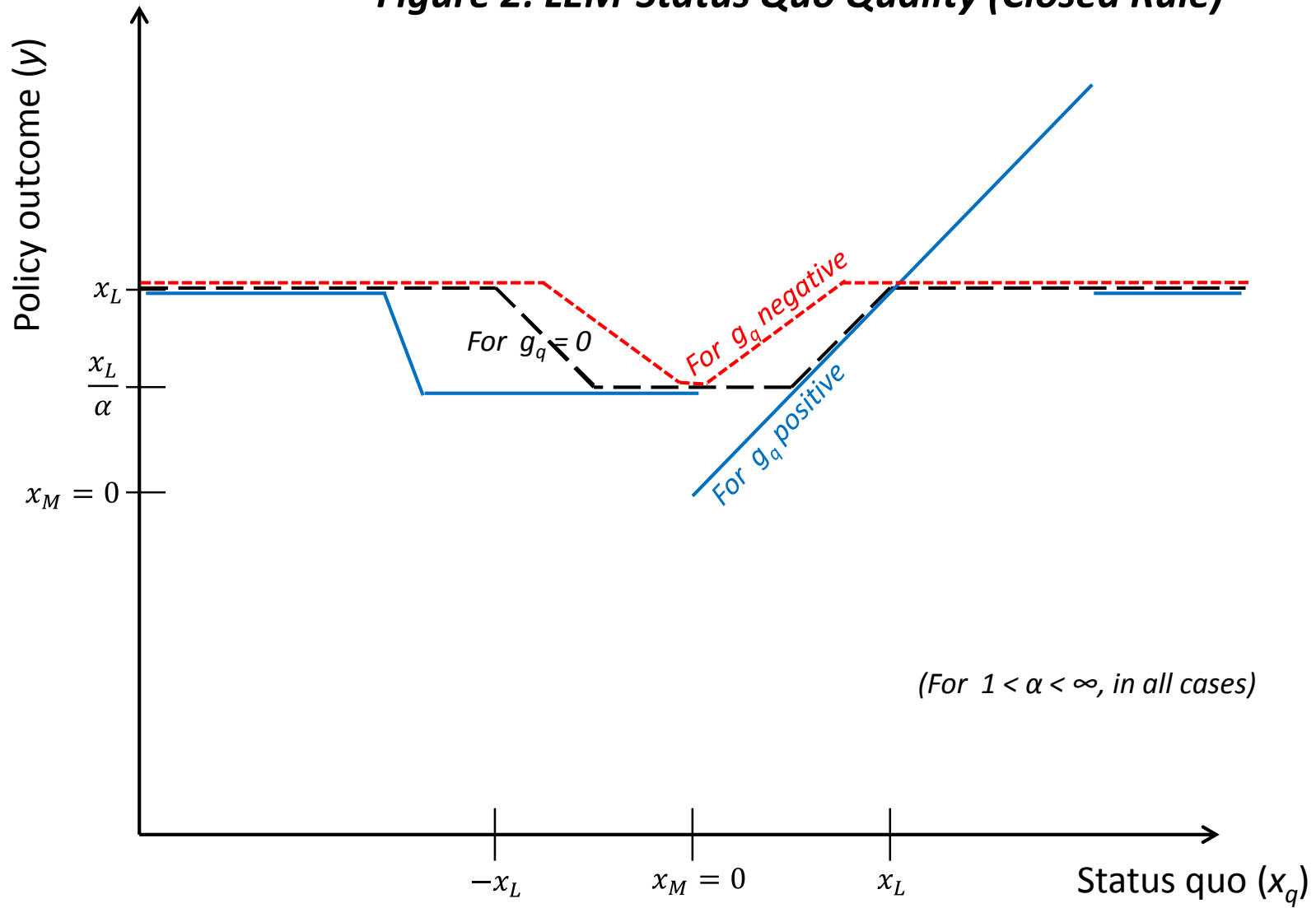$$(x_b^*, g_b^*) = (\frac{x_L - x_P + \alpha x_P}{\alpha}, \frac{(x_L - x_P)^2}{\alpha^2} - (x_P - x_q)^2).$$

Moreover, analysis reveals that the Lawmaker's participation constraint binds at $x_q = \frac{x_P + \alpha x_{P} - x_L}{\alpha}$. Hence, whenever $x_q \in \left(x_P, \frac{x_P + \alpha x_{P} - x_L}{\alpha}\right)$, the Lawmaker will propose the optimal bill (with attached quality) above; whereas whenever $x_q \in [\frac{x_P + \alpha x_{P} - x_L}{\alpha}, 2x_P - x_L]$, the Lawmaker will propose her ideal point without quality, which will lead to the new policy being $(2x_P - x_q)$.
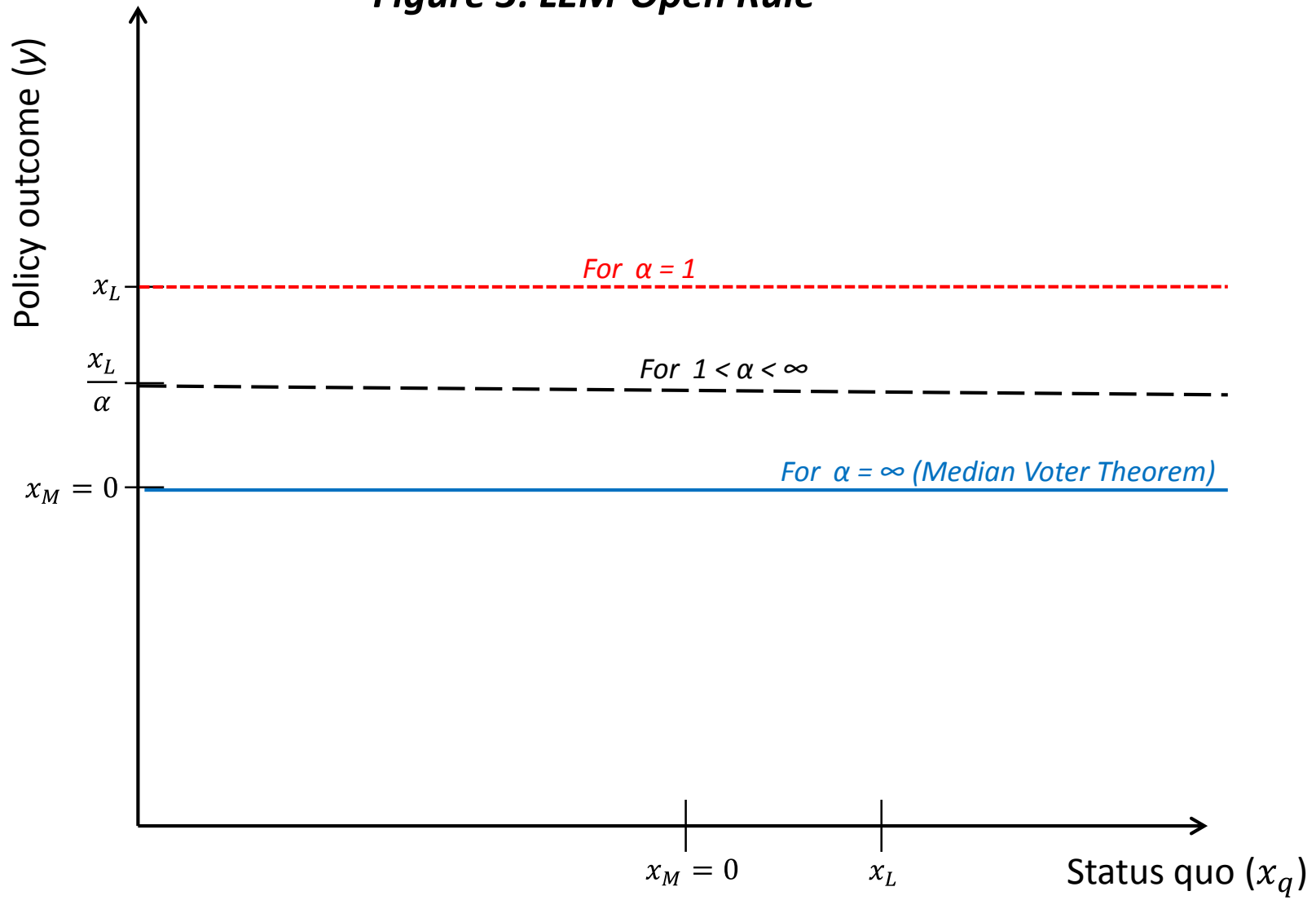
Figure 1: LEM-Closed Rule

**Figure 2: LEM-Status Quo Quality (Closed Rule)**

Policy outcome ($y$)

$x_L$

$\dfrac{x_L}{\alpha}$

$x_M = 0$

For $g_q = 0$

For $g_q$ negative

For $g_q$ positive

(For $1 < \alpha < \infty$, in all cases)

$-x_L$

$x_M = 0$

$x_L$
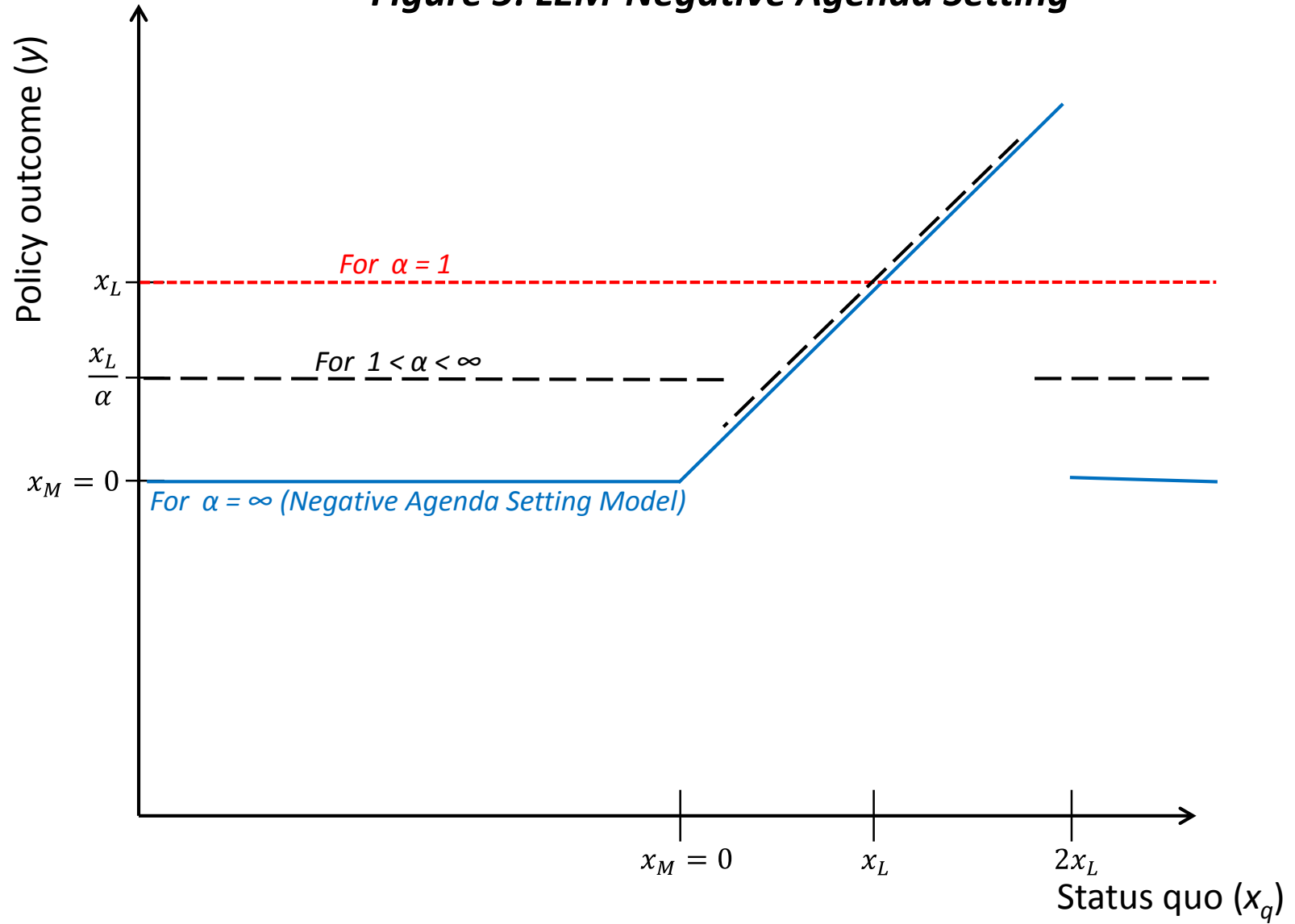
Status quo ($x_q$)

50

Figure 3: LEM-Open Rule

Figure 4: LEM-Multiple Proposers (Open Rule)
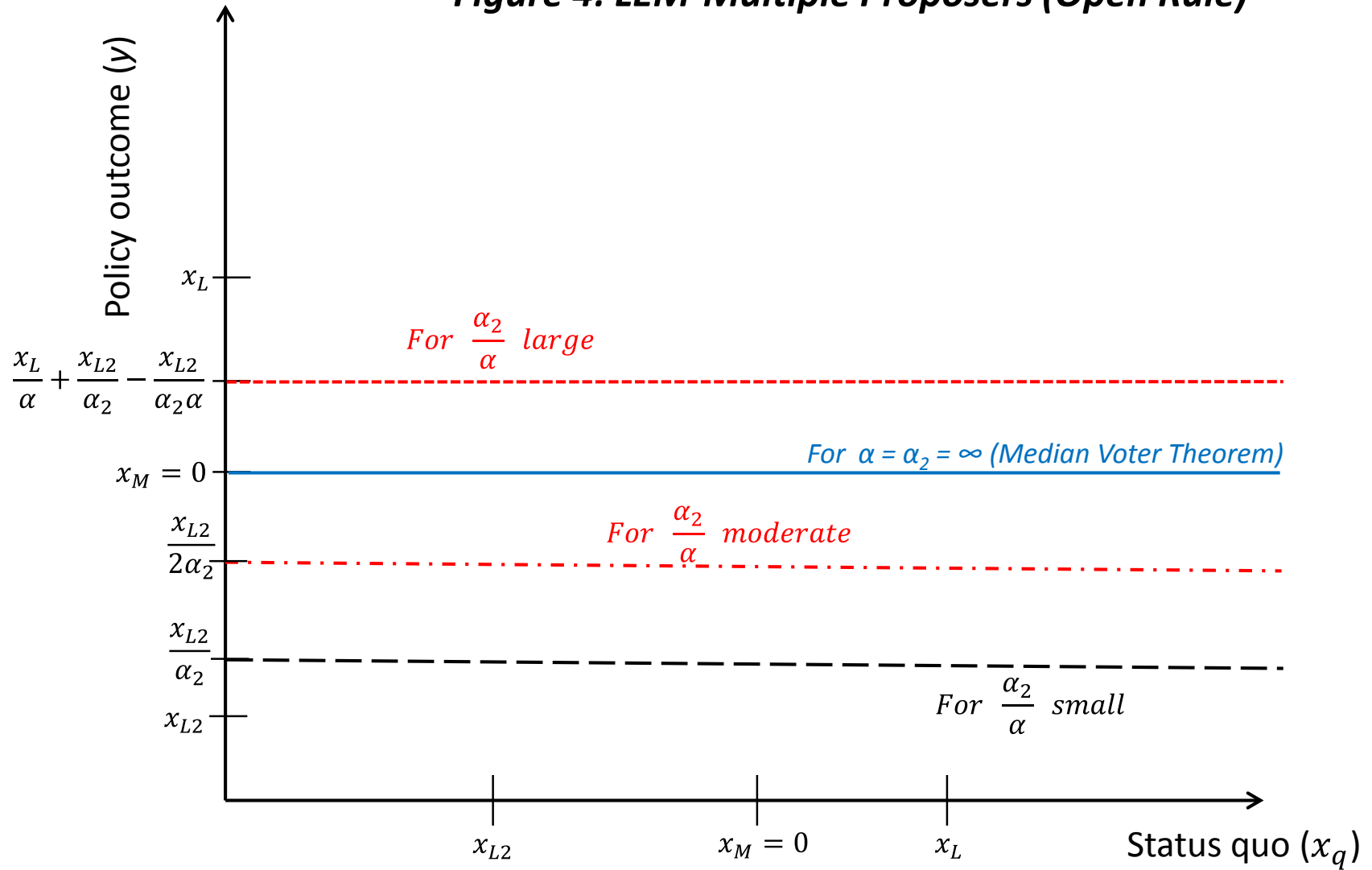
# Figure 5: LEM-Negative Agenda Setting

Policy outcome ($y$)

$x_L$ — For $\alpha = 1$

$\dfrac{x_L}{\alpha}$ — For $1 < \alpha < \infty$

$x_M = 0$ — For $\alpha = \infty$ (Negative Agenda Setting Model)

$x_M = 0$   $x_L$   $2x_L$

Status quo ($x_q$)

# Figure 6: LEM-Pivotal Politics



For $\alpha = 1$

For $1 < \alpha \leq \frac{x_L - x_P}{-x_P}$

$x_P + \dfrac{x_L - x_P}{\alpha}$

$x_M = 0$

For $\alpha > \frac{x_L - x_P}{-x_P}$

$x_P$

For $\alpha = \infty$ (Pivotal Politics Model)

$2x_P$     $x_P$     $x_M = 0$     $x_L$     Status quo ($x_q$)

Policy outcome ($y$)

$x_L$