

Veto Players and Policy Entrepreneurship¹

Alexander V. Hirsch² and Kenneth W. Shotts³

October 10, 2015

¹We appreciate comments on previous versions of this paper from Scott Ashworth, David Epstein, Justin Grimmer, John Huber, Craig Volden, Alan Wiseman, and audiences at Columbia, Duke PARISS, Emory CSLPE, Georgetown, Harvard/MIT Political Economy, KU Leuven, NYU, Princeton CSDP, APSA 2011, MPSA 2011, and SPSA 2012.

²California Institute of Technology, Division of the Humanities and Social Sciences. MC 228-77, Pasadena, CA 91125. Phone: (626) 395-4216. Email: avhirsch@hss.caltech.edu.

³Stanford GSB. 655 Knight Way, Stanford, CA 94305. Phone: (650) 725-4510. Email: kshotts@stanford.edu.

Abstract

Political institutions often use decision making procedures that create *veto players*—individuals or groups who, despite lacking direct decision making authority, nevertheless have the power to block policy change. In this paper we use the competitive policy development model of Hirsch and Shotts (2015) to examine how the presence of veto players affects outcomes when policies are developed endogenously. Consistent with spatial models of pivotal politics, veto players can induce gridlock, which is harmful to a centrist decisionmaker. But they can also have more subtle effects. Some of the effects are negative—for example, when the status quo is centrist, veto players dampen productive policy competition because of their resistance to change. But some of the effects are surprisingly positive. In particular, when the status quo benefits a veto player and there is a skilled policy entrepreneur who is highly motivated change it, the veto player forces the entrepreneur to develop a much higher quality proposal. This effect yields substantial benefits for a centrist decisionmaker. We also show that veto players can induce asymmetric patterns of policy development, with much greater activity by the faction that is more dissatisfied with the status quo.

1 Introduction

In political organizations, the need to accommodate many competing stakeholders often results in decisionmaking procedures that create *veto players*—individuals or groups who, despite lacking direct decisionmaking authority, nevertheless have the power to block policy change. For example, chief executives often have constitutionally-granted veto powers (Cameron 2000); supermajority procedures in legislatures, parliaments, and commissions generate implicit veto pivots (Krehbiel 1998, Brady and Volden 1998, Diermeier and Myerson 1999, Tsebelis 2002); and bureaucracies are sometimes structured so that an agency must seek the approval of another agency or interest group before it can act (McCubbins, Noll, and Weingast 1987, Moe 1989).

Despite the ubiquity of procedures that create veto players, commentators on the political process are of two minds about their consequences. Recent debates over the filibuster in the U.S. Senate—where supermajority rules to limit debate (i.e. invoke cloture) effectively create veto players—provide an illustration. Proponents of the filibuster have argued that greater hurdles to policy enactment encourage constructive deliberation (Arenberg and Dove 2012). Opponents complain about the ability of the minority party to obstruct majority-supported resolutions, and have recently taken the dramatic step of eliminating supermajority cloture on most Senate confirmations.¹

In this paper, we extend the model of *policy entrepreneurship* developed in Hirsch and Shotts (2015a) to understand these competing effects. The policy process is modeled as an open forum in which a decisionmaker relies on one or more policy-motivated groups, known as *entrepreneurs*, to develop new proposals. Rather than promise policy-contingent transfers or furnish general policy-relevant information,² the entrepreneurs gain support for their proposals by making costly, up-front, and policy-specific investments in their *quality*. Quality reflects characteristics of policies that are valued by all players, such as cost savings, promotion of economic growth, or efficient and non-corrupt administration. In the original model, competition benefits the sole decisionmaker because it prevents an entrepreneur from extracting all the benefits of her quality investments in the form of ideological concessions. Surprisingly, the benefits of competition are greatest when the competing entrepreneurs are *ideologically polarized*, because they have the strongest incentive to invest in quality to realize ideological gains.

In the present paper, we analyze how the inclusion of veto players in decisionmaking affects this process. Veto players create additional hurdles to policy change, because they have the power to block proposals that they find less desirable than the status quo. The effect of veto players on the policymaking environment is not obvious. The entrepreneurs could endogenously respond to additional hurdles either *productively* (by moderating their proposals and investing more in quality

¹“Reid, Democrats trigger ‘nuclear’ option,” *Washington Post*, November 21, 2013.

²See Grossman and Helpman (2001) for a review of both theories of influence.

to gain their support) or *destructively* (by reducing their investments in policy development).

In our analysis, we also consider how competition interacts with the inclusion of veto players to affects a centrist decisionmaker’s welfare. In particular, we consider the effect of veto players in both *monopoly* policy environments—where only a single entrepreneur has the capacity to develop new proposals—and *competitive* policy environments—where multiple competing groups can simultaneously develop new proposals. The monopoly variant of the model captures policymaking in states where institutional capacity is highly asymmetric (see Londregan’s (2000) description of the Chilean presidency), or on issues exhibiting “client politics” where only one interest group is organized (Wilson 1989). The competitive variant captures policymaking on issues exhibiting “interest group politics” where multiple competing groups are organized.

Our analysis generates several results about how veto players affect the quality and ideology of policy outcomes. First, we show that a necessary condition for the decisionmaker to benefit from the presence of veto players is that their ideological preferences *counterbalance* those of a potential entrepreneur. Because a counterbalancing veto player is more opposed to a potential entrepreneur’s desired change than the decisionmaker, he can encourage that entrepreneur to both moderate her policy proposals, and to invest more in quality. The intuition is natural, and closely resembles that of bargaining models in which a player can benefit by delegating decisionmaking to a player with more extreme preferences (e.g., Fershtman, Judd, and Kalai 1991). It differs notably, however, from information-based models, in which expertise takes the form of private information about an unknown state of the world; those models typically suggest that experts should be protected to encourage investment in and truthful revelation of information. A key reason for this distinction is that quality in our model is specific to a single policy, and cannot be expropriated to improve other proposals with distinct ideologies.³

Once this counterbalancing condition is met, the potential benefits of veto players depend on the willingness and ability of potential entrepreneurs to develop alternative proposals. If some entrepreneur is very skilled at developing high quality policies and is highly dissatisfied with the status quo, then the presence of a counterbalancing veto player can benefit the decisionmaker by extracting greater moderation and/or quality from that entrepreneur. However, harmful gridlock can instead result if veto players and entrepreneurs are all reasonably satisfied with the status quo and relatively unskilled at developing high quality policies.

The preceding patterns obtain in both monopolistic and competitive policy environments, but the resulting predictions are subtly different. In monopoly policy environments, the presence of veto players is most harmful when they allow a monopolist policy entrepreneur to protect a *non-centrist*

³Canonical works in the informational literature are Crawford and Sobel (1982) and Gilligan and Krehbiel (1987). Hirsch and Shotts (2012) discuss policy-specific quality and implications for committee organization, and Hirsch and Shotts (2015b) discuss implications for other policymaking institutions.

status quo that benefits her. In competitive policy environments, in contrast, any non-centrist status quo is disliked by at least one entrepreneur, and veto players generate the greatest harm when the status quo is *centrist*. Under these conditions, no one entrepreneur is sufficiently motivated to overcome the additional barriers created by the veto players; instead, their demands dampen the intensity of productive competition over policy that would otherwise result.

The competitive variant of the model also generates insights about how veto players influence observable patterns of competition. In the absence of veto players, equilibria must be symmetric when the entrepreneurs are equally extreme and able (Hirsch and Shotts 2015a). Veto players, however, can also generate asymmetries in activity between otherwise-symmetric entrepreneurs because they may be attempting to protect a non-centrist status quo. In particular, when the status quo is very lopsided in the direction of one entrepreneur, she has little motivation to develop an alternative policy, while her opponent has a strong motivation to do so. The equilibrium consequence is that the “satisfied” entrepreneur near the status quo is largely or completely inactive, while the “dissatisfied” entrepreneur far from the status quo always develops a new policy for consideration. The model thus generates a natural and intuitive pattern often seen in real-world politics; it is the faction with the greatest interest in changing the status quo that is most active in proposing and investing in a credible policy alternative, while the faction that benefits more from the status quo is less constructively involved in policy development.

Finally, we observe that in the competitive model, the decisionmaker actually benefits most from the presence of veto players when there is no observable competition between policy developers. The reason is that the absence of competition reflects the strong willingness of one faction to invest in changing a lopsided status quo, rather than exogenous constraints on her competitor’s ability to participate in policymaking. An important implication of this observation is that the absence of observable competition in policy development is not *prima facie* evidence of political dysfunction. It can instead simply reflect competing groups’ differential willingness to invest in policy development given their skills and preferences as well as the location of the status quo.

The paper proceeds as follows. Section 2 summarizes related literature. Section 3 introduces the model and analyzes how veto players affect the set of feasible policies that can be adopted. Section 4 analyzes the effect of veto players when there is a single policy entrepreneur, and Section 5 analyzes the effect of veto players in a competitive environment. Section 6 applies the model to discuss the effects of filibusters in the U.S. Senate, and Section 7 concludes.

2 Related Literature

Our model relates to several literatures. The first considers how constraints on a decisionmaker’s discretion in various contexts can improve her welfare by helping solve dynamic inconsistency prob-

lems, such as committing to low inflation; such constraints include delegating decisionmaking (Rogoff 1985) and employing supermajority rules (Dal Bo 2006). Our analysis, in contrast, considers how constraints on a decisionmaker’s discretion can improve the set of alternatives from which she selects by influencing the behavior of other strategic actors.

A large and diverse literature also considers the consequences of employing supermajority rules in decisionmaking. While our analysis does not directly consider voting rules, our model can be mapped from a collective choice setting where individuals have two-dimensional preferences over ideology and quality; the individual with the median ideology acts as the decisionmaker, and supermajority rules effectively create veto pivots on either side (Krehbiel 1998; Brady and Volden 1998). Among the many rationales for the supermajority rules are stability (Caplin and Nalebuff 1998; Barbera and Jackson 2004), balanced budgets (Alesina and Tabellini 1990), minority protections (Aghion and Bolton 2003), insulation of the executive (Aghion, Alesina, and Trebbi 2004), intergenerational conflict (Messner and Polborn 2004), information acquisition and aggregation (Persico 2004), and maximizing campaign contributions (Diermeier and Myerson 1999).

Our work also relates to previous research on veto players and blocking coalitions (Krehbiel 1998; Brady and Volden 1998; Crombez 1996; Tsebelis 2002). The vast majority of this research adopts a purely-ideological model of policy choice. In contrast, an important feature of our model is that policies have an endogenous quality dimension, and thus there exists the possibility for “vote buying” by developing high-quality policies.⁴

Also important in our model is that quality is *policy-specific*, rather than being applicable to policies anywhere in the ideological spectrum. Thus our model contrasts with the many political economy models that build on Crawford and Sobel’s (1982) classic model, in which the information necessary to tailor a liberal policy is exactly the same as the information necessary to tailor a conservative one. The Brownian motion approach developed by Callander (2008, 2011a, 2011b) is more similar to our model, but his model is purely spatial, whereas we model quality directly. In doing this, we build on models of policymaking by Londregan (2000), Bueno de Mesquita and Stephenson (2007), Lax and Cameron (2007), Ting (2011), and Hirsch and Shotts (2012). A key feature of all of these models is that, in contrast to the Crawford and Sobel model, an expert is able to exert informal agenda power by creating high-quality policies.

Finally, because the cost of investing in quality is paid up-front, our model with competing entrepreneurs relates to previous research on all-pay contests (Baye, Kovenock, and de Vries 1993; Che and Gale 2003; Siegel 2009). Entrepreneurs simultaneously make up-front payments to generate

⁴The version of our model with only one entrepreneur is technically similar to Snyder’s (1991) model of vote-buying without price discrimination; the entrepreneur must always produce enough quality to gain the support of the veto player most opposed to the desired policy change. Our model differs, however, in that benefits spill over to other policymakers because quality is a public good.

proposals with two dimensions (ideology and quality), and the decisionmaker chooses among them subject to the veto constraint. Our model has two primary differences from most previous contest models, both of which complicate the equilibrium analysis. The first difference is that, as in Hirsch and Shotts (2015a) the entrepreneurs in our model are policy-motivated rather than rent seeking; the loser of the contest thus cares about the exact policy which is implemented. In the terminology of Baye, Kovenock, and de Vries (2012) the model features *second-order rank order spillovers*. It is thus better tailored than previous contest models to political environments, where actors have opposing particularistic interests yet also have a shared interest in the collective outcome. A second difference that distinguishes our model from most previous contest models is that it features players without direct decisionmaking power who can block policy proposals. The presence of veto players implies that developing quality can be strategically-productive to the entrepreneurs in more than one way.⁵ Specifically, an entrepreneur can be motivated to produce more quality both to improve the odds that the decisionmaker prefers her policy to others, *and* to gain the consent of veto players. Both of these incentives affect the equilibrium policies developed in the model.

3 The Model

Our model builds on the two-stage game of policy entrepreneurship in Hirsch and Shotts (2015a). Policies in the model have two components: *ideology* $y \in \mathbb{R}$ and *quality* $q \in [0, \infty) = \mathbb{R}^+$. Thus, a policy is a point in a subset of two-dimensional real space, $b = (y, q) \in \mathbb{R} \times \mathbb{R}^+ = \mathbb{B}$. All players' utility functions $U_i(b)$ over the two dimensions are additive, and quality is valued equally by all players. Specifically,

$$U_i(b) = q - (x_i - y)^2,$$

where x_i denotes player i 's ideological ideal point.

Policy Development In the *policy development* stage of the game, each of up to two entrepreneurs $i \in N \leq 2$ may simultaneously choose to invest costly resources to develop a new policy $b_i = (y_i, q_i) \in \mathbb{B}$ with ideology y_i and quality $q_i \geq 0$. The marginal cost to entrepreneur i of developing quality is α_i , and it exceeds the entrepreneur's own marginal benefit from that quality, i.e., $\alpha_i > 1$. Thus, an entrepreneur will not choose to invest costly resources in developing quality unless doing so will increase the probability that her policy will be chosen.

Policy Choice In the *policy choice* stage of the game, the organization either chooses a policy from the set of newly-developed policies $\mathbf{b} \in \mathbb{B}^N$, or retains a *status quo policy* $b_0 = (y_0, q_0)$. For

⁵This property of the model is related to Siegel (2014), who analyzes contests in which a player's effort affects her probability of winning and is also directly-productive, in that it affects her utility even if she doesn't win.

simplicity, we assume that the status quo is of low quality ($q_0 = 0$).

In the original model of competitive entrepreneurship in Hirsch and Shotts (2015a), policy is chosen by a single decisionmaker. In the present model we augment this decisionmaking process with $j \in K$ *veto players* with ideal points denoted x_{Vj} . Specifically, a decisionmaker with ideal ideology $x_D = 0$ first makes a take-it-or-leave-it proposal from the set of available policies. Then, if any veto player rejects the proposal, the status quo policy b_0 prevails. Because the decisionmaker always has implicit veto authority by virtue of her proposal power, we simplify notation and terminology by assuming that the set of veto players includes the decisionmaker. In addition, we use $x_{Vl} \leq 0$ and $x_{Vr} \geq 0$ to denote the ideal ideologies of the leftmost and rightmost veto players.

Finally, we assume that the status quo policy b_0 is not Pareto-dominated among the veto players by any 0-quality policy. This assumption is shorthand for three implicit assumptions: (i) the organization can choose off-the-shelf zero-quality policies that are costless to develop, (ii) quality is policy-specific in the sense that it cannot be transferred across policies with different ideologies, and (iii) policy is stable absent effort by the entrepreneurs to develop something new.

3.1 The Effect of Veto Players on Decisionmaking

In the absence of veto players, the status quo must reflect the preferences of the decisionmaker by assumption, i.e., $y_0 = 0$. In order to get an alternative policy b_i implemented, an entrepreneur only needs to ensure that it is preferred by the unitary decisionmaker to this status quo, as well as to all other available alternatives. This is depicted in the top panel of Figure 1, in which the set of acceptable policies is located above the decisionmaker's indifference curve through his ideal point with 0 quality.

The presence of veto players creates additional hurdles to policy change, and this affects the policymaking process in two ways. First, as in standard in pivotal politics models, it expands the range of potential status quos that entrepreneurs may face when they enter the policymaking process; the status quo may be noncentrist ($y_0 \neq 0$) because a veto player previously blocked the decisionmaker from altering it. Specifically, y_0 can be located anywhere between the leftmost veto player, $x_{Vl} \leq 0$, and the rightmost veto player, $x_{Vr} \geq 0$. Because the status quo may not perfectly reflect the decisionmaker's preferences, he will be more receptive to the entrepreneurs' new proposals. This is illustrated in the middle panel of Figure 1. To gain the decisionmaker's support over the status quo, the entrepreneurs must only develop policies above the decisionmaker's indifference curve through $y_0 \neq 0$, which is strictly lower than the curve in the top panel.

However, for change to occur, the decisionmaker's support is no longer sufficient; a new policy also must be acceptable in lieu of the status quo to all veto players, who are collectively more opposed to policy change. This can be seen in the middle panel of Figure 1 by observing that the veto players'

indifference curves through the status quo y_0 are steeper than the decisionmaker's. To avoid a veto, the decisionmaker is constrained to choosing her favorite policy that is above the upper envelope of these two indifference curves—we shade this region, and henceforth refer to it as the *veto proof set*.

The net effect of including veto players in the decisionmaking process is thus to simultaneously raise and lower the hurdles to policy change; the shift in the set of acceptable policies is illustrated in the bottom panel of Figure 1. Policies near a noncentrist status quo become acceptable because the decisionmaker cannot alter this status quo on her own. However, policies far from a noncentrist status quo become unacceptable because a veto player will block them. The equilibrium effect of including veto players in the decisionmaking process thus hinges on how the shift affects the entrepreneurs' strategic incentives to invest in quality. It may make them less willing to invest, if they are favorably disposed to the status quo or unwilling to satisfy the additional demands of the veto players. It may also make them more willing to invest, if they strongly dislike the status quo, and are willing to invest in quality to change policy.

Notation To characterize how veto players affect the game, it is helpful to introduce additional notation and terminology. As in Hirsch and Shotts (2015a) we call the decisionmaker's utility for a policy its *score* $s(y, q) = U_D(y, q) = q - y^2$. Absent veto players, the score of the status quo is $s(0, 0) = 0$, and the decisionmaker will choose the policy with the highest score subject to the constraint that it is ≥ 0 .

The inclusion of veto players both shifts the range of acceptable scores, and restricts the set of acceptable policies given each score; the following definition describes the veto-proof set in terms of scores.

Definition 1 Let $x_{Vl} \leq 0$ and $x_{Vr} \geq 0$ denote the leftmost and rightmost veto players, and define

$$z_L(s) = y_0 - \frac{s - s_0}{2|x_{Vr}|} \quad \text{and} \quad z_R(s) = y_0 + \frac{s - s_0}{2|x_{Vl}|}$$

where $s_0 = -y_0^2$ is the score of the status quo. A policy (s, y) with score s and ideology y (and hence quality $q = s + y^2$) is *veto-proof* i.f.f. $y \in Y_V(s) = [z_L(s), z_R(s)]$.⁶

Figure 2 illustrates the veto-proof set for a particular configuration of status quo and veto players. The decisionmaker's indifference curves, i.e., the policies with equal score, are depicted by the green lines. When veto players are present, some policies with scores $\in [-y_0^2, 0]$ become acceptable that would not have been acceptable in their absence. However, because the veto players are collectively more opposed to ideological change than the decisionmaker, on any given score curve s the range of

⁶When $x_{Vl} = 0$ let $z_R(s)$ be defined as $+\infty$, and when $x_{Vr} = 0$ let $z_L(s)$ be $-\infty$.

veto-proof policies is an interval $Y_V(s) = [z_L(s), z_R(s)]$.⁷ The right boundary $z_R(s)$ is determined by the ideology of leftmost veto player x_{Vl} because he is most opposed to rightward policy changes, while the left boundary $z_L(s)$ is determined by the rightmost veto player x_{Vr} . Described using this notation, the effect of veto players on the set of acceptable policies is to increase the range of acceptable scores (from $[0, +\infty]$ to $[-y_0^2, +\infty)$), but to shrink the set of acceptable ideologies given each score (from $[-\infty, +\infty]$ to $[z_L(s), z_R(s)]$). The decisionmaker's problem is thus to choose the policy $b = (y, q)$ with the highest score $s(y, q)$ among the ones developed by the entrepreneurs, subject to the constraint that it is veto proof, i.e., $y \in [z_L(s(y, q)), z_R(s(y, q))]$.

4 Monopolistic Policy Environments

We begin the equilibrium analysis by studying *monopolistic* policymaking environments, in which only a single individual or group has the capacity to develop new high quality proposals. De facto policy development monopolies arise in many issue areas and institutional environments, for a variety of reasons. First, they may be a consequence of one actor's singular capacity or expertise. For example, Londregan (2000) describes the Chilean President as an effective policy monopolist vis a vis the Chamber of Deputies and the Senate, and Johnson (1982) characterizes the Ministry of International Trade and Industry (MITI) in Japan as a monopolist over industrial policy in the 1960s and 1970s.⁸ Second, monopolies can arise when interests on one side of an issue are unable or unwilling to organize due to collective action problems, which leads to regulatory capture (Stigler 1971) or client politics (Wilson 1989). Finally, monopolies may be the consequence of formal institutional rules or informal norms; for example, the European Commission historically had a monopoly on developing proposals for the Council of Ministers and Parliament (Crombez 1996).

We first characterize the unique equilibrium of the monopoly model for any configuration of parameters, including the absence of veto players. We then apply this analysis to analyze how various configurations of veto players affect the policy process.

⁷The role of a score in the competitive model with veto players is subtly different from both Hirsch and Shotts (2015) and Siegel (2009). In both of those contests, a bidder never wishes to produce a higher score than necessary to beat her competitors. In the present contest, a bidder may strictly prefer to do so in order to satisfy the veto constraint. This property significantly complicates the equilibrium analysis but is essential for our main insights, and is shared with Siegel's (2014) analysis of contests with productive effort.

⁸A monopoly does not have to be anchored in formal proposal rights—in Hirsch and Shotts (2015a), we show that the competitive policy development equilibrium when one entrepreneur is at the decisionmaker's ideal point is the same as if the other entrepreneur is a monopolist.

4.1 Equilibrium Characterization

In a monopoly environment, the lone entrepreneur E 's policy (y_E, q_E) need only be veto proof to be chosen. Given a particular status quo y_0 , exactly one veto player (which could be the decisionmaker) will be the *binding veto player* for the direction of change desired by the entrepreneur. If the entrepreneur wishes to move the status quo rightward ($x_E > y_0$) then the leftmost veto player $x_{Vl} \leq 0$ will be binding; in the other direction, the rightmost veto player $x_{Vr} \geq 0$ will be binding. Henceforth we use x_{bVE} to denote the ideal ideology of the binding veto player given an entrepreneur x_E , status quo y_0 , and collection of veto players K (inclusive of the decisionmaker). The resulting equilibrium is as follows.

Proposition 1 *In monopolistic policy environments, the status quo y_0 may be located anywhere between the leftmost and rightmost veto players $[x_{Vl}, x_{Vr}]$. Let \hat{y}_E^* denote the **weighted midpoint** $\frac{1}{\alpha_E}x_E + \left(1 - \frac{1}{\alpha_E}\right)x_{bVE}$ between entrepreneur x_E and the binding veto player x_{bVE} .*

(Case 1 - Active Entrepreneurship) *If the status quo y_0 is on the opposite side of the weighted midpoint \hat{y}_E^* from the entrepreneur, then the equilibrium ideological outcome is the weighted midpoint $y_E^* = \hat{y}_E^*$.*

(Case 2 - Gridlock) *If the status quo y_0 is on the same side of the weighted midpoint \hat{y}_E^* as the entrepreneur, then the equilibrium ideological outcome is the status quo $y_E^* = y_0$.*

The decisionmaker's utility is $s_E^ = s_0 + 2|x_{bVE}(y_E^* - y_0)|$, and quality is $q_E^* = s_E^* + (y_E^*)^2$.*

The intuition for the equilibrium is simple; examples are depicted in Figure 3. Consider an entrepreneur who wishes to move the status quo rightward ($x_E > y_0$). To make some ideological location y_E acceptable to the decisionmaker as well as all veto players in lieu of the status quo, she must generate enough quality to satisfy the leftmost veto player, i.e., $x_{bVE} = x_{Vl} \leq 0$, since he is the most opposed to rightward ideological movements. The entrepreneur will only develop policies on the right boundary of the veto proof set, i.e., $y_E = z_R(s(y_E, q_E))$. When deciding which policy to develop, the entrepreneur will trace along the right boundary of the veto proof set until she reaches the ideological location where the marginal benefit of additional ideological gains equals the marginal cost of investing in enough quality to compensate the leftmost veto player. This critical ideological location is the weighted midpoint $\hat{y}_E^* = \frac{1}{\alpha_E}x_E + \left(1 - \frac{1}{\alpha_E}\right)x_{Vl}$. The better is the entrepreneur at developing quality (lower α_E), the closer this will be to her own ideal point. Finally, if the status quo is already to the right of the weighted midpoint, the entrepreneur will protect it rather than engage in entrepreneurship, and gridlock will prevail.

4.2 Monopoly With a Single Decisionmaker

When there is a single decisionmaker, he is the binding veto player whose support the monopoly entrepreneur must gain (i.e. $x_{Vl} = x_{Vr} = 0$). The status quo will be located at his ideal point ($y_0 = s_0 = 0$), and the entrepreneur will wish to move it towards x_E . Applying Proposition 1, the equilibrium is as follows.

Corollary 1 *In monopolistic policy environments with a single decisionmaker, the entrepreneur develops a policy with ideological location $y_E^* = \frac{x_E}{\alpha_E}$ and quality $q_E^* = \left(\frac{x_E}{\alpha_E}\right)^2$. The decisionmaker adopts the policy and receives equilibrium utility $s(y_E^*, q_E^*) = 0 = s_0$.*

In the equilibrium, the entrepreneur effectively behaves as an agenda setter. However, her power isn't a consequence of *formal* agenda rights, as in Romer and Rosenthal (1978). Rather, her power is *informal*, as in Aghion and Tirole (1997), and results from her monopoly ability to produce higher-quality policies. Because she only needs to satisfy the decisionmaker, she only invests in exactly the minimum level of quality $q_E = y_E^2$ necessary to compensate him for his ideological losses relative to his own ideal with 0 quality, i.e., $s(y_E, y_E^2) = 0 = s_0$. The equilibrium is depicted in Figure 4. The quality of the resulting policy $q_E^* = \left(\frac{x_E}{\alpha_E}\right)^2$ strictly exceeds that of the status quo $b_0 = (0, 0)$, but the ideological outcome also moves away from the decisionmaker's ideal to $y_E^* = \frac{x_E}{\alpha_E}$. Despite a higher-quality policy, the decisionmaker is no better off than absent the entrepreneur, because the entrepreneur extracts all the benefits in the form of ideological rents. As the entrepreneur becomes more extreme or her marginal cost of quality α_E goes down, her equilibrium policy becomes more ideologically extreme and the rents she extracts $U_E(0, 0) - U_E\left(\frac{x_E}{\alpha_E}, \left(\frac{x_E}{\alpha_E}\right)^2\right) = \frac{x_E^2}{\alpha_E}$ from exploiting her monopoly on policy development capacity go up.

Thus, when one entrepreneur has the monopoly ability (or right) to generate high-quality proposals and there is a single decisionmaker, the entrepreneur effectively exploits that ability to fully extract the benefits of quality. This is the *problem of monopoly*—a decisionmaker who could theoretically implement any policy of her choosing is nevertheless forced to make ideological concessions to access a monopolist's expertise. Knowing this, the entrepreneur will exercise informal agenda setting power by developing high-quality proposals that also aggressively promote her ideological objectives, leaving the decisionmaker no better off than in the absence of her expertise.⁹

4.3 Monopoly with Veto Players

When can the presence of veto players benefit the decisionmaker by helping him capture some of the rents that a monopoly entrepreneur would otherwise extract? To answer this question, we

⁹See Hirsch and Shotts (2015b) for an applied analysis of policy-development monopolies.

consider two specific subcases. The first case considers a unitary veto player. This could represent, for example, an executive who can veto bills passed by a legislature. The second case considers two veto players located symmetrically about the decisionmaker. This could be a consequence of supermajority rules in a collective choice body, which create two veto points located on either side of the median—one whose consent implies supermajority support for a leftward policy shift, and another whose consent implies supermajority support for a rightward policy shift (Brady and Volden 1988, Krehbiel 1998).¹⁰

In the subsequent analysis we assume without loss of generality that the entrepreneur is to the right of the decisionmaker ($x_E > 0$). We also assume that the veto players are more moderate than the entrepreneur ($|x_{Vj}| \leq x_E, \forall j$). Intuitively, this assumption captures scenarios where there is a single well-funded interest group with extreme preferences relative to a low-capacity government.

4.3.1 A Single Veto Player

There are two possible configurations of a single veto player. We say that she is *aligned* with the entrepreneur when $x_V \in [0, x_E]$, because compared to the decisionmaker, she is more supportive of policy movements toward the entrepreneur. In contrast, we say that she *counterbalances* the entrepreneur when $x_V < x_D < x_E$, because she is more opposed to policy movements toward the entrepreneur. The following proposition characterizes when the decisionmaker benefits from the presence of a single veto player.

Proposition 2 *In the model with a single veto player:*

1. *if the veto player is aligned with the entrepreneur ($x_V \in [0, x_E]$), the decisionmaker is strictly better off eliminating her regardless of the status quo or the entrepreneur's costs. Doing so makes policy strictly higher quality and weakly more moderate.*
2. *if the veto player counterbalances the entrepreneur ($x_V < 0$),*

(a) the decisionmaker is better off eliminating the veto player if the entrepreneur has high costs ($\alpha_E \geq 2 \left(1 + \frac{x_E}{|x_V|}\right)$), or if she has moderate costs ($\alpha_E \in \left[1 + \frac{x_E}{|x_V|}, 2 \left(1 + \frac{x_E}{|x_V|}\right)\right]$) and the status quo is sufficiently close to the entrepreneur, i.e. $y_0 > \bar{y}_0$, where

$$\bar{y}_0 = |x_V| \cdot \left(\sqrt{\left(2 \left(1 + \frac{x_E}{|x_V|}\right) \cdot \alpha_E^{-1} - 1\right)} - 1 \right) < 0$$

¹⁰For supermajority rules to create well-defined pivots in our model requires the preservation of a single crossing property; utility functions of the form we assume are sufficient but not necessary.

(b) *the decisionmaker is better off maintaining the veto player if the entrepreneur has low costs* $\left(\alpha_E \leq 1 + \frac{x_E}{|x_V|}\right)$, *or if she has moderate costs* $\left(\alpha_E \in \left[1 + \frac{x_E}{|x_V|}, 2\left(1 + \frac{x_E}{|x_V|}\right)\right]\right)$ *and the status quo is sufficiently far from the entrepreneur, i.e.,* $y_0 < \bar{y}_0$.

The proposition first states that a veto player who is aligned with the entrepreneur never benefits the decisionmaker; this case is depicted in Figure 5. Such a veto player simply stacks the deck in favor of the entrepreneur by protecting a status quo $y_0 > x_D$ that is favorable for her, while providing no additional hurdle to policy change. That is, he increases the range of acceptable scores, but does not tighten the right boundary of the veto proof set ($z_R(s) = +\infty \forall s$) because the decisionmaker is more opposed to policy movements rightward. The result is either the same policy $\frac{x_E}{\alpha_E}$ that would prevail absent the veto player but with lower quality (as depicted in Figure 5), or collusion between the aligned veto player and the entrepreneur to protect a noncentrist status quo.

The proposition next states that a veto player who counterbalances the entrepreneur is necessary, but not sufficient, for the decisionmaker to benefit. Such a veto player generates a cost for the decisionmaker of $-y_0^2$ by initially protecting a noncentrist status quo. However, his greater opposition to the change desired by the entrepreneur can also force the entrepreneur to moderate her policy, invest more in quality, or both. These effects generate a spillover benefit to the decisionmaker of $2|x_V|(y_E^* - y_0)$, where y_E^* is the weighted midpoint between the entrepreneur and the veto player. Whether this spillover benefit is sufficient for the decisionmaker to be better off with the veto player present depends on both the entrepreneur's willingness to invest in quality to generate ideological change (i.e., her distance from the status quo y_0), and her ability to invest in quality to generate ideological change (i.e., her cost of developing quality α_E).

If the entrepreneur's costs are very low (i.e., she is high-ability), the decisionmaker is better off with a counterbalancing veto player regardless of the location of the status quo. An example is depicted in the top panel of Figure 6, in which the veto player counterbalances the entrepreneur but is more ideologically moderate, the entrepreneur is high ability $\left(\alpha_E < 1 + \frac{x_E}{|x_V|}\right)$, and the status quo is at the decisionmaker's ideal $y_0 = 0$. The weighted midpoint y_E^* between the entrepreneur and the veto player is to the right of 0, and the veto player's indifference curve through the status quo, i.e. $z_R(s)$, is steeper than that of the decisionmaker. Consequently, the resulting policy with a veto player is both higher quality and more moderate than what would prevail in her absence.

If the entrepreneur's costs are very high, then the decisionmaker is worse off with the counterbalancing veto player present even when the status quo is as far from the entrepreneur as possible ($y_0 = x_V$), and the entrepreneur has the greatest incentive to change policy. This is depicted in the middle panel of Figure 6, where $\alpha_E > 2\left(1 + \frac{x_E}{|x_V|}\right)$. The entrepreneur generates a new policy that is distinct from the status quo and higher quality, but the policy is so ideologically extreme due to the opposition of the veto player that the decisionmaker would be better off eliminating the veto player

entirely.

Finally, if the entrepreneur's costs are moderate, then the decisionmaker only benefits if the status quo y_0 is sufficiently *far* from the entrepreneur and close to the veto player (i.e. $y_0 < \bar{y}_0 < 0$). This is depicted in the bottom panel of Figure 6, where $\alpha_E \in \left[1 + \frac{x_E}{|x_V|}, 2 \left(1 + \frac{x_E}{|x_V|}\right)\right]$. For the particular status quo depicted (at the midpoint between the veto player and the decisionmaker) the decisionmaker is better off with the veto player present. However, if the status quo were closer to the entrepreneur then the decisionmaker would be worse off in equilibrium, because the entrepreneur would not produce sufficient quality to overcome the costs of a noncentrist policy outcome. The dotted purple line depicts the possible locations of the equilibrium policy outcome, depending on the location of the status quo.

Overall, the following results emerge. A necessary condition for the veto player to be beneficial for the decisionmaker is that he counterbalances the entrepreneur. When this condition holds, the decisionmaker benefits if and only if the combination of the entrepreneur's *willingness* to engage in entrepreneurship (a distant y_0), and *ability* to engage in entrepreneurship (a low α_E) is sufficiently strong.

4.3.2 Multiple Symmetric Veto Players

The preceding analysis focuses on the consequences of including a single veto player in the decisionmaking process. However, creating a single veto player is often not possible; many decisionmaking procedures simultaneously give rise to multiple veto players because they extend rights to groups rather than individuals. We now consider the consequences of including two veto players in the decisionmaking process who are located symmetrically about the decisionmaker, so $-x_{Vl} = x_{Vr} = x_V > 0$. This could arise, for example, in a collective decisionmaking body with symmetrically distributed preferences and a supermajority rule; the extremism of the veto players x_V would be increasing in the supermajority threshold. Symmetric veto players may also be interpreted as a generic representation of the dispersion of decisionmaking power in an organization; the more members of the organization have veto power, the more ideologically extreme will be the most extreme of those members.

Proposition 3 *Let x_V denote the ideological extremism of symmetric veto players at $-x_V$ and x_V .*

- *The decisionmaker is better off eliminating the veto players if the entrepreneur has high costs $\left(\alpha_E > 2 \left(1 + \frac{x_E}{x_V}\right)\right)$.*
- *The decisionmaker is better off maintaining the veto players if they are both sufficiently moderate $\left(x_V < \frac{2}{3}x_E\right)$ and the entrepreneur has very low costs $\left(\alpha_E < \frac{2}{5} \left(1 + \frac{x_E}{x_V}\right)\right)$.*

- *Otherwise, the decisionmaker is better off maintaining the veto players if and only if the status quo is sufficiently far from the entrepreneur, i.e., $y_0 < \bar{y}_0$ as previously defined.*

In addition, the decisionmaker is always weakly better off with a single counterbalancing entrepreneur at $-x_V$ than he is with symmetric veto players at $(-x_V, x_V)$.

With symmetric veto players, both an aligned and counterbalancing veto player are simultaneously present; the counterbalancing veto player makes it more costly for the entrepreneur to shift any status quo point rightward, but the aligned veto player can also stack the deck in the entrepreneur's favor by protecting status quo points $y_0 \in [0, x_E]$. Thus, results are similar to the case of a single veto player but with a few subtle differences.

First, it remains true that veto players are counterproductive when the entrepreneur is high-cost; symmetric veto players can never be better than a single counterbalancing veto player, because the additional veto player protects status quo points aligned with the entrepreneur. Second, the entrepreneur must be even more skilled at developing quality than in the counterbalancing case for the decisionmaker to unconditionally benefit from the veto players' presence. This is because the aligned veto player protects additional status quo points that are closer to the entrepreneur; thus for the decisionmaker to benefit from the combined presence of the two veto players, the entrepreneur must be very skilled and the veto players must not be too extreme.

Overall, the intuitions with a single counterbalancing veto player and with symmetric veto players are similar. The decisionmaker benefits when the entrepreneur is highly skilled and/or sufficiently dissatisfied with the status quo. However, the benefits are overall lower than for a single counterbalancing veto player because the additional veto player protects more status quo points aligned with the entrepreneur.

5 Competitive Policy Environments

We now turn our attention to competitive policy environments, where multiple individuals and groups can simultaneously develop new high-quality proposals. Active competition between ideologically-distinct factions on either side of a more-centrist government is the norm in most major domestic policy issue areas, including as health care, energy, and the environment. Policy development in regulatory rulemaking environments is also frequently characterized by competition, where business, labor, and consumer interests propose already-developed regulations that reflect their different priorities (McCubbins, Noll, and Weingast 1987).

Analyzing the effects of veto players in competitive environments is significantly more complex than in monopolistic environments for several reasons. First, even absent veto players, the decisionmaker's welfare is affected by the preferences and abilities of the entrepreneurs in equilibrium;

a monopolist entrepreneur always exercises informal agenda-setting power, but competition forces the entrepreneurs to leave the decisionmaker with some rents (Hirsch and Shotts 2015a). Second, the strategic calculus faced by the entrepreneurs is much more complicated. In particular, because investing in quality is “all-pay” (Siegel 2009), equilibria are often in mixed strategies. Thus, an entrepreneur must sometimes pay the costs of investing in policy quality while uncertain about which policy her competitor will develop. Finally, the impact of the veto players on the strategic environment can be highly asymmetric. If the status quo closely reflects the preferences of both a veto player and an aligned entrepreneur, then that entrepreneur will find it much harder (and less beneficial) than her competitor to realize additional ideological gains through entrepreneurship.

5.1 Properties of Equilibria

We begin by describing some properties of equilibria in the competitive model that apply to the game with both a single decisionmaker, and with veto players. The statements herein are corollaries of Lemmas and Propositions in a more complete treatment in the Appendix. For our analysis, we assume that the two entrepreneurs are located strictly to the left and right of the decisionmaker, and denote their ideal points $x_L < 0$ and $x_R > 0$, respectively. We also henceforth assume that either there are either no veto players ($x_{Vl} = x_{Vr} = x_D = 0$), or that they are located strictly to the left and right of the decisionmaker ($x_{Vl} < 0 < x_{Vr}$).¹¹

Describing equilibria requires briefly revisiting the notation of Section 3.1 and concepts from the baseline competitive model in Hirsch and Shotts (2015a). Recall that the *score* $s(y, q) = U_D(y, q) = q - y^2$ of a policy is the utility it gives the decisionmaker, and that a policy (s, y) with score s and ideology y (and hence quality $q = s + y^2$) is veto-proof if and only if $y \in [z_L(s), z_R(s)]$, where $z_L(s)$ is the left boundary of the veto proof set as a function of score and $z_R(s)$ is the right boundary (see Figure 2). While the concept of a score helpful in the monopoly model, it is essential to equilibrium analysis in the competitive model. The reason is that competitive equilibria are often in mixed strategies, i.e., the policies of each entrepreneur can be a probability distribution σ_i over the two-dimensional policy space.

Writing each entrepreneur’s policies in terms of score and ideology (s, y) substantially simplifies the analysis because the decisionmaker is equally-happy with all veto-proof policies that have the same score s – i.e., that satisfy $q - y^2 = s$ and $y \in [z_L(s), z_R(s)]$. They give him the same utility if implemented, and are all acceptable to the veto players. Consequently, from the perspective of each entrepreneur i , all such policies–if developed–will be implemented with the same probability. This probability is exactly equal to the probability that her opponent $-i$ develops a lower score policy or

¹¹The present draft omits analysis of a single veto player in the competitive model. However, we have analyzed that variant, and our results suggest that the equilibrium correspondence is continuous as $x_{Vj} \rightarrow x_D = 0$ for some $j \in \{l, r\}$, in which case the model with two veto players can be used to approximate a model with one veto player.

$F_{-i}(s)$, where $F_{-i}(\cdot)$ denotes the probability CDF over scores induced by the (potentially mixed) strategy of i 's opponent.

While veto proof policies with the same score (s, y) are all equivalent to the decisionmaker, they crucially are *not* equivalent to the entrepreneurs; different policies will have different ideologies y , levels of quality $s + y^2$, and costs to develop $-\alpha_i(s + y^2)$. A second simplifying feature of the model, however, is that given her opponent's score CDF, each entrepreneur has a *unique* optimal ideology to target $y_i^*(s)$ when she develops a policy with score s . This property arises from the fact that an entrepreneur is more willing to pay the up-front costs of quality-development for the uncertain benefits of ideological gains when the policy in question has a higher probability of being adopted (i.e., has a higher score s). Formally, we consider equilibria of the model with veto players that have the following property, which is established in the Appendix.¹²

Corollary 2 *In the equilibria we consider, with probability 1 each entrepreneur's policies (s_i, y_i) are either 0-quality, or satisfy $y_i = y_i^*(s_i)$, where*

$$y_i^*(s_i) = \begin{cases} F_{-i}(s_i) \cdot \frac{x_i}{\alpha_i} & \text{when it is veto proof, and} \\ \text{the closer of } z_L(s_i) \text{ and } z_R(s_i) \text{ to } F_{-i}(s_i) \cdot \frac{x_i}{\alpha_i} & \text{otherwise} \end{cases} .$$

The ability to uniquely describe the optimal ideology for each score in a best-response is the critical simplification that allows a characterization of equilibria. Corollary 2 is the analog to Observation 1 in the baseline competitive model without veto players in Hirsch and Shotts (2015a), with one key difference. Without veto players, the optimal ideology $y_i^*(s)$ for each score s is simply the probability $F_{-i}(s)$ that a score- s policy wins, multiplied by the ratio $\frac{x_i}{\alpha_i}$ of the entrepreneur's ideology to her marginal costs. With veto players, however, this policy may not be veto-proof, i.e., its ideology may not be in $Y_V(s) = [z_L(s), z_R(s)]$. Consequently, the optimal ideology $y_i^*(s)$ is either $F_{-i}(s) \frac{x_i}{\alpha_i}$ if it is veto proof, or the closest boundary of the veto-proof set if it is not.

5.1.1 Form of Equilibria

We henceforth say that an entrepreneur is *active* if she develops a veto proof policy with score $> s_0$ (and therefore with strictly positive quality); in the terminology of score CDFs, the probability $F_i(s_0)$ that she develops a policy with score $\leq s_0$ is strictly < 1 . We say that she is *inactive* if she only develops a policy with score $\leq s_0$; equivalently, $F_i(s_0) = 1$.¹³ In the competitive model without veto players, there is a unique equilibrium in mixed strategies (Hirsch and Shotts 2015a). With veto players, however, equilibria may be in both pure and mixed strategies; we therefore describe the form of each of these types of equilibria in turn.

¹²Showing that this property applies to all equilibria is work in progress, and requires ruling out the possibility that both entrepreneurs develop policies with the same score with strictly positive probability.

¹³Note that when $x_{Vl} < x_D < x_{Vr}$, a veto-proof policy has positive quality i.f.f. it has score $> s_0$.

Pure Strategy Equilibria The form of all pure strategy equilibria is described in the following corollary to Proposition 4, which is in the Appendix.

Corollary 3 *In every pure strategy equilibrium at least one entrepreneur $-i$ is inactive, and the other develops her monopoly policy (s_i^*, y_i^*) with probability 1.*

The requirement that one entrepreneur be inactive in a pure strategy equilibrium follows immediately from the all-pay nature of the contest; if both entrepreneurs were active and playing pure strategies, then at least one could be better off by either developing no policy (saving the costs) or developing a veto-proof policy that is slightly better for the decisionmaker than her opponent's policy. The fact that an active entrepreneur in a pure strategy equilibrium develops her monopoly policy is then obvious; in equilibrium, her incentives are identical to those of a monopolist.

Why do pure strategy equilibria sometimes exist in the presence of veto players but not in their absence? Intuitively, the reason is that veto players sometimes force a monopolist to develop a policy that is sufficiently moderate and high-quality that it is insulated from potential competition.

Mixed Strategy Equilibria In mixed strategy equilibria of the model both entrepreneurs are active and mix over both the ideological locations and qualities of the policies they develop, as described in the following remark.

Remark 1 *We consider mixed strategy equilibria in which there is an entrepreneur k and two thresholds \underline{s} and \bar{s} satisfying $s_0 \leq \underline{s} < \bar{s}$ such that the following holds.*

- *Absent veto players ($x_{Vl} = x_{Vr} = 0$), $\underline{s} = s_0$, both entrepreneurs' score CDFs (F_k, F_{-k}) are atomless and have support $[\underline{s}, \bar{s}]$.*
- *With veto players ($x_{Vl} < 0 < x_{Vr}$), $\underline{s} > s_0$ and*
 - *entrepreneur k 's score CDF F_k has support $[\underline{s}, \bar{s}]$ and exactly one atom at \underline{s} ,*
 - *entrepreneur $-k$'s score CDF F_{-k} has support $s_0 \cup [\underline{s}, \bar{s}]$ and exactly one atom at s_0 .*

The mixed strategy equilibrium absent veto players is unique and relatively simple to characterize analytically. With veto players, mixed strategy equilibria are cumbersome to derive by hand, but straightforward to compute numerically from the entrepreneurs' indifference conditions. We characterize equilibria in which one entrepreneur k is *always active*—with probability $F_k(\underline{s})$ she develops the optimal veto-proof policy with score exactly equal to \underline{s} ; since $\underline{s} > s_0$ this policy has strictly positive quality. With the remaining probability she mixes over the optimal veto-proof policies generating scores in the interval $[\underline{s}, \bar{s}]$. Her competitor $-k$ is *inactive with strictly positive*

probability—with probability $F_{-k}(s_0)$ she develops no policy, and with the remaining probability she mixes over optimal veto-proof policies generating scores in the same interval $[\underline{s}, \bar{s}]$. The boundary conditions and differential equations characterizing the equilibria are described in the Appendix, and arise straightforwardly from the entrepreneurs’ indifference conditions.

We now analyze how various configurations of veto players affects competitive policymaking environments. To focus on this question, we henceforth assume that the two entrepreneurs are symmetrically located about the decisionmaker ($-x_L = x_R = x_E$) and have identical costs of developing quality ($\alpha_L = \alpha_R = \alpha_E$).

5.2 Competition With a Single Decisionmaker

In the previous section we showed that a monopolist entrepreneur facing a single decisionmaker behaves as an informal agenda setter, extracting all the benefits of quality in the form of ideological rents (as discussed in Corollary 1).

In Hirsch and Shotts (2015a), however, we show that competition prevents this from occurring; in equilibrium, some rents from policy development must be left behind for the decisionmaker. The reason is that an entrepreneur need only produce a higher-score policy than her competitor to get it adopted; if her competitor attempted to behave as a monopoly agenda setter and produce a 0–score policy, she could defeat it by developing the decisionmaker’s ideal policy with ε quality. We also show that the competitive model with a single decisionmaker has a unique symmetric mixed strategy equilibrium. In the equilibrium, both entrepreneurs are always active, and mix without atoms over an interval of strictly-positive scores. As in the monopoly case, the entrepreneurs use quality investments to obtain ideological outcomes that they prefer. In contrast, however, the amount of quality that an entrepreneur develops on any given policy exceeds the minimum required to gain the decisionmaker’s support over the status quo; the reason is simply that each entrepreneur need also gain the decisionmaker’s support over her competitor. The equilibrium is stated below, which is a restatement of Propositions 1-2 and Corollary 1 in Hirsch and Shotts (2015a).

Corollary 4 *Suppose that $-x_L = x_R = x_E$, $\alpha_L = \alpha_R = \alpha_E$, and there is a single decisionmaker. Then there is a unique mixed strategy equilibrium in which the entrepreneurs mix smoothly over policies with ideology and quality $(y_i, s(|y_i|) + y_i^2)$, and in which*

1. *the ideological extremism $|y_i|$ of each entrepreneur’s policies is uniformly distributed over $[0, \frac{x_E}{\alpha_E}]$*
2. *the score of a policy with ideology y_i is $s^*(|y_i|) = 4x_E \left(x_E \ln \left(\frac{x_E}{x_E - |y_i|} \right) - |y_i| \right) > 0$ for $|y_i| > 0$*

In addition, as the entrepreneurs become more extreme (higher x_E) or more skilled (lower α_E), their proposals become first-order stochastically more extreme, but also first-order stochastically higher quality and better for the decisionmaker.

The unique equilibrium is depicted in Figure 7. The left panel depicts the entrepreneurs' score CDFs $F_L(s) = F_R(s) = F(s)$, which are atomless and identical (since the distribution over ideological extremism, and the mapping from ideological extremism to score, is identical). The right panel depicts the ideological locations and quality of policies, ranging from a 0-quality policy at the decisionmaker's ideal point to a high-quality policy with ideology $|y_i| = \left| \frac{x_E}{\alpha_E} \right|$. The decisionmaker's utility is strictly positive for all equilibrium policies, and therefore exceeds her utility in the monopoly game when she is a single decisionmaker.

A key implication of Corollary 4 is that the decisionmaker's equilibrium utility exceeds her utility from the status quo (both in expectation and with probability 1) even absent veto players; competition partially protects her from monopoly agenda setting. In addition, her utility is *increasing* in both the ideological extremity of the entrepreneurs x_E , and their common skill at developing quality α_E^{-1} . These properties are discussed in greater depth in Hirsch and Shotts (2015a). Here it suffices to note that greater ideological extremism x_E and lower costs α_E of developing quality increase the entrepreneurs' potential rents from entrepreneurship; a monopolist would keep all these rents, whereas with competition the decisionmaker captures a proportionate share of them.

5.3 Competition With Veto Players

We now analyze the effects of veto players when there are two competing entrepreneurs, and compare our results to the competitive game without veto players, and also to the monopoly game with veto players. The results in this section are computational, in the sense that we derive analytical sufficient conditions for equilibrium in the Appendix to compute equilibria and perform comparative statics. The distinction between analytical and computational results is indicated with the label 'Result' in lieu of 'Proposition.' We note that our analytical results do not rule out multiple equilibria. However, our computational procedure can check that there is a unique solution to our equilibrium conditions, and every one of the wide range of cases that we have computed (i.e., beyond the symmetric parameter profiles presented here) has a unique equilibrium.¹⁴ To focus on the pure effect of dispersion of authority, here we consider a model in which veto players are symmetric, $x_{Vr} = -x_{Vl} = x_V$, and the entrepreneurs have common costs, $\alpha_L = \alpha_R = \alpha_E$.

5.3.1 Equilibrium Strategies

In the competitive model with two symmetric veto players, one entrepreneur is always located farther from the status quo y_0 and is therefore worse off under it; we henceforth refer to her as the *dissatisfied*

¹⁴The equilibrium in the game absent veto players is also shown analytically to be unique in Hirsch and Shotts (2015). We furthermore conjecture, and have partially proved, that our sufficient conditions for equilibrium with veto players are also necessary; combined with our computational results this would strongly suggest uniqueness.

entrepreneur. Correspondingly, we refer to her counterpart as the *satisfied* entrepreneur.

The dissatisfied entrepreneur has two important features that distinguish her from the satisfied entrepreneur. First, because loss functions along the ideology dimension are common and convex, she places a greater marginal value on ideological shifts in her direction from the status quo; she is thus more *motivated* to engage in entrepreneurship than her competitor. Second, she faces an easier time persuading the binding veto player to consent to policy changes—for example, if the status quo is $y_0 < 0$, then it is easier to convince the left veto player to move policy to the right than it is to convince the right veto player to move policy to the left.

We begin by describing basic properties of the computed equilibria.

Result 1 *In the equilibrium with symmetric entrepreneurs $-x_L = x_R = x_E$ and symmetric veto players $-x_{Vl} = x_{Vr} = x_V$ who are more moderate than the entrepreneurs ($x_V < x_E$),*

1. *the dissatisfied entrepreneur is always active, while the satisfied entrepreneur is sometimes or always inactive*
2. *the dissatisfied entrepreneur's score CDF first order stochastically dominates the satisfied entrepreneur's score CDF*

Figure 8 presents an example of a typical mixed strategy equilibrium for the game; the left panel depicts equilibrium score CDFs, while the right panel depicts equilibrium policies. The dissatisfied entrepreneur (located to the right of the decisionmaker) is always active by virtue of her greater motivation to change the status quo and her greater opportunity to do so because y_0 is closer to the ideal point of the left veto player. With strictly positive probability, she develops a policy located at the blue dot in the right panel; with the remaining probability, she mixes over the policies on the blue curve. The policies that she develops are fully constrained by the veto players, i.e., they are on the boundary of the veto proof set, due to her greater distance from the status quo. The satisfied entrepreneur on the left, in contrast, is sometimes inactive, as indicated by the purple dot at the status quo. With the remaining probability she mixes over the policies on the purple curve, and her policies (in equilibrium) are unconstrained by the veto players.

As depicted in the left panel, the score CDF of the dissatisfied entrepreneur first order stochastically dominates that of the satisfied entrepreneur. Intuitively, the pattern of policy competition is one in which the dissatisfied side of a policy issue is both more likely to develop a new proposal, and more likely to have the proposal she develops ultimately adopted. In the symmetric competitive model absent veto players, the unique equilibrium is symmetric. However, veto players alone combined with otherwise symmetric entrepreneurs result in asymmetries, because the gridlock they induce tilts the initial playing field against one side of a policy issue.

5.3.2 The Pattern of Competition

As previously observed, the satisfied entrepreneur is inactive with strictly positive probability. We now consider how the satisfied entrepreneur's probability of being active is affected by the extremity of the veto players x_V and the location of the status quo y_0 .

Result 2 *The probability that the satisfied entrepreneur is active is strictly decreasing in the ideological the extremity of the status quo $|y_0|$ and the veto players x_V , unless the equilibrium is in pure strategies, in which case it is constant at 0.*

The probability that the satisfied entrepreneur is active is depicted as a contour plot in Figure 9 as a function of the location of the status quo y_0 (on the x -axis) and the extremity of the veto players (on the y -axis). In the mixed strategy region, the probability is strictly decreasing in both quantities; and for sufficiently extreme veto players the equilibrium converges to a pure strategy region where the satisfied entrepreneur never develops a policy, and the dissatisfied entrepreneur appears to act as a monopolist.

These comparative statics arise because of the asymmetric impact of veto players on the entrepreneurs. Veto players essentially force the dissatisfied entrepreneur to make additional ideological concessions and investments in quality, which also has the (strategically unintended) effect of fortifying her policy against competition. This is easiest to see by considering the effect of a more distant status quo y_0 on a monopolist entrepreneur's policy proposal. By Proposition 1, a monopolist's policy becomes increasingly high quality (but ideologically fixed) as the status quo moves away from her and toward a counterbalancing veto player, because the veto player demands ever-increasing quality investments to consent to the same ideological outcome. These investments simultaneously make it more difficult – and less intrinsically beneficial – for a competing entrepreneur to enter the arena with her own alternative.

Overall, in the presence of veto players, actual direct competition is most likely to occur in equilibrium when veto players and status quo points are moderate. The reason is similar to standard contest models; observable competition (in equilibrium) is a function of *parity* of motivation and ability. Also worth noting is that the lack of parity in the results we present here is not driven by asymmetries in ideologies and costs, but rather by asymmetries in the status quo, and the resulting asymmetric impact of institutional barriers to change.

5.3.3 Decisionmaker Utility

Finally, we consider when the decisionmaker would be better off eliminating the veto players and placing all decisionmaking authority in his own hands. Recall that in monopolistic policy environments, the decisionmaker is better off eliminating the veto players when the status quo is sufficiently

close to the monopolist entrepreneur. Competitive environments are different, however, both because of the disparate impact of veto players, and because competition already gives the decisionmaker some rents from policy development. The following result characterizes when the decisionmaker would be better off eliminating the veto players in a competitive policy environment.

Result 3 *In competitive policy environments with symmetric veto players and entrepreneurs, the decisionmaker is better off eliminating the veto players if*

- *they are sufficiently moderate ($x_V < \bar{x}_V$)*
- *they are more extreme ($x_V > \bar{x}_V$) but the status quo is sufficiently moderate ($|y_0| < \bar{y}_0(x_V)$).*

The two panels of Figure 10 illustrate when the decisionmaker would be better off eliminating symmetric veto players as a function of the location of the status quo y_0 (on the x -axis) and the extremity of the veto players (on the y -axis). In both panels, the red region indicates where the decisionmaker is better off eliminating the veto players, while the green region indicates where he is better off maintaining them. The first panel depicts a monopolistic policy environment with a single entrepreneur on the right (as described in Proposition 3); the second panel depicts a competitive policy environment with entrepreneurs located symmetrically on either side of the decisionmaker.¹⁵

A number of results emerge. First and as previously described, in a monopolistic policy environment the decisionmaker is better off eliminating the veto players when the status quo is sufficiently close to the monopolist, because the entrepreneur and the aligned veto player can jointly *protect* it rather than engage in entrepreneurship. This includes cases where the status quo is extreme but on the same side of the decisionmaker as the entrepreneur.

The pattern is distinctly different in a competitive policy environment. The presence of entrepreneurs on *either* side of the decisionmaker means that an extreme status quo can never be protected; one faction will always have a strong interest in engaging in entrepreneurship to change it. With competition, the decisionmaker instead benefits from eliminating the veto players when the status quo is *moderate*, and located roughly in between the left and right entrepreneurs.

Thus, in a competitive policy environment the inclusion of veto players benefits the decisionmaker precisely when they have extreme preferences, and seek to protect an extreme status quo. This result seems counterintuitive, until one considers how extreme veto players affect the strategic behavior of *other* political actors; namely the entrepreneurs.

The entrepreneurs are most willing to invest in quality to realize ideological gains when they are highly motivated to change the status quo, i.e., when it is distant from them. Under these circumstances, an extreme veto player is beneficial to the decisionmaker because he can extract

¹⁵As is the case throughout this section, the entrepreneurs are assumed to be of high ability ($\alpha_E < 1 + \frac{x_E}{x_V}$).

greater quality investments and ideological concessions than the decisionmaker herself could credibly demand. When the status quo is moderate to begin with, neither entrepreneur is sufficiently motivated for these beneficial effects to emerge. Instead, the veto players' collective resistance to change simply dampens the intensity of policy competition. The decisionmaker is consequently better off eliminating them, and relying on competition alone to spur policy development.

Combining the preceding results with our results on the pattern of competition yields an additional and surprising implication. In competitive political environments with veto players, the presence of observable competition and the welfare of the decisionmaker are *inversely* correlated. When the status quo is moderate, the entrepreneurs' motivation to change it is comparable but low; both are observed to be active, but they invest less in quality. When the status quo is extreme, the entrepreneurs' motivation to change it is highly asymmetric, and a counterbalancing veto player extracts substantial ideological concessions and quality investments from the dissatisfied entrepreneur. The decisionmaker is better off by virtue of these investments, but little direct competition is observed.

The conclusion we draw is that in competitive political environments with veto players, the absence of direct competition and apparent monopoly by one interest group is not necessarily indicative of dysfunctional politics. Instead, it may be indicative of an extreme status quo on a policy issue that only a interest group is highly motivated to change. Under these conditions, the veto players already extract substantial quality investments. Consequently, potential competing groups may rationally calculate that they are best off remaining inactive because their interests are already protected. We return to this interpretation of the competitive model in the subsequent section.

6 Application: Filibusters

We now show how our model can be applied to understand the stability of the U.S. Senate's 60-vote supermajority requirement for cloture to break a filibuster. As documented by Binder and Smith (1997), has there never been a Senate majority in support of eliminating the filibuster on legislation by reducing the cloture requirement to 51 votes.¹⁶ This presents a puzzle for a variety of reasons. First, the filibuster is often vigorously denounced for hindering majorities' preferred legislation. Second, constitutional scholarship and Senate history support the proposition that a simple majority may, through various procedures, eliminate or modify the filibuster (Gold and Gupta 2005).

Finally, and most importantly, in simple spatial models of policymaking, supermajority rules generally harm centrists by preventing them from altering policies to reflect their own ideal point. While supermajority requirements can be rationalized as an optimal institutional response by cen-

¹⁶Note, however, that the Senate has recently established a precedent for majority-cloture on most confirmations of executive appointees.

trists to counterbalance the power of non-centrists who have formal agenda-setting power (Peress 2009), it is unclear whether such arguments are applicable to the U.S. Senate. In the Senate, the absence of germaneness requirements gives individual members considerable power to ensure that their proposals are included on the agenda. Indeed, party leaders in the Senate expend extraordinary effort to accommodate the scheduling demands of individual members (Oleszek 2011).

Our model, however, shows that even in the absence of formal agenda setting power, centrist Senators may benefit from maintaining supermajority requirements that create de facto veto players. In particular, our model with a single decisionmaker is akin to a legislature operating under majority rule as it considers policy proposals generated by interest groups, committees, or party leaders. The ideal point of the effective decisionmaker is that of the median legislator. Our model with veto players can be straightforwardly interpreted in a manner consistent with the standard pivotal politics model (Brady and Volden 1998, Krehbiel 1998). Because passing legislation requires the support of 60 of 100 senators, the 40th and 60th most liberal senators effectively act as veto players (with the support of more-extreme members).

As we have shown in the previous sections, a centrist decisionmaker in a political organization often benefits when non-centrist actors have veto power. In the context of the Senate, this implies that the median Senator can often benefit from the threat of a filibuster if it forces policy entrepreneurs to generate higher-quality legislation. Moreover, our analysis implies the benefits of the filibuster institution can be greatest when circumstances have resulted in non-centrist status quo policies. This could occur in policy areas that are rapidly changing, such as financial regulation or health care.

More subtly, as suggested in the previous section, our analysis implies that visible activity by highly motivated partisan entrepreneurs (e.g., the liberal wing of the Democratic party on health care reform in 2009), the presence of non-centrist veto players that counteract the entrepreneurs (e.g., Senator Ben Nelson of Nebraska), and the absence of credible alternative proposals by the opposition (in this instance, the Republican party) may not indicate a policymaking environment that harms centrists. Rather, such features may result when there is a highly-motivated entrepreneur willing to expend considerable effort to change the status quo, whose motivation drives out potential competing policy entrepreneurs, and who is forced by veto players to generate a higher-quality proposal than she otherwise would, thereby benefitting centrists.

Finally, we note that the literature offers many explanations in the literature for the stability of the filibuster and supermajority rules more generally. Thus, our model constitutes only one of many possible rationales. However, we note that most competing explanations that lack formal agenda setters focus on either dynamic policymaking considerations (e.g. Alesina and Tabellini 1990) or ex-ante preference uncertainty (e.g. Aghion, Alesina and Trebbi 2004). Our analysis, in contrast, illustrates how and when such rules may benefit centrists even in a static, complete information

policymaking environment by inducing the development of higher-quality legislation.

7 Conclusion

In this paper we developed a model of costly production of policy proposals in political environments where actors have divergent objectives, but also have a shared interest in the quality of policies that are enacted. In such environments, policy entrepreneurs have opportunities to obtain informal agenda power by crafting policies that are well-designed but that also promote their own objectives. Our primary goal in the paper has been to assess how the presence of veto players affects the nature of policies that are enacted as well as the utility of decisionmakers.

If there a single entrepreneur with a monopoly on the ability to create high-quality policies, the effect of veto players depends critically on three factors: the location of the veto players, the location of the status quo, and how effective the entrepreneur is at producing high-quality policies. We show that a decisionmaker can be hurt by the presence of veto players, either because they lead to gridlock (as in standard pivotal politics models) or because the equilibrium policy outcomes are only marginally better than the status quo. However, the decisionmaker can also be helped by veto players, when they force the entrepreneur to develop high-quality policies that are not too ideologically-divergent from the decisionmaker's preferred outcomes. We show that the decisionmaker benefits most when a veto player counterbalances the entrepreneur, the status quo is far from the entrepreneur's ideal point, and the entrepreneur faces low costs of developing high-quality policies.

Several of the results from the single-entrepreneur model continue to hold if there are two entrepreneurs on either side of the decisionmaker. Absent veto players, competing entrepreneurs in an all-pay contest will generate policies that benefit the decisionmaker. If the status quo policy is quite moderate, the effect of veto players symmetrically located on either side of the decisionmaker is to dampen this competition, thereby making the decisionmaker worse off. However, if the status quo is sufficiently noncentrist, it will be far away from one of the entrepreneurs, who will be motivated to work hard to create a high-quality policy, while the other entrepreneur remains inactive.

One surprising implication of our analysis is that veto players are most beneficial for a centrist decisionmaker in precisely the circumstances where standard pivotal politics models predict that they are most harmful, specifically when the status quo is close to the ideal point of a veto player who has preferences substantially different from those of the decisionmaker. In such circumstances, the only faction that will actively develop new policy alternatives is the one that is highly dissatisfied with the status quo. However, the lack of observable competition is simply a symptom of the fact that veto players are forcing the policy developer to craft reasonably-moderate, high quality policies.

Our model thus contrasts sharply with simple spatial models of policy choice by providing a

quality-based rationale for fragmented decisionmaking authority. This may potentially explain the stability of supermajority requirements in the U.S. Senate and other political institutions that could choose to operate under purely majoritarian procedures yet choose instead to maintain implicit veto rights for noncentrist members.

The model also yields testable comparative statics on the number of well-developed policy proposals that will be created for a given issue: multiple serious proposals are likely to be developed when the status quo is centrist or when veto players are absent. Moreover, our model provides predictions about the quality of policies that are adopted. Quality is difficult to measure empirically because it comes from a variety of characteristics. However, if measurement issues can be overcome one could test the model's prediction that centrist policies that are enacted tend to be of mediocre quality, whereas noncentrist ones typically are carefully-crafted, because of the need to gain veto players' approval.

8 References

- Aghion, Philippe, and Jean Tirole. 1997. "Formal and Real Authority in Organizations." *Journal of Political Economy* 105:1-29.
- Aghion, Philippe, A. Alesina, and F. Trebbi. 2004. "Endogenous Political Institutions." *Quarterly Journal of Economics* 119: 565-611.
- Alesina, Alberto, and G. Tabellini. 1990. "Voting on the Budget Deficit." *American Economic Review* 80:37-49.
- Baye, Michael R., Dan Kovenock, and Casper G. de Vries. 1993. "Rigging the Lobbying Process: An Application of the All-Pay Auction." *American Economic Review* 83:289-294.
- Baye, Michael R., Dan Kovenock, and Casper G. de Vries. 2012. "Contests With Rank-Order Spillovers." *Economic Theory* 51:315-350.
- Binder, Sarah A., and Steven S. Smith. 1997. *Politics or Principle: Filibustering in the United States Senate*. Brookings Institution Press.
- Brady, David W. and Craig Volden. 1998. *Revolving Gridlock*. Westview Press.
- Bueno de Mesquita, Ethan, and Matthew C. Stephenson. 2007. "Regulatory Quality Under Imperfect Oversight." *American Political Science Review* 101:605-620.
- Callander, Steven. 2008. "A Theory of Policy Expertise." *Quarterly Journal of Political Science* 3(2):123-140.
- Callander, Steven. 2011a. "Searching and Learning by Trial-and-Error." *American Economic Review* 101: 2277-2308.
- Callander, Steven. 2011b. "Searching for Good Policies." *American Political Science Review* 105: 643-662.
- Cameron, Charles M. 2000. *Veto Bargaining: Presidents and the Politics of Negative Power*. Cambridge University Press.
- Che, Yeon-Koo, and Ian Gale. 2003. "Optimal Design of Research Contests." *American Economic Review* 93:646-671.

- Crawford, Vince, and Joel Sobel. 1982. "Strategic Information Transmission." *Econometrica* 50:1431-51.
- Crombez, Christophe. 1996. "Legislative Procedures in the European Union." *British Journal of Political Science* 26:199-228.
- Dove, Robert and R. Arenberg. 2012. *Defending the Filibuster*. Indiana University Press.
- Diermeier, Daniel, and Roger B. Myerson. 1999. "Bicameralism and Its Consequences for the Internal Organization of Legislatures." *American Economic Review* 89:1182-1196.
- Gold, Martin, and Dimple Gupta. 2005. "The Constitutional Option to Change Senate Rules and Procedures: A Majoritarian Means to Overcome the Filibuster." *Harvard Journal of Law and Public Policy* 28:205-272.
- Hirsch, Alexander V., and Kenneth W. Shotts. 2012. "Policy-Specific Information and Informal Agenda Power." *American Journal of Political Science* 56(1):67-83.
- Hirsch, Alexander V., and Kenneth W. Shotts. 2015a. "Competitive Policy Development." *American Economic Review*, 105(4): 1646-64.
- Hirsch, Alexander V., and Kenneth W. Shotts. 2015b. "Policy-Development Monopolies: Adverse Consequences and Institutional Responses." Typescript.
- Hitt, Matthew P., Craig Volden, and Alan E. Wiseman. 2014. "Spatial Models of Legislative Effectiveness." <http://www.vanderbilt.edu/csdi/SpatialModelsofLegislativeEffectiveness.pdf> (accessed September 23, 2015).
- Johnson, Chalmers. 1982. *MITI and the Japanese Miracle*. Stanford University Press.
- Krehbiel, Keith W. 1998. *Pivotal Politics: A Theory of U.S. Lawmaking*. University of Chicago Press.
- Lax, Jeffrey R., and Charles M. Cameron. 2007. "Bargaining and Opinion Assignment on the US Supreme Court." *Journal of Law, Economics, and Organization* 23:276-302.
- Londregan, John B. 2000. *Legislative Institutions and Ideology in Chile*. Cambridge University Press.
- McCarty, Nolan. 2013. "Complexity, Capacity and Capture" in *Preventing Capture: Special Interest Influence and How to Limit It*, eds. Daniel Carpenter and David Moss. Cambridge University Press.

- McCubbins, Matthew D., Roger G. Noll, and Barry R. Weingast. 1987. "Administrative Procedures as Instruments of Political Control." *Journal of Law, Economics, and Organization* 3:243-277.
- Moe, Terry M. 1989. "The Politics of Bureaucratic Structure." In *Can the Government Govern?*, eds. John E. Chubb and Paul E. Peterson. Brookings Institution Press.
- Oleszek, Walter J. 2001. *Congressional Procedures and the Policy Process*. CQ Press.
- Peress, Michael. 2009. "Optimal Supermajority Requirements in a Two-Party System." *Journal of Politics* 71:1379-1393.
- Romer, Thomas, and Howard Rosenthal. 1979. "Bureaucrats Versus Voters: On the Political Economy of Resource Allocation by Direct Democracy." *Quarterly Journal of Economics* 93(4):563-587.
- Siegel, Ron. 2009. "All-Pay Contests." *Econometrica* 77:71-92.
- Siegel, Ron. 2010. "Asymmetric Contests With Conditional Investments." *American Economic Review* 100:2230-2260.
- Siegel, Ron. 2014. "Contests with Productive Effort." *International Journal of Game Theory* 43: 515-23.
- Snyder, James M. 1991. "On Buying Legislatures." *Economics and Politics* 3: 93-109.
- Stigler, George J. 1971. "The Theory of Economic Regulation." *Bell Journal of Economics and Management Science* 2:3-21.
- Ting, Michael M. 2011. "Organizational Capacity." *Journal of Law, Economics, and Organization* 27:245-271.
- Tsebelis, George. 2002. *Veto Players: How Political Institutions Work*. Princeton University Press.
- Tullock, Gordon. 1980. "Efficient Rent Seeking." In *Toward a Theory of the Rent Seeking Society*, ed. James M. Buchanan, Robert D. Tollison, and Gordon Tullock. Texas A&M University Press.
- Wilson, James Q. 1989. *Bureaucracy: What Government Agencies Do and Why They Do It*. Basic Books.

Appendix

In **Appendix A** we prove results of the monopoly model. In **Appendix B** we present a general treatment of the competitive model and provide proofs for the statements contained therein.

A Monopoly Model

Proof of Proposition 1

Without loss of generality, we consider the case $x_{bVE} \leq 0 < x_E$. We prove the proposition in three steps.

Step 1. We show that the entrepreneur either declines to develop a policy or develops one on the boundary of the veto proof set between the entrepreneur and the status quo, i.e., $y_E \in [y_0, x_E]$ with q_E such that $y_E = z_R(s)$. Note that the entrepreneur never develops a policy with $q_E > 0$ that is outside the veto proof set, because doing so means incurring cost $\alpha_E q_E$ and receiving no benefit. Also, note that within the veto-proof set, only policies with $y_E \in \{z_L(s), z_R(s)\}$, can be optimal to develop. If $y_E \in (z_L(s), z_R(s))$, then for sufficiently small ϵ the entrepreneur can develop $(y_E, q_E - \epsilon)$, which will be enacted and yield $(\alpha_E - 1)\epsilon$ higher utility for the entrepreneur. Finally, note that if the entrepreneur's policy is veto-proof and $y_E < y_0$ then the entrepreneur is strictly better off developing (y_0, q_E) and if $y_E > x_E$ then the entrepreneur is strictly better off developing (x_E, q_E) . For $y_E \in [y_0, x_E]$ the binding veto player is to the left of y_0 so $y_E = z_R(s)$.

Step 2. We find the entrepreneur's utility from developing $y_E \in [y_0, x_E]$ with q_E such that $y_E = z_R(s)$. For such a policy, indifference of the left veto player means $q_E = (y_E - x_{bVE})^2 - (y_0 - x_{bVE})^2 = 2x_{bVE}(y_0 - y_E) + y_E^2 - y_0^2$, so the entrepreneur's utility is

$$-(x_E - y_E)^2 - (\alpha_E - 1) [2x_{bVE}(y_0 - y_E) + y_E^2 - y_0^2].$$

Taking the derivative with respect to y_E yields

$$2x_E - 2y_E - (\alpha_E - 1)(-2x_{bVE} + 2y_E)$$

which equals zero at

$$\hat{y}_E^* = \frac{1}{\alpha_E} x_E + \left(1 - \frac{1}{\alpha_E}\right) x_{bVE}.$$

For $y_0 < \hat{y}_E^*$, this weighted midpoint is optimal, whereas for $y_0 > \hat{y}_E^*$ the entrepreneur's utility is strictly higher from sitting out than it is for developing any $y_E \in (y_0, x_E]$ on the boundary of the veto proof set.

Step 3. The decisionmaker's utility is $-(y_E^*)^2 + 2x_{bVE}(y_0 - y_E^*) + (y_E^*)^2 - y_0^2 = s_0 + 2|x_{bVE}(y_E^* - y_0)|$ and quality q_E^* follows directly from the definition of score. ■

Proof of Proposition 2(i)

$x_V < x_E$ implies that $y_0 < x_E$ (since $y_0 \in [0, x_V]$), so the binding veto player is the decisionmaker since the entrepreneur wishes to move policy rightward. By Proposition 1, $s_E^* = -y_0^2 < 0$, so the decisionmaker is better off eliminating the veto player. Absent the veto player, the policy outcome is $\left(\frac{x_E}{\alpha_E}, \left(\frac{x_E}{\alpha_E}\right)^2\right)$. With the veto player, if $y_0 < \frac{x_E}{\alpha_E}$ the policy outcome is $\left(\frac{x_E}{\alpha_E}, -y_0^2 + \left(\frac{x_E}{\alpha_E}\right)^2\right)$, which is equally extreme and lower quality than in the absence of the veto player. With the veto player, if $y_0 > \frac{x_E}{\alpha_E}$ the policy outcome is $(y_0, 0)$, which is more extreme and lower quality than in the absence of the veto player. This shows the desired properties. ■

Proof of Propositions 2(ii) and 3

Given a status quo $y_0 < x_E$ and a binding veto player to the left of the decisionmaker of ideological extremity $|x_V|$, the decisionmaker's equilibrium utility is $s_E^* = -y_0^2 + 2|x_V| \cdot (\hat{y}_E^* - y_0)$ for $y_0 < \hat{y}_E^*$ and $-y_0^2$ otherwise. It is simple to verify that this is decreasing in y_0 so it has a well defined root. Using the quadratic formula, $s_E^* \geq 0$ i.f.f.

$$y_0 \leq \bar{y}_0 = |x_V| \cdot \left(\sqrt{\left(2 \left(1 + \frac{x_E}{|x_V|}\right) \cdot \alpha_E^{-1} - 1\right)} - 1 \right)$$

To prove the results for a single counterbalancing veto player, observe that in this case the status quo is $y_0 \in [x_V, 0]$. Thus,

- For the entrepreneur to be better off maintaining the veto player regardless of the location of the status quo with a single counterbalancing entrepreneur requires that $\bar{y}_0 > 0$, since then all feasible status quos $y_0 \in [x_V, 0]$ are $< \bar{y}_0$. It is simple to verify that this is the case when $\alpha_E < 1 + \frac{x_E}{|x_V|}$.
- For the entrepreneur to be better off eliminating the veto player regardless of the location of the status quo with a single counterbalancing entrepreneur requires that $\bar{y}_0 < x_V$, since then all feasible status quos $y_0 \in [x_V, 0]$ are $> \bar{y}_0$. It is simple to verify that this is the case when $\alpha_E > 2 \left(1 + \frac{x_E}{|x_V|}\right)$.
- For the entrepreneur's welfare to be based on the location of the status quo with a single counterbalancing entrepreneur requires that $\bar{y}_0 \in [x_V, 0]$, and it is simple to verify that this is the case when the entrepreneur has intermediate costs $\alpha_E \in \left(1 + \frac{x_E}{|x_V|}, 2 \left(1 + \frac{x_E}{|x_V|}\right)\right)$.

To prove the results for symmetric veto players, observe that this implies the status quo may be anywhere in $y_0 \in [-x_V, x_V]$ which is $< x_E$. The condition to be better off eliminating the veto player for all status quos is identical, i.e., $\bar{y}_0 < -x_V$. The condition for the decisionmaker to be better off maintaining the veto player for all status quos is now that $\bar{y}_0 > x_V$ since $y_0 \in [-x_V, x_V]$, and it is

simple to verify that this holds for very low costs $\alpha_E < \frac{2}{5} \left(1 + \frac{x_E}{x_V}\right)$. Otherwise $\bar{y}_0 \in [-x_V, x_V]$ and whether the decisionmaker benefits from eliminating the veto players is based on the location of the status quo. ■

B Competitive Model

For analysis of the competitive model we assume that the leftmost and rightmost veto players are distinct from the decisionmaker ($x_{Vl} < 0$ and $x_{Vr} > 0$), which simplifies the notation and equilibrium analysis. Our computational results also suggest that the equilibrium when $x_{Vi} \rightarrow x_D = 0$ converges to the equilibrium when $x_{Vi} = 0$, and hence that this assumption is innocuous.

Recall from the main text that the score of a policy (y, q) is the utility $U_D(y, q) = q - y^2$ that it gives the decisionmaker, and that player i 's utility for a policy with score s and ideology y is $V_i(s, y) = U_i(y, s + y^2) = -x_i^2 + s + 2x_i y$. We show below that for an entrepreneur who wants to move policy to the left, x_{Vr} is binding, whereas for an entrepreneur who wants to move policy to the right, x_{Vl} is binding.

We transform strategies (y, q) to be expressed in terms of score and ideology. An entrepreneur's pure strategy $b_i = (s_i, y_i)$ is a two-dimensional element of $\mathbb{B} \equiv \{(s, y) \in \mathbb{R}^2 \mid s + y^2 \geq 0\}$, or the set of scores and ideologies that imply positive-quality policies. A mixed strategy σ_i is a probability measure over the Borel subsets of \mathbb{B} .

B.1 Equilibrium outcomes of policymaking subgame

We first characterize equilibrium outcomes of the subgame commencing with the decisionmaker's proposal, which is subject to the approval of the veto players. Recall that the status quo $b_0 = (y_0, q_0)$ is assumed to have quality $q_0 = 0$ and therefore score $s_0 = -y_0^2$ and ideology $y_0 \in [x_{Vl}, x_{Vr}]$ between the leftmost and rightmost veto players. The history consists of the profile of proposals $\mathbf{b} \in \mathbb{B} \times \mathbb{B}$ made by the entrepreneurs. Any profile of strategies results in a probability distribution $w(\mathbf{b}) : \mathbb{B}^2 \rightarrow \Delta(\mathbf{b} \cup b_0)$ over policy outcomes for each history $\mathbf{b} \in \mathbb{B} \times \mathbb{B}$. The policy outcome must be one of the entrepreneurs' policies or the status quo b_0 .

When the decisionmaker proposes some policy (s, y) , the veto players will evaluate that policy against the status quo (s_0, y_0) . Player i 's utility difference between the two policies is

$$V_i(s, y) - V_i(s_0, y_0) = (s - s_0) + 2x_i(y - y_0),$$

which satisfies a single crossing property in x_i . Hence, if $y < y_0$, then a necessary and sufficient condition for all veto players to weakly prefer the proposal to the status quo is that the *rightmost* veto player x_{Vr} weakly prefers it, i.e., $V_{Vr}(s, y) - V_{Vr}(s_0, y_0) \geq 0 \iff y \geq y_0 - \frac{s - s_0}{2|x_{Vr}|} = z_L(s)$. Similarly,

if $y > y_0$ then a necessary and sufficient condition for all veto players to weakly prefer the proposal to the status quo is that the *leftmost* veto player x_{Vl} weakly prefers it, i.e., $V_{Vl}(s, y) - V_{Vl}(s_0, y_0) \geq 0 \iff y \leq y_0 + \frac{s-s_0}{2|x_{Vl}|} = z_R(s)$. Thus, as stated in Definition 1 a policy is weakly preferred by all veto players to the status quo if and only if $s \geq s_0$ and $y \in Y_V(s) = [z_L(s), z_R(s)]$; we term this the *veto proof set*.

In the policymaking stage, the decisionmaker is an agenda-setter vis-a-vis the veto players. As is customary in agenda-setting models, we henceforth restrict attention to strategy profiles in which both veto players break indifference in favor of the decisionmaker's proposal. With this restriction, the organization must always choose a policy (s, y) that maximizes the score (i.e. decisionmaker's utility) from within the subset of feasible policies $\mathbf{b} \cup b_0$ in the veto-proof set Y_V . A policy outside the veto proof set can never prevail because it will be vetoed by one of the veto players. The decisionmaker will never propose a policy from within the set that doesn't maximize her utility, because any other proposal within the set will be accepted for sure. A formal statement of policy outcomes given each history is as follows.

Observation 1 *When the veto players break indifference in favor of the decisionmaker's proposal, a probability distribution over outcomes $w(\mathbf{b})$ can result from an equilibrium of the subgame commencing with \mathbf{b} if and only if $\forall b$ in the support of $w(\mathbf{b})$, $(s, y) \in \underset{\{\mathbf{b} \cup b_0\} \cap \{(s, y) : s \geq s_0, y \in Y_V(s)\}}{\arg \max} s$.*

B.2 Equilibrium Conditions

We now derive equilibrium conditions. In the baseline model in Hirsch and Shotts (2015a), $F_i(s)$ is defined to be the CDF over scores induced by i 's mixed strategy σ_i . The presence of veto players, however, requires slightly adjusting this definition; if the decisionmaker proposes a policy with score $s > s_0$ that isn't veto proof, it will be vetoed, the outcome will be the status quo b_0 , and player i 's resulting utility from policy will be $V_i(s_0, y_0)$.

To accommodate this wrinkle, let $F_i(s)$ instead denote the CDF over the decisionmaker's utility if he were to always propose entrepreneur i 's policy (s_i, y_i) (which is distributed according to σ_i). That is, F_i denotes the CDF of the random variable $\mathbf{1}_{y_i \in Y_V(s_i)} \cdot s_i + (1 - \mathbf{1}_{y_i \in Y_V(s_i)}) \cdot s_0$. Thus, if i only develops veto-proof policies, then as in Hirsch and Shotts (2015a) F_i is just the CDF over scores induced by i 's mixed strategy σ_i . (In the equilibria we consider the distinction will be immaterial, since the entrepreneurs will only develop veto-proof policies). As in the original model, we restrict attention to strategies generating score CDFs that can be written as the sum of an absolutely continuous and a discrete distribution.

Let $\Pi_i(s_i, y_i; \sigma_{-i})$ denote i 's expected utility from developing policy (s_i, y_i) (suppressing possible dependence on how the decisionmaker chooses between two bills that offer her the exact same score). Note that our simplifying assumption that $x_{Vl} < 0 < x_{Vr}$ implies that (i) no policy with score $s < s_0$

is veto proof, (ii) the unique veto proof policy with score = s_0 is the status quo (s_0, y_0) , and (iii) the unique 0-quality policy that is veto proof is the status quo (s_0, y_0) .

We first consider scores $s_i > s_0$ at which $-i$'s score CDF has no atom. For any veto proof policy $(y_i \in [z_L(s_i), z_R(s_i)])$, we have that $\Pi_i(s_i, y_i; \sigma_{-i})$ is equal to

$$-\alpha_i (s_i + y_i^2) + F_{-i}(s_i) \cdot V_i(s_i, y_i) + \int_{s_{-i} > s_i, y_{-i} \in Y_V(s)} V_i(s_{-i}, y_{-i}) d\sigma_{-i}. \quad (1)$$

With probability $F_{-i}(s_i)$, i 's opponent develops a policy that is either not veto proof or is veto proof and has a lower score, i 's policy in this case will then be proposed and passed for sure, and this yields utility $V_i(s_i, y_i)$. With the remaining probability (when $s_{-i} > s_i$ and $y_{-i} \in Y_V(s)$), $-i$'s policy will be proposed and passed for sure, yielding utility $V_i(s_{-i}, y_{-i})$. Now observe that only the first two terms of equation 1 are affected by y_i as long as it is veto-proof. Taking the first derivative w.r.t. y_i yields $-2\alpha_i y_i + 2F_{-i}(s_i) x_i$, which is strictly decreasing in y_i . There is thus a unique strictly optimal value of y_i in the bounded interval $[z_L(s_i), z_R(s_i)]$.

Next consider the unique veto proof policy with score s_0 , or any non-veto proof policy. For all such policies, $\Pi_i(s_i, y_i; \sigma_{-i})$ is equal to

$$-\alpha_i (s_i + y_i^2) + F_{-i}(s_0) \cdot V_i(s_0, y_0) + \int_{s_{-i} > s_0, y_{-i} \in Y_V(s)} V_i(s_{-i}, y_{-i}) d\sigma_{-i}. \quad (2)$$

With probability $F_{-i}(s_0)$, $-i$ develops a policy that is not veto proof or the status quo; the best (and possibly only) choice for the DM is hence the status quo. Otherwise (when $s_{-i} > s_i$ and $y_{-i} \in Y_V(s)$), $-i$'s policy is both veto proof and strictly better than any other alternative, and is hence chosen for sure. Now observe that the second and third terms are unaffected by (s_i, y_i) —that is, when a non-veto proof policy is developed, outcomes are as if the status quo was developed. The only influence of (s_i, y_i) is therefore through the up-front cost $-\alpha_i (s_i + y_i^2)$.

The preceding observations about $\Pi_i(s_i, y_i; \sigma_{-i})$ immediately yield our first key lemma.

Lemma 1 *In the competitive model with $x_{Vl} < 0$ and $x_{Vr} > 0$,*

- *developing a policy (s_i, y_i) that is not veto proof ($y_i \notin Y_V(s_i)$) is weakly dominated by developing the status quo (s_0, y_0) , and strictly dominated if it has positive quality ($s_i + y_i^2 > 0$).*
- *At any score $s_i > s_0$ where $-i$'s score CDF F_{-i} opponent has no atom, developing $(s_i, y_i^*(s_i))$ is strictly better than developing any other veto proof policy, where*

$$y_i^*(s_i) = \begin{cases} F_{-i}(s_i) \cdot \frac{x_i}{\alpha_i} & \text{when it is veto proof, and} \\ \text{the closer of } z_L(s_i) \text{ and } z_R(s_i) \text{ to } F_{-i}(s_i) \cdot \frac{x_i}{\alpha_i} & \text{otherwise} \end{cases}.$$

Lemma 1 does two important things. First, it rules out an incentive to develop policies that are not veto proof – this is straightforward because such a policy will lose the contest for sure if proposed. Second, for almost every score s_i , it characterizes entrepreneur i 's unique best “mixture” of ideology y_i and quality q_i to produce a veto proof policy with score s_i .

B.2.1 Pure Strategy Equilibria

In the absence of veto players, pure strategy equilibria do not exist (Hirsch and Shotts 2015a). However, the presence of veto players potentially introduces such equilibria. As described in the main text, in any pure strategy equilibrium at least one entrepreneur $-k$ must be inactive, while the other must develop her monopoly policy (s_k^*, y_k^*) . This will be an equilibrium when entrepreneur $-k$ is unwilling to pay the cost of defeating (s_k^*, y_k^*) . Below we state the formal condition, using the notation $y_i^*(s_i; F_{-i}(s_i))$ to refer to i 's optimal score ideology to develop at score s_i given the probability $F_{-i}(s_i)$ that her opponent develops a lower-score policy.

Proposition 4 *In every pure strategy equilibrium at least one entrepreneur $-k$ must be inactive, and the other must develop policy (s_k^*, y_k^*) . Let $\hat{s} = \max\{s_k^*, s_{-k}^*\}$. There exists a pure strategy equilibrium in which entrepreneur $-k$ is inactive i.f.f.*

$$(\hat{s} - s_k^*) + 2x_{-k} (y_{-k}^*(\hat{s}; 1) - y_k^*) \leq \alpha_{-k} \left(\hat{s} + [y_{-k}^*(\hat{s}; 1)]^2 \right)$$

In the equilibrium, $F_{-k}(s_0) = 1$ and $F_k(s) = 0$ for $s_k < s_k^$ and 1 otherwise.*

Proof of Proposition 4

As argued in the main text, at least one entrepreneur must be inactive in any pure strategy equilibrium. If $-k$ is inactive, then k develops her equilibrium policy (s_k^*, y_k^*) from the one entrepreneur game. This generates a utility for $-k$ producing a policy (s_{-k}, y_{-k}) with $s_{-k} \neq s_k^*$ of,

$$-\alpha_{-k} (s_{-k} + y_{-k}^2) + \mathbf{1}_{s_{-k} \geq s_k^*} \cdot V_{-k}(s_{-k}, y_{-k}) + (1 - \mathbf{1}_{s_{-k} \geq s_k^*}) \cdot V_{-k}(s_k^*, y_k^*)$$

Scores $s_{-k} \in (s_0, s_k^*)$ are strictly dominated since they are costly and lose for sure. Scores $s_{-k} > s_k^*$ generate identical utility as the one entrepreneur game, and $-k$'s utility difference between developing the best policy $y_{-k}^*(s_{-k}; 1)$ for such a score and staying out of the contest is

$$(s_{-k} - s_k^*) + 2x_{-k} (y_{-k}^*(s_{-k}; 1) - y_k^*) - \alpha_{-k} \left(s_{-k} + [y_{-k}^*(s_{-k}; 1)]^2 \right) \quad (3)$$

From our analysis of the 1-entrepreneur game we know that when $s_{-k}^* > s_0$, the derivative of the objective function is > 0 for $s_{-k} < s_{-k}^*$, is $= 0$ for $s_{-k} = s_{-k}^*$, and is < 0 for $s_{-k} > s_{-k}^*$. If $s_{-k}^* = s_0$ then the derivative is < 0 everywhere.

Thus, if $s_{-k}^* > s_k^*$ then it is the strictly best score for $-k$ conditional on producing a winning score $> s_k^*$. Entrepreneur $-k$ then prefers to enter the contest and the pure strategy equilibrium does not exist if Equation (3) > 0 with s_{-k}^* substituted in. This is the condition in the statement.

If $s_{-k}^* \leq s_k^*$ then utility and Equation (3) are both decreasing over $s_{-k} > s_k^*$. Thus, if Equation (3) ≤ 0 with s_k^* substituted in, the equilibrium holds. Alternatively, if Equation (3) > 0 with s_k^* substituted in, then $-k$ can achieve a gain arbitrarily close to it by developing a policy with score $s_k^* + \varepsilon$ for sufficiently small ε , and the pure strategy equilibrium fails. ■

B.2.2 Mixed Strategy Equilibria

In mixed strategy equilibria of the model, both entrepreneurs are active with strictly positive probability, and mix over both the ideological locations and qualities of the policies they develop. In Hirsch and Shotts (2015a) without veto players, we not only derive mixed strategy equilibria, but also show that they are unique. In the present draft we instead present sufficient conditions for mixed strategy equilibria, and omit claims of existence or uniqueness. However, we conjecture that both claims are effectively true, and they are work in progress for a future draft.

To state sufficient conditions for mixed strategy equilibria, we first introduce additional notation. The strategy profiles we will consider for the statement have the following two properties: (i) with probability 1 both entrepreneurs develop veto-proof policies of the form $(s_i, y_i^*(s_i))$, and (ii) the probability that both entrepreneurs develop veto-proof policies with the same score $s > s_0$ is 0; that is, there are no “score ties.” Thus, in such profiles player i ’s expected utility from developing any veto-proof policy (s_i, y_i) can be written more precisely as,

$$\Pi_i^*(s_i, y_i; F) = -\alpha_i (s_i + y_i^2) + F_{-i}(s_i) \cdot V_i(s_i, y_i) + \int_{s_i}^{\infty} V_i(s_{-i}, y_{-i}^*(s_{-i})) dF_{-i} \quad (4)$$

In addition, her utility from developing the strictly best veto-proof policy with score s_i is $\Pi_i^*(s_i, y_i^*(s_i); F)$, which we henceforth denote as simply $\Pi_i^*(s_i; F)$. For the proposition, we use the notation x_{bVk} to represent the binding veto player opposite entrepreneur k , i.e., x_{vL} for the entrepreneur at x_R and x_{vR} for the entrepreneur at x_L . And, as before s_i^* is the score of entrepreneur i ’s optimal proposal if she were a monopolist. We now characterize sufficient conditions for equilibrium.

Proposition 5 *A profile of strategies σ is a SPNE if there is an entrepreneur k and two thresholds \underline{s} and \bar{s} satisfying $s_0 < \underline{s} < s_k^* \leq \max\{s_{-k}^*, s_k^*\} < \bar{s}$ such that the following holds.*

(Policies) *With probability 1, both entrepreneurs $i \in \{L, R\}$ develop veto-proof policies of the form $(s_i, y_i^*(s_i))$.*

(Scores) *The equilibrium score CDFs (F_k, F_{-k}) satisfy the following conditions.*

1. Entrepreneur k is always active, F_k has support $[\underline{s}, \bar{s}]$ with exactly one atom at \underline{s} , and

$$F_k(\underline{s}) = \alpha_{-k} \left(\frac{\underline{s} + [y_{-k}^*(\underline{s})]^2}{2x_{-k}(y_{-k}^*(\underline{s}; F_k(\underline{s})) - z_k(\underline{s}))} \right) \iff \Pi_{-k}^*(s_0; F) = \Pi_{-k}^*(\underline{s}; F)$$

2. Entrepreneur $-k$ is sometimes active, F_{-k} has support $s_0 \cup [\underline{s}, \bar{s}]$ with exactly one atom at s_0 , and

$$F_{-k}(\underline{s}) = \alpha_k \frac{|x_{bV_k}| + 2|z_k(\underline{s})|}{|x_{bV_k}| + 2|x_k|} \iff \left. \frac{\partial}{\partial s_k} (\Pi_k^*(s_k; F)) \right|_{\underline{s}} = 0$$

3. For $s \in [\underline{s}, \bar{s}]$, the following coupled system of differential equations hold:

$$\begin{aligned} \alpha_i - F_{-i}(s) &= f_{-i}(s) \cdot 2x_i(y_i^*(s) - y_{-i}^*(s)) \\ &\quad + 2\alpha_i \frac{\partial y_i^*(s)}{\partial s} \cdot \left(F_{-i}(s) \frac{x_i}{\alpha_i} - y_i^*(s) \right) \quad \forall i \in \{L, R\}. \end{aligned}$$

Proof of Proposition 5

We proceed in two steps. First, we show that for $i \in \{L, R\}$, every possible policy (s, y) delivers utility $\leq \Pi_i^*(s_i, y_i^*(s_i); F)$ for some s_i . Second, we show that $\forall i \in \{L, R\}$, i 's equilibrium utility Π_i^* is equal to $\max_{s_i} \{\Pi_i^*(s_i, y_i^*(s_i); F)\}$. These properties jointly imply that $i \in \{L, R\}$ has no profitable deviation and thus equilibrium.

Step 1

By Lemma 1, for any policy (s, y) that is not veto-proof or the status quo (which is the unique veto-proof policy with score s_0), entrepreneur i is weakly better off sitting out, i.e., $\Pi_i^*(s, y; F) \leq \Pi_i^*(s_0, y_0; F) = \Pi_i^*(s_0, y_i^*(s_0); F)$. Lemma 1 also implies that for any veto-proof policy (s, y) with a score $s > s_0$ where $-i$ has no atom, $\Pi_i^*(s, y; F) < \Pi_i^*(s, y_i^*(s); F)$. This takes care of all possible policies for the always-active entrepreneur k , since in the strategy profiles in Proposition 5 her opponent has no atoms above s_0 .

It also takes care of almost all possible policies for the sometimes-inactive entrepreneur $-k$. However, we must also show that for $-k$, the payoff $\Pi_{-k}^*(\underline{s}, \hat{y}_{-k}; F)$ from developing any veto proof policy $(\underline{s}, \hat{y}_{-k})$ with $\hat{y}_{-k} \neq y_{-k}^*(\underline{s}; F_k(\underline{s}))$ at the score where k has an atom is weakly worse than the payoff $\Pi_{-k}^*(s_{-k}, y_{-k}^*(s_{-k}); F)$ from developing the optimal-veto proof policy at some score s_{-k} .

Let $w_k(y_k^*(\underline{s}), \hat{y}_{-k})$ be the probability that k 's policy is enacted when the entrepreneurs propose policies $(\underline{s}, y_k^*(\underline{s}))$ and $(\underline{s}, \hat{y}_{-k})$. Then $-k$'s utility from developing $(\underline{s}, \hat{y}_{-k})$ is

$$\begin{aligned} & -\alpha_{-k}(\underline{s} + \hat{y}_{-k}^2) + F_k(\underline{s}) [w_k(y_k^*(\underline{s}), \hat{y}_{-k}) V_{-k}(\underline{s}, y_k^*(\underline{s})) + (1 - w_k(y_k^*(\underline{s}), \hat{y}_{-k})) V_{-k}(\underline{s}, \hat{y}_{-k})] \\ & + \int_{\underline{s}}^{\infty} V_{-k}(s_k, y_k^*(s_k)) dF_k \end{aligned} \quad (5)$$

Note that for $-k$ to prefer to develop $(\underline{s}, \hat{y}_{-k})$ rather than (s_0, y_0) requires $V_{-k}(\underline{s}, \hat{y}_{-k}) > V_{-k}(\underline{s}, y_k^*(\underline{s}))$ so Equation 5 \leq

$$-\alpha_{-k}(\underline{s} + \hat{y}_{-k}^2) + F_k(\underline{s})V_{-k}(\underline{s}, \hat{y}_{-k}) + \int_{\underline{s}}^{\infty} V_{-k}(s_k, y_k^*(s_k)) dF_k. \quad (6)$$

But the argument for Lemma 1 implies that Equation 6 is strictly less than

$$\lim_{s_{-k} \rightarrow \underline{s}^+} \{\Pi_{-k}^*(s_{-k}, y_{-k}^*(s_{-k}); F)\} = -\alpha_{-k}(\underline{s} + y_{-k}^*(\underline{s})) + F_k(\underline{s})V_{-k}(\underline{s}, y_{-k}^*(\underline{s})) + \int_{\underline{s}}^{\infty} V_{-k}(s_k, y_k^*(s_k)) dF_k.$$

Thus there must exist a score $\underline{s} + \epsilon$ such that $\Pi_{-k}^*(\underline{s} + \epsilon, y_{-k}^*(\underline{s} + \epsilon); F)$ is strictly greater than $-k$'s utility from developing $(\underline{s}, \hat{y}_{-k})$.

Step 2

We argue that for each entrepreneur i , equilibrium utility Π_i^* is equal to $\max_{s_i} \{\Pi_i^*(s_i, y_i^*(s_i); F)\}$. In the previous step we ruled out scores $s_i < s_0$. Also note that for any policy at a score $s_i > \bar{s}$, entrepreneur i is strictly better off developing $y_i^*(\bar{s}; 1)$, because $\bar{s} > s_i^*$, and as noted in our analysis of the monopoly model the entrepreneur's utility from enacting $(s_i, y_i^*(s_i))$ and having it enacted with probability 1 is strictly decreasing for $s_i > s_i^*$.

For entrepreneur $-k$, no score in (s_0, \underline{s}) , can be optimal, because it would entail paying costs to develop a policy that loses for sure. And the proposition's first boundary condition, which specifies the size of k 's atom at \underline{s} ensures that $-k$ is indifferent between sitting out and developing a score at $\underline{s} + \epsilon$, i.e.,

$$\begin{aligned} 0 &= \lim_{s_{-k} \rightarrow \underline{s}^+} \{\Pi_{-k}^*(s_{-k}, y_{-k}^*(s_{-k}); F)\} - \Pi_{-k}^*(s_0, y_{-k}^*(s_0); F) \\ &= F_k(\underline{s})2x_{-k}(y_{-k}^*(\underline{s}; F_k(\underline{s})) - z_k(\underline{s})) - \alpha_{-k}(\underline{s} + [y_{-k}^*(\underline{s})]^2). \end{aligned}$$

For entrepreneur k , the proposition's second boundary condition ensures that $\Pi_k^*(\underline{s}, y_k^*(\underline{s}); F) > \Pi_k^*(s_k, y_k^*(s_k); F)$, $\forall s_k < \underline{s}$, by specifying the size of $-k$'s atom at s_0 . To derive the size of the atom, we first note that for $s_k \in [s_0, \underline{s}]$, a necessary condition for a policy $(s_k, y_k^*(s_k; F_{-k}))$ to maximize k 's utility is that $y_k^*(s_k; F_{-k}) = z_k(s_k)$. Otherwise there exists a sufficiently small δ such that $F_{-k}(s_k - \delta) = F_{-k}(s_k)$ and $F_{-k}(s_k) \cdot \frac{x_k}{\alpha_k} \in (z_L(s_k - \delta), z_R(s_k - \delta))$, and thus $y_k^*(s_k - \delta; F_{-k}) = y_k^*(s_k; F_{-k})$ which would mean that $\Pi_k^*(s_k; F) - \Pi_k^*(s_k - \delta; F) = -\alpha_k \delta$, i.e., $(s_k, y_k^*(s_k; F_{-k}))$ couldn't maximize k 's utility. Next, we set $y_k^*(s_k; F_{-k}) = z_k(s_k)$ and differentiate Equation 4 to get

$$\frac{\partial}{\partial s_k} (\Pi_k^*(s_k; F)) = -\alpha_k \left(1 + \frac{\partial [z_k^*(s_k)]^2}{\partial s_k} \right) + F_{-k}(s_k) \left(1 + 2x_k \frac{\partial z_k^*(s_k)}{\partial s_k} \right). \quad (7)$$

For the equilibrium specified in Proposition 5, this must be ≥ 0 for $s_k < \underline{s}$. In fact it must be equal to 0 at \underline{s} . To see why, note that for any s_k where F_{-k} is continuous,

$$\begin{aligned} & -\alpha_k \left(1 + \frac{\partial [z_k^*(s_k)]^2}{\partial s_k} \right) + F_{-k}(s_k) \left(1 + 2x_k \frac{\partial z_k^*(s_k)}{\partial s_k} \right) \\ \leq & -\alpha_k \left(1 + \frac{\partial ([y_k^*(s_k; F_{-k})]^2)}{\partial s_k} \right) + F_{-k}(s_k) \left(1 + 2x_k \frac{\partial y_k^*(s_k; F_{-k})}{\partial s_k} \right) \end{aligned}$$

by Lemma 1, and $f_{-k}(s_k) \cdot 2x_k (y_k^*(s_k; F_{-k}) - y_{-k}^*(s_k; F_k)) \geq 0$, so the differential equation in the proposition's third condition for $\underline{s} + \varepsilon$ with ε sufficiently small could not be satisfied unless the boundary condition holds with equality. The boundary condition is then derived by setting (7) equal to 0 at \underline{s} , plugging in for $z_k^*(s_k)$ and $\frac{\partial z_k^*(s_k)}{\partial s_k}$, using Definition 1 in the main text to get $F_{-k}(\underline{s}) = \alpha_k \frac{|x_{bV_k}| + 2|z_k(\underline{s})|}{|x_{bV_k}| + 2|x_k|}$.

The coupled differential equations in the proposition's third condition are derived by differentiating Equation 4 for each entrepreneur and setting it equal to zero to ensure that her payoff $\Pi_i^*(s_i, y_i^*(s_i); F)$ is constant on the interval $[\underline{s}, \bar{s}]$ where the entrepreneurs mix continuously. Specifically, for each $i \in \{L, R\}$

$$\begin{aligned} 0 &= \frac{\partial \Pi_i^*(s, y_i^*(s); F)}{\partial s} \\ &= -\alpha_i - 2\alpha_i y_i^*(s) \frac{\partial y_i^*(s)}{\partial s} + F_{-i}(s) \left[1 + 2x_i \frac{\partial y_i^*(s)}{\partial s} \right] + f_{-i}(s) \cdot 2x_i (y_i^*(s) - y_{-i}^*(s)) \\ \alpha_i - F_{-i}(s) &= f_{-i}(s) \cdot 2x_i (y_i^*(s) - y_{-i}^*(s)) + 2\alpha_i \frac{\partial y_i^*(s)}{\partial s} \cdot \left(F_{-i}(s) \frac{x_i}{\alpha_i} - y_i^*(s) \right). \end{aligned}$$

■

Intuition and Computational Procedure Deriving equilibria satisfying the conditions in Proposition 5 is cumbersome to do analytically, but straightforward to do numerically. The differential equations and boundary conditions that define the equilibrium score CDFs (F_k, F_{-k}) can be intuitively understood by considering the incentives of each entrepreneur. First, the entrepreneur k who is always active knows that her competition will develop no policy (i.e., propose the status quo) with probability $F_{-k}(s_0) > 0$. Thus, increasing her score over the interval $[s_0, \underline{s}]$ will not generate any benefits in the form of increasing the chance of winning the contest. She must therefore *actively prefer* to develop a policy with score $\underline{s} > s_0$ over policies with lower scores that will win the contest with the same probability. This generates the boundary condition on $F_{-k}(\underline{s})$. Second, the entrepreneur $-k$ who is sometimes inactive must be exactly indifferent between staying out of the policy contest, and entering the contest with a policy at score $\underline{s} > s_0$. This policy has strictly positive quality, and

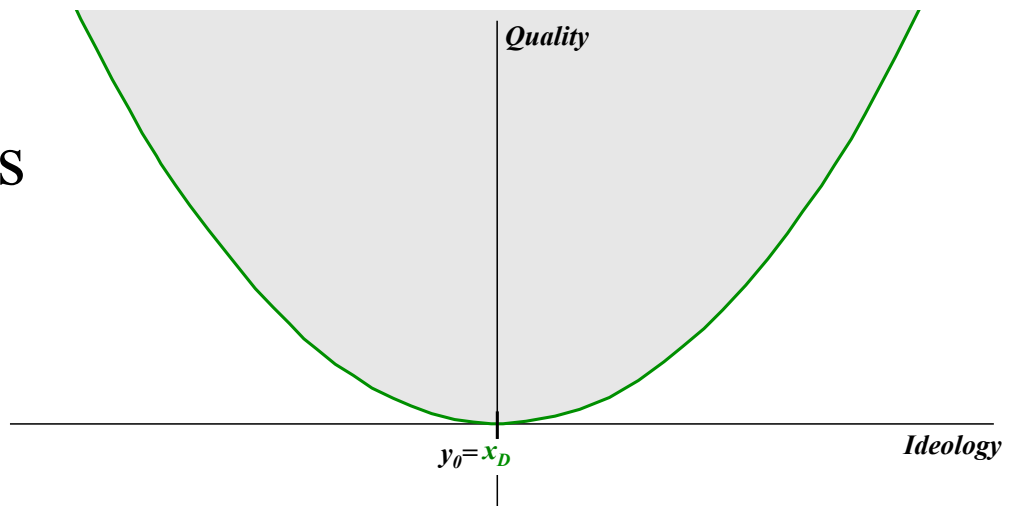
therefore a strictly positive up-front cost to develop. She must then also have a strictly positive probability $F_k(\underline{s})$ of winning the contest with it, which generates the second boundary condition.

The differential equations in Proposition 5 arise from the fact that both entrepreneurs must be indifferent over developing all ideologically optimal veto proof policies with scores in the common support interval $[\underline{s}, \bar{s}]$. Note that both differential equations contain both score CDFs F_k and F_{-k} , a complication that arises from the partial dependence of each entrepreneur's optimal ideologies $y_i^*(s_i)$ on her opponent's score CDF F_{-i} . Nevertheless, the incentives described by the differential equations are intuitive. The left hand side represents the marginal cost of producing a policy with a higher score given a *fixed* probability $F_{-i}(s)$ of winning the contest. The two terms in the right hand side represent the marginal benefit of producing a policy with a higher score, which is two-fold. First (and as in Hirsch and Shotts (2015a) it increases the probability of victory by $f_{-i}(s)$, which results in a beneficial change in ideological outcomes from $y_{-i}^*(s)$ to $y_i^*(s)$. Second, if policy is constrained by an opposing veto player ($F_{-i}(s) \frac{x_i}{\alpha_i} \neq y_i^*(s)$), then there is an additional benefit of moving policy closer to the unbounded optimum.

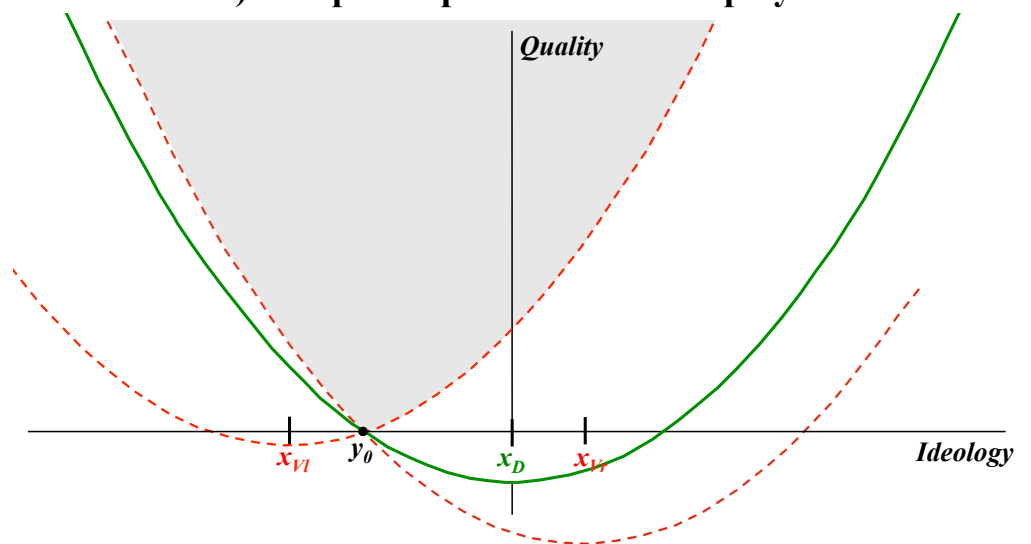
To characterize equilibria, we proceed as follows. For each set of parameter values, we first verify whether pure strategy equilibria exist by checking the conditions in Proposition 4. Then, for parameters such that a pure strategy equilibrium does not exist we compute mixed strategy equilibria as follows. We conjecture an entrepreneur k who is always active and then search over candidate values of $\underline{s} \in [s_0, s_k^*]$ to support a mixed strategy equilibrium. An equilibrium is identified when the score CDFs satisfying the boundary conditions at the candidate \underline{s} and the pair of coupled differential equations also satisfy the required boundary condition $F_{-k}(\bar{s}) = F_k(\bar{s}) = 1$ at some \bar{s} (this boundary condition is implicit in the statement of equilibrium because the support of the CDFs is common and atomless above \underline{s}). In all the parameter profiles we have considered for which a pure strategy equilibrium does not exist, there exists exactly one mixed strategy equilibrium that satisfies the sufficient conditions in Proposition 5.

Figure 1:
Effect of
Veto Players

a) Acceptable policies with one decisionmaker



b) Acceptable policies with veto players



c) Difference

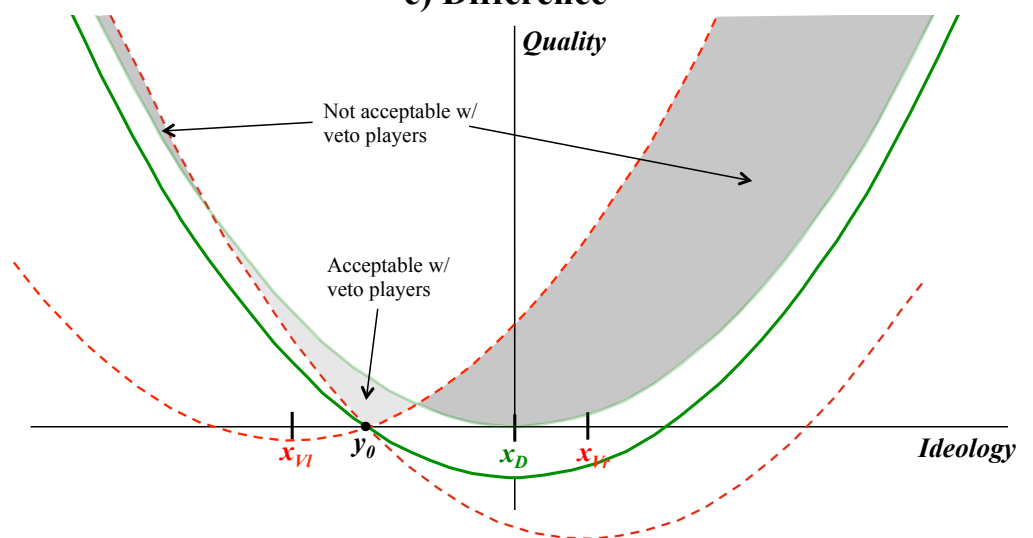


Figure 2: The Veto-Proof Set

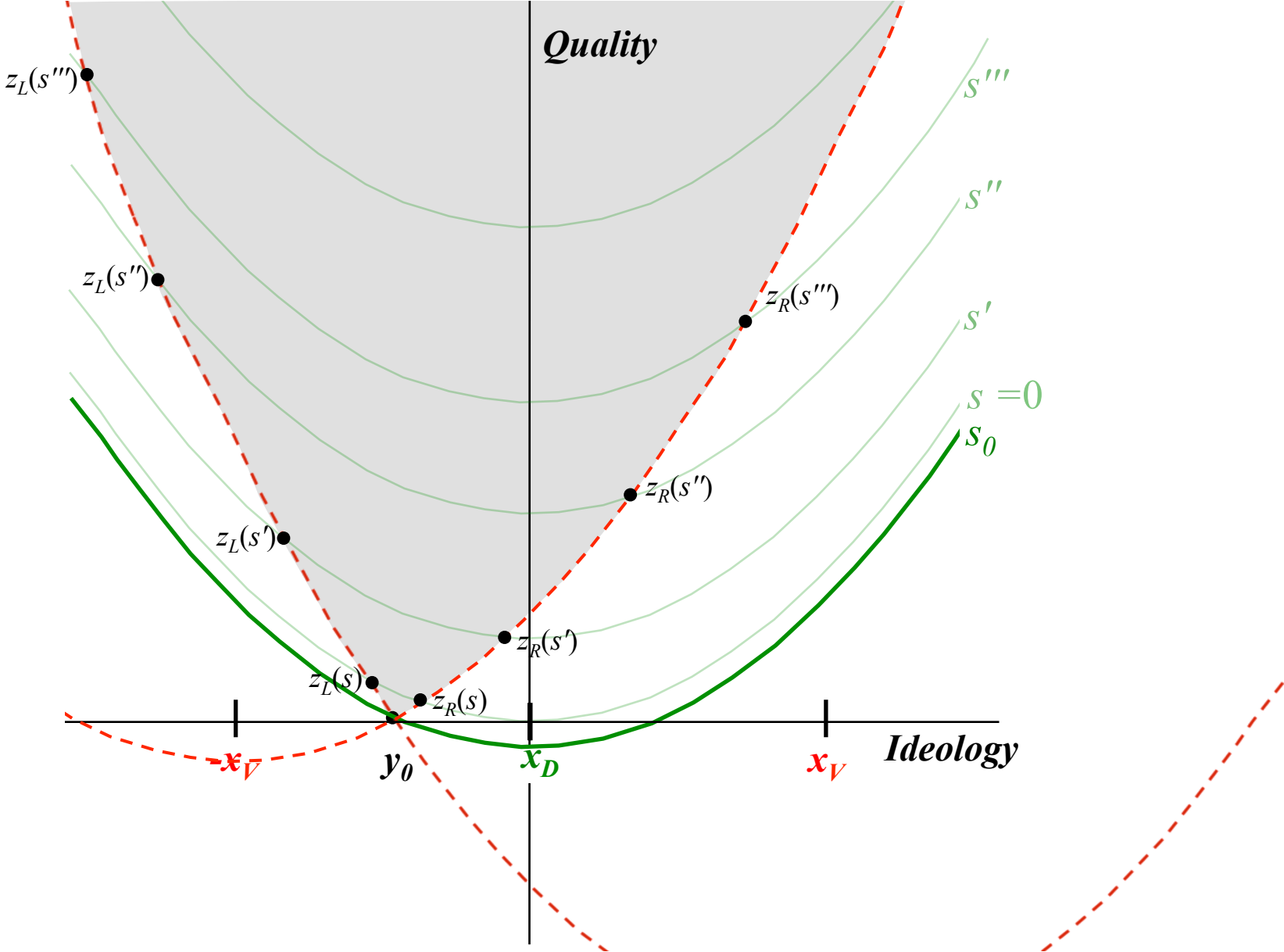
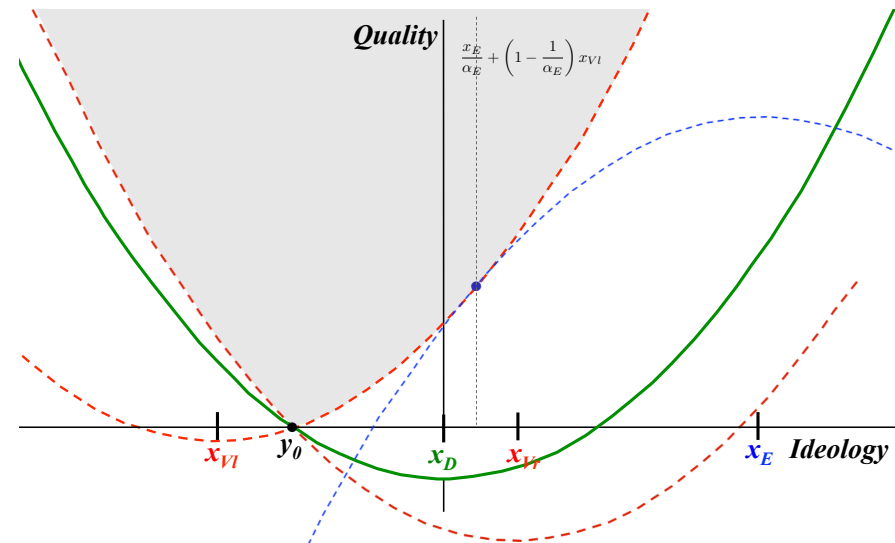
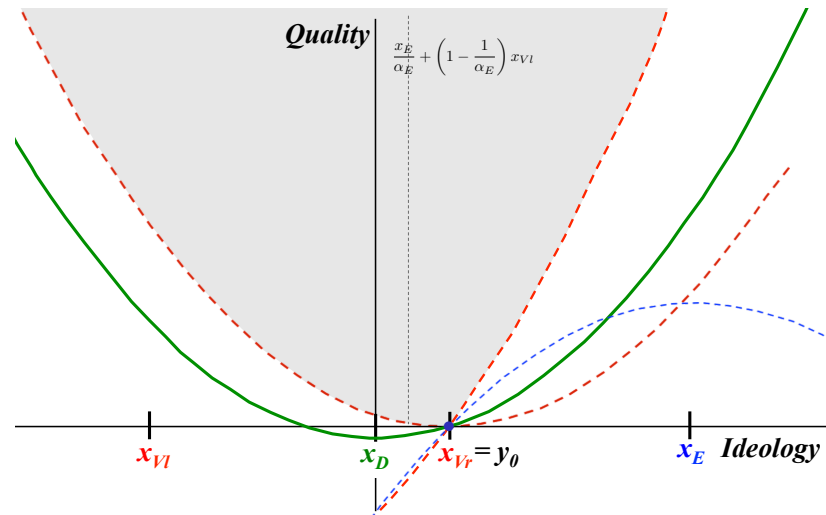


Figure 3: Monopoly Equilibrium



a) Active Entrepreneurship



a) Gridlock

Figure 4: Monopoly with a single DM

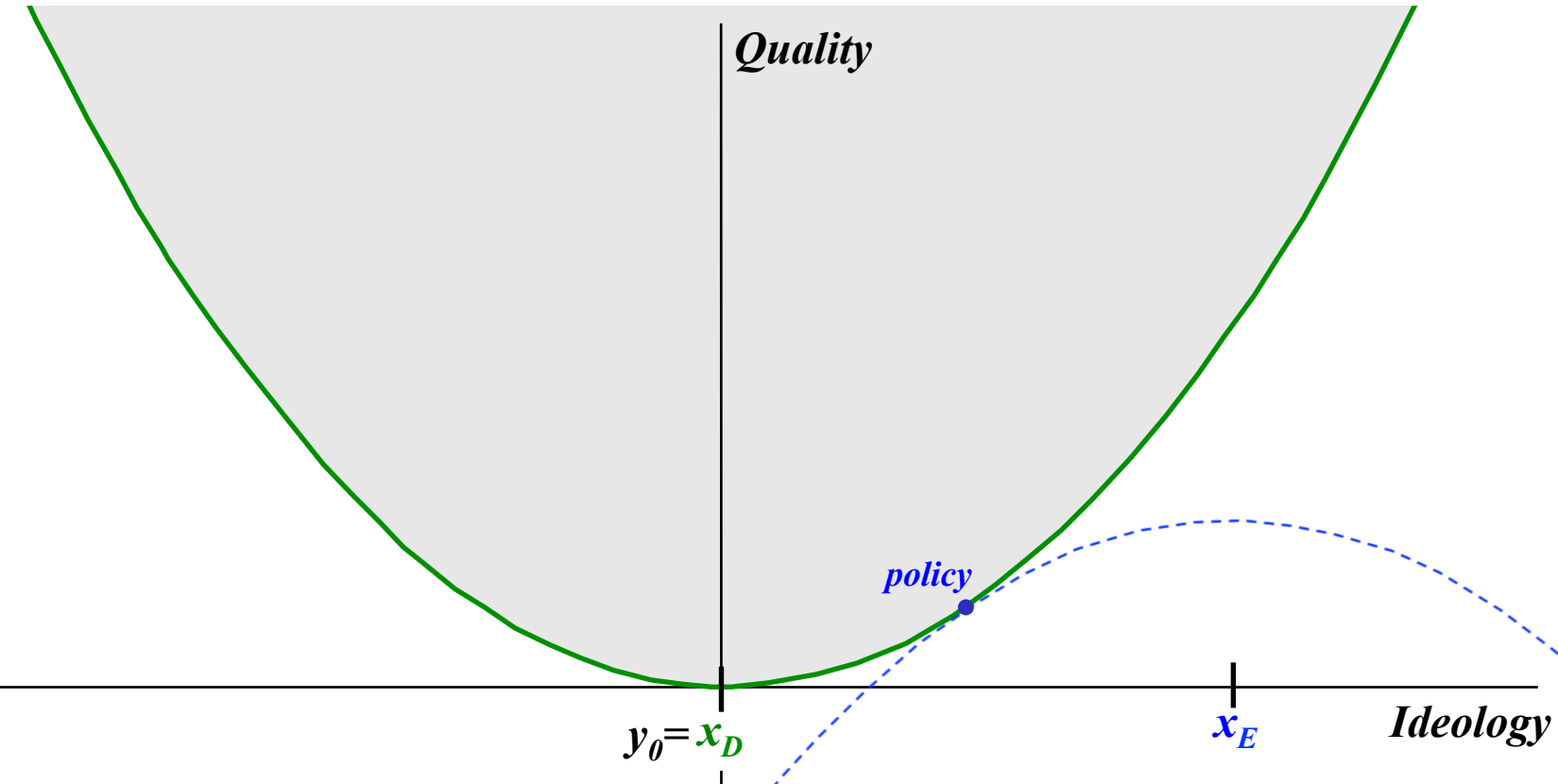


Figure 5: Monopoly with aligned veto player

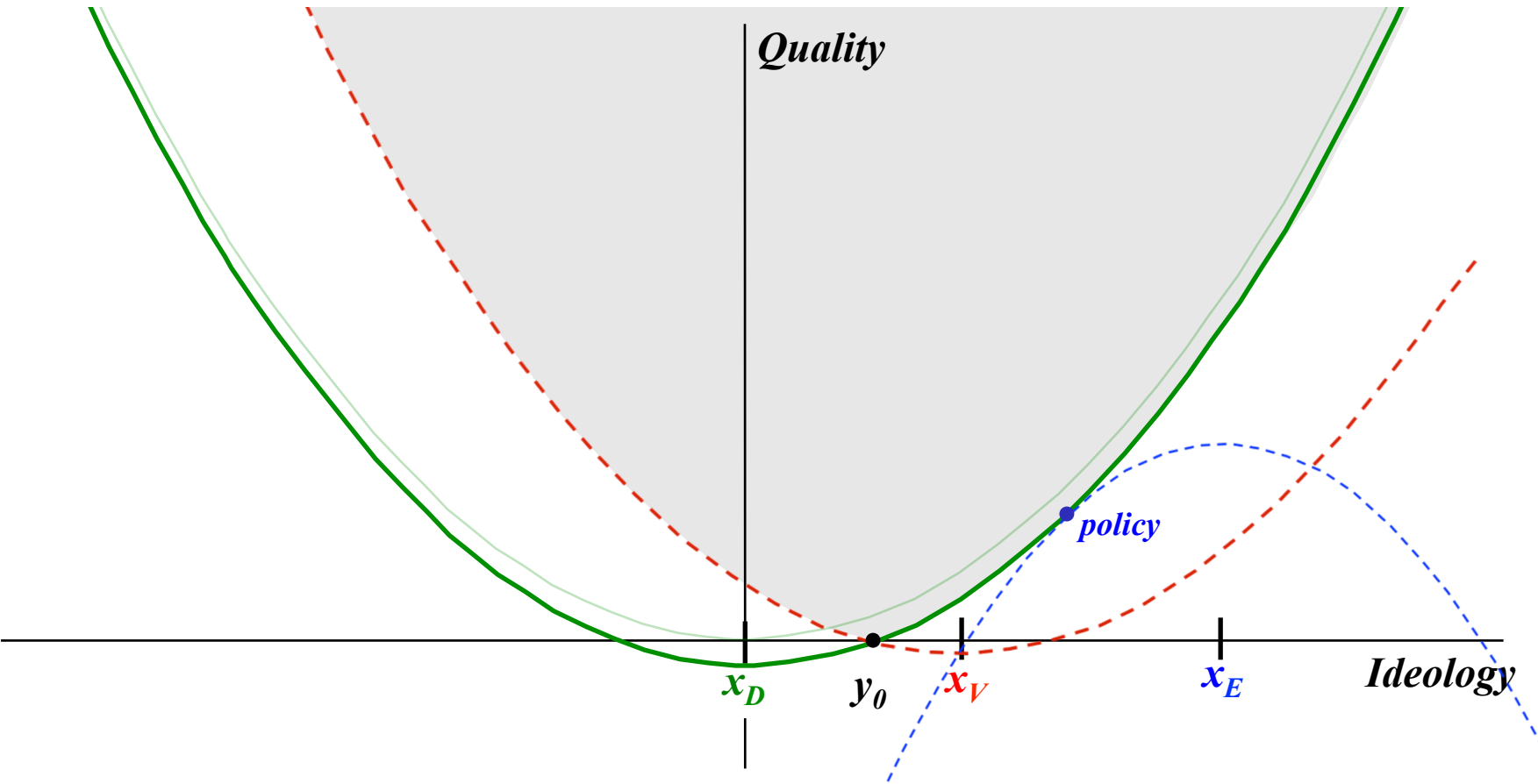
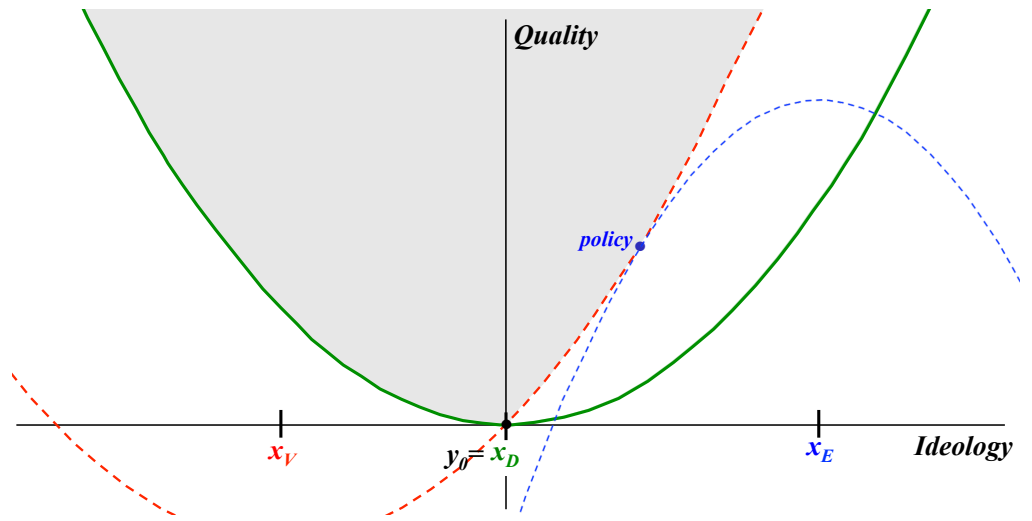
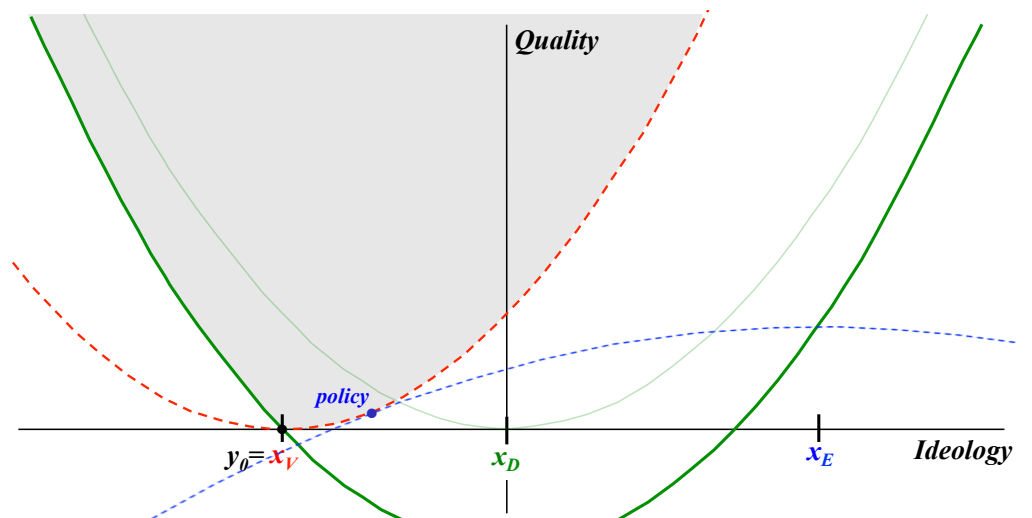


Figure 6:
Effect of costs

a) Low cost entrepreneur



b) High cost entrepreneur



c) Medium cost entrepreneur

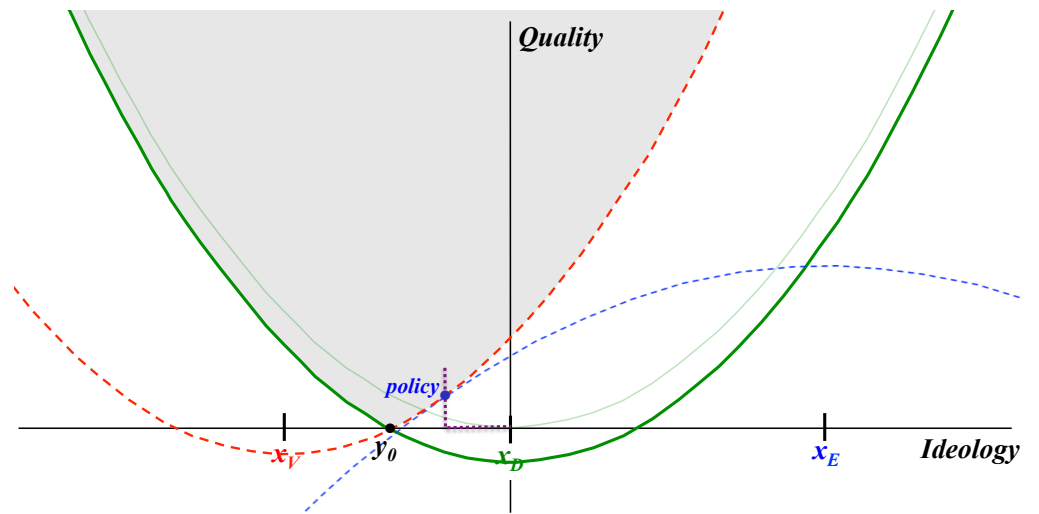
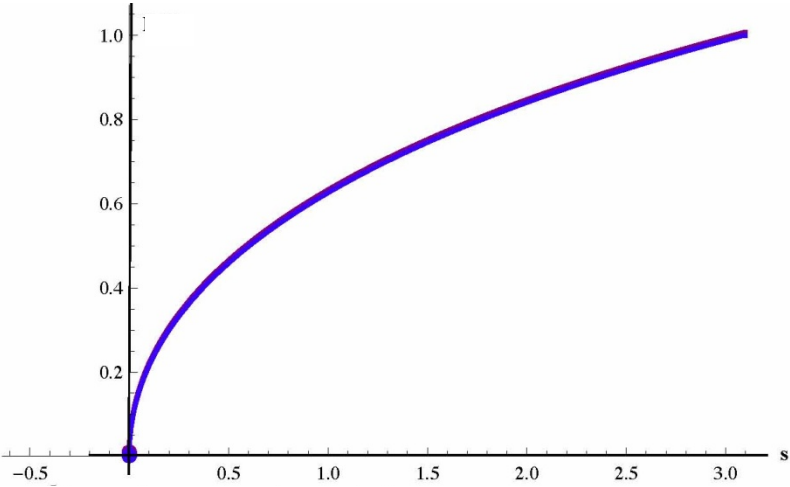
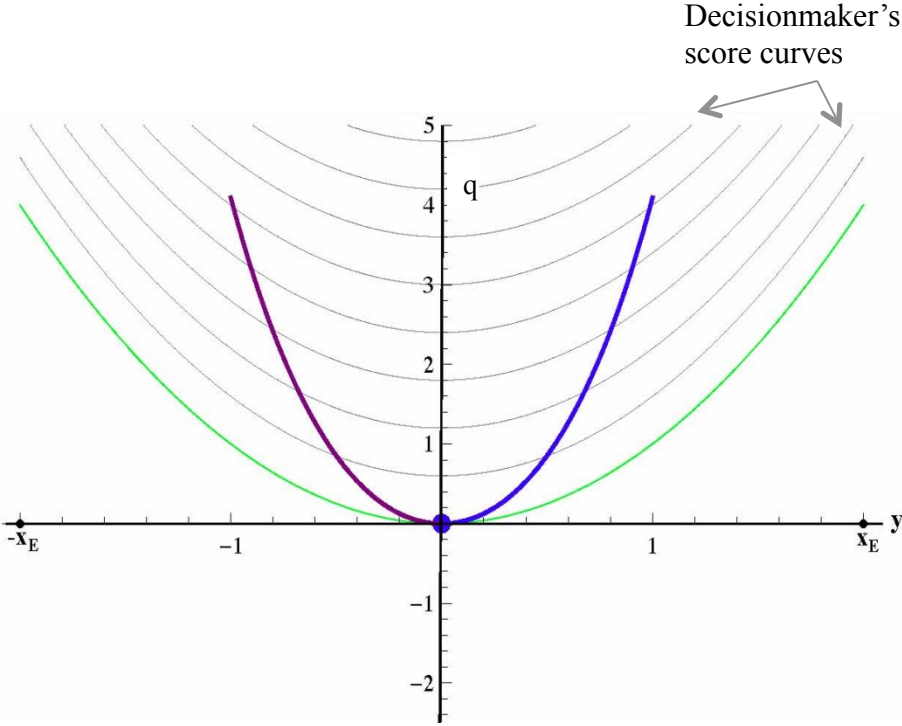


Figure 7: Competition with a single decisionmaker

CDF for score (same for both entrepreneurs)



Proposals

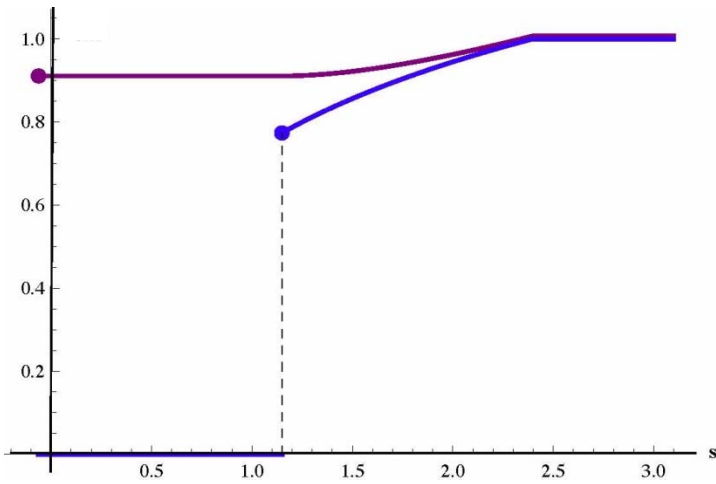


- Left entrepreneur's proposals
- Right entrepreneur's proposals
- Decisionmaker's indifference curve through (0,0)

Figure 8: Competition with Symmetric Veto Players

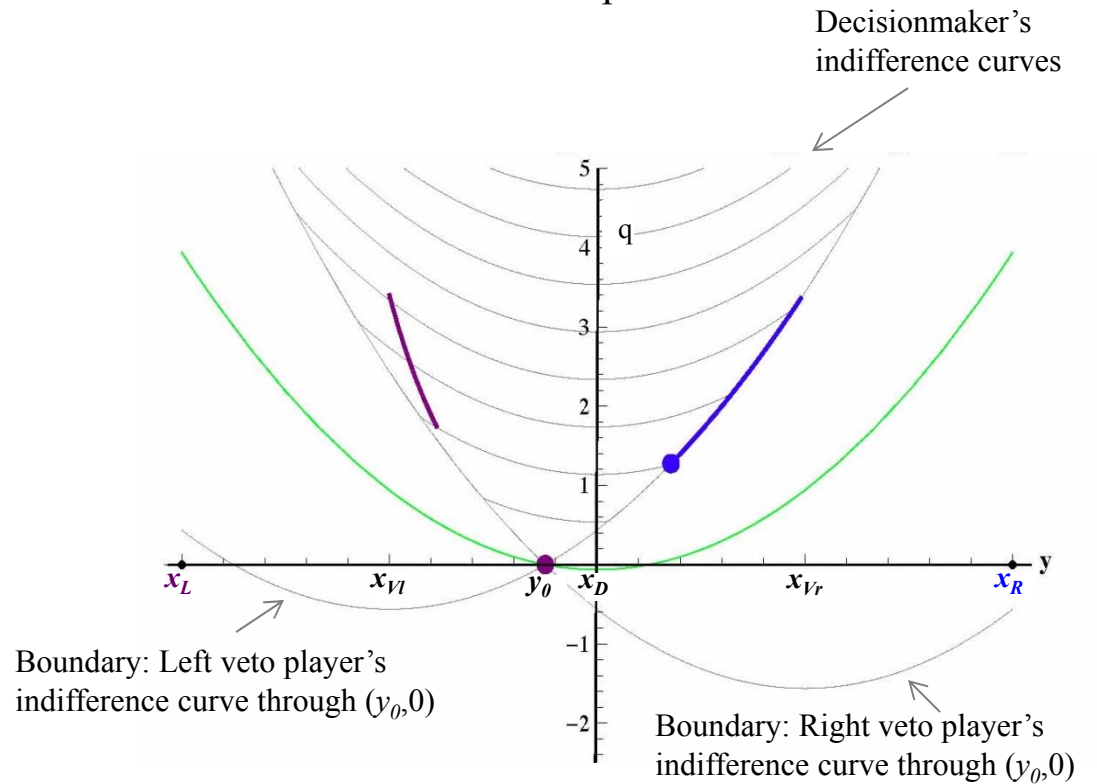
Decisionmaker $x_D = 0$, Entrepreneurs $-x_L = x_R = 2$, Veto players $-x_{VL} = x_{VR} = 1$, Status quo $y_0 = -\frac{1}{4}$, Costs $\alpha_L = \alpha_R = 2$.

CDF for score



- Left entrepreneur's $F_L(s)$
- Right entrepreneur's $F_R(s)$

Proposals



- Left entrepreneur's proposals
- Right entrepreneur's proposals
- Decisionmaker's indifference curve through $(y_0, 0)$

Figure 9: Probability Satisfied Entrepreneur is Active

Decisionmaker $x_D = 0$, Entrepreneurs $-x_L = x_R = 2$, Costs $\alpha_L = \alpha_R = 2$.

- Pure strategy equilibrium with only dissatisfied entrepreneur active
- Mixed strategy equilibrium with satisfied entrepreneur sometimes active.
Darker green shading means higher probability of being active.

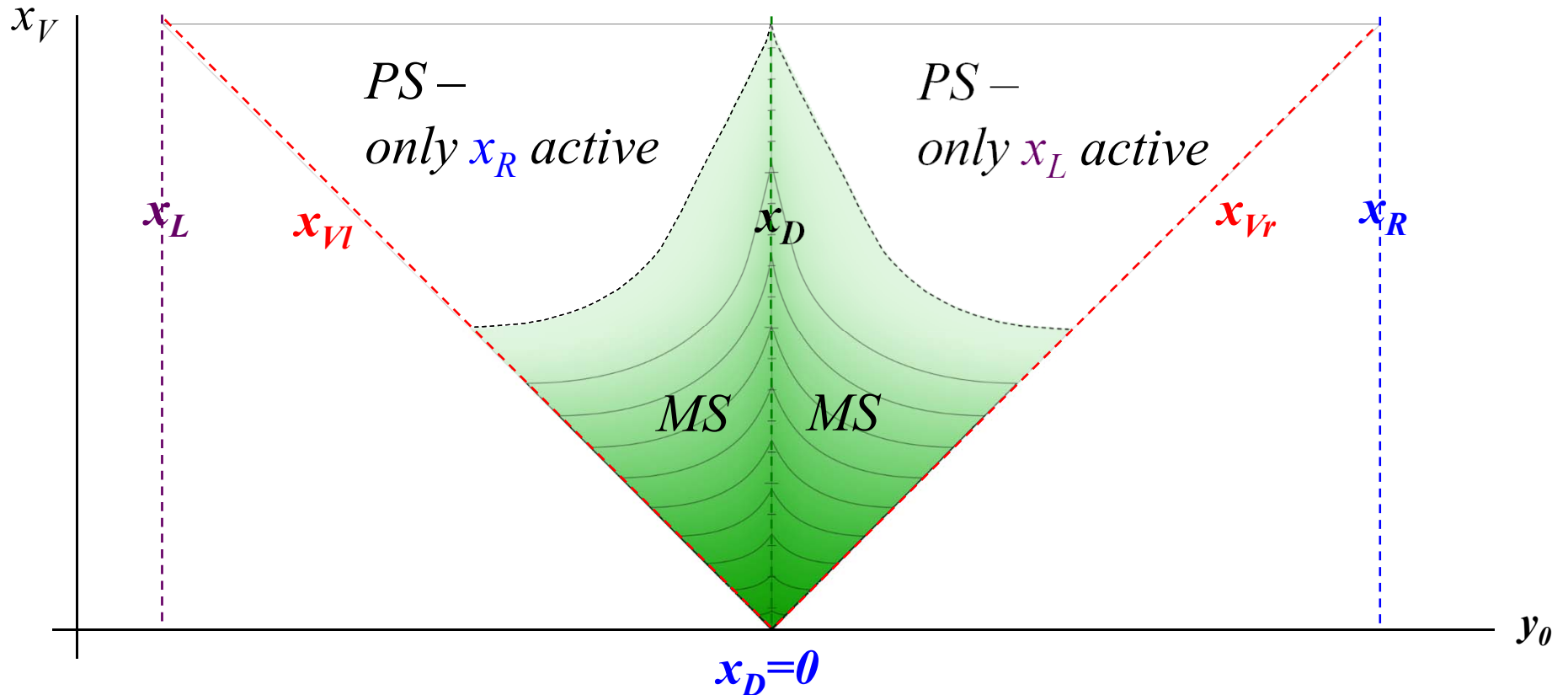


Figure 10: Effect of eliminating veto players

