Gridlock and Delegation in a Changing World

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Abstract

Fixed statutes and regulations often have variable consequences over time. If left unattended, such *drift* can severely erode the performance of government as an institution of representation. To better understand the mechanics of policy-making in a changing world, we develop a positive theory that captures political drift in a dynamic, separation-of-powers system. We show analytically that a distinctive combination of legislative supermajoritarianism and agency autonomy—institutional features that, in isolation, elicit widespread criticism—can effectively ameliorate policies' susceptibility to the vicissitudes of exogenous change. The critical mechanism for governmental accommodation of drift is delegation, which increases all decision-makers' well-being by reducing fluctuations in outcomes. Although the complete smoothing of outcomes is attainable in a separation of powers system, we show that this is typically not achieved in equilibrium. The presence of drift provides an opportunity for self-interested legislators to extract a distributional benefit from their fellow legislators at the expense of overall policymaking efficiency.

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"Things alter for the worse spontaneously, if they be not altered for the better designedly."

—Sir Francis Bacon

1 Introduction

It is often said that the only constant is change itself. As time marches on, economies evolve in structure and scope, social networks form and fray, and lives of citizens are nudged, shaken, or shocked by an array of social and economic forces. Politics cannot escape these realities. Specifically, as the world changes, so, too, do the consequences brought about by governmental policies. Often, the direction and magnitude of changes in outcomes are unintended or undesired. Hacker and Pierson (2010a) refer to the impact of change on policy outcomes as *drift*. They explain:

> "Drift describes the politically driven failure of public policies to adapt to the shifting realities of a dynamic economy and society. Drift is not the same as simple inaction. Rather, it occurs when the effects of public policies change substantially due to shifts in the surrounding economic or social context and then, despite the recognition of alternatives, policy makers fail to update policies due to pressure from intense minority interests or political actors exploiting veto points in the political process." (p. 170).

Few public policies are immune from political drift, and many are bombarded by it. For instance, massive social programs, such as Medicare, have variable consequences over time even when governing statutes and regulations are constant. On the demand side, drift can be caused by changes in demographics and health ailments (e.g., obesity), and, on the supply side, drift is due may be initiated by discoveries and innovations in pharmaceuticals in medical devices. Another example is the Internal Revenue Service's treatment of "carried interest," which originally sought to encourage real estate investment but, with no intervention or interference, has since transformed into a legal basis for private equity and venture capital managers to pay a lower-rate, capital gains tax on their managerial fees. The policy has been stable over time, but the outcomes—e.g., the set of beneficiaries, magnitude of benefits, and cost to the U.S. Treasury—have not.

In light of the core democratic principle that policy outcomes are meant to reflect citizens' interests, the ubiquity of drift makes efficacious representative democracy a moving target. How can government in an ever-changing world react with the speed

and accuracy necessary to maintain fidelity between political outcomes and the wishes of its people? This challenge seems to be especially acute in modern separation-of-powers democratic institutions, such as the United States. In the legislative branch, the inertia of Congressional lawmaking is notorious due to the Senate's ample opportunities to filibuster and its supermajority requirement to invoke cloture.[1] Congress often has difficulty reacting to seismic shifts in policy environments, such as medical reform and energy dependence, let alone run-of-the-mill incremental drift. As for the executive branch, scholars and commentators frequently lament that the bureaucracy runs amok, shirks responsibility, and abuses unilateral powers, all outside the reach of legislative oversight.[2] Nor are these intra-governmental pathologies significantly attenuated by electoral institutions. For one thing, elections are blunt and infrequent tools for choosing representatives. For another thing, even if the electoral connection were somehow tuned to representative perfection, responsive legislators would still be left to conquer their propensity for gridlock and agencies' predispositions to pursue their separate agendas.

Motivated by these broad normative concerns about representative ideals, the narrower positive objective of this paper is to acquire a deeper understanding of how modern political systems manage drift in reality—whether it be well or badly. Our approach is grounded in two fundamental features of modern policy-making: supermajoritarianism and delegation. The principal contribution is to show how a democracy with these seemingly debilitating features *is* capable of accommodating drift effectively via repeated interaction of legislators and bureaucrats in a sensibly stylized institutional setting.

Although our main result may be considered surprising or possibly even uplifting, the normative implications of our analysis are not entirely sanguine. In principle, drift can be *completely* neutralized within political institutions, but this occurs only rarely in equilibrium. Otherwise, the inefficiency of drift does not wash out of the system altogether. The impediment to the best imaginable solution—as so often the case—is self-interested legislators. The presence of drift creates the possibility for rent-seeking that limits the effectiveness of representative government. More specifically, control over the legislative agenda allows a winning coalition of legislators to extract a surplus from a losing coalition while reducing but not eliminating fluctuations in outcomes.

[1]Mostly descriptive but regularly with normative overtones, research on filibusters includes Binder and Smith (1997), Binder (2003), Brady and Volden (2006), Koger (2010), and Schickler and Wawro (2006).

[2]The literature of bureaucratic control is huge. See, for example, Moe (1984), McCubbins (1985) and Bendor, Taylor, and VanGaalen (1987) on shirking of various forms, Martin (1997) and Epstein and O'Halloran (1999) on strategic use of information, and McConnell (1966) and Stigler (1971) on agency capture. Excellent reviews include Bendor and Meirowitz (2004) and Krause (2010).

Among the by-products of our results on democratic efficacy is a novel insight into the role and interrelationship of delegation and supermajoritarianism. Our model is the first to combine these two components into a dynamic theory of policy-making.[3] We show that this combination of components provides a much different result than those of its isolated parts, and, in so doing, we provide a more comprehensive and compelling theory of separation-of-power politics. To be more specific, our model illustrates that, in a changing world with political drift, delegation breaks legislative gridlock and overcomes the inertia-inducing effects of supermajoritarianism that are predicted by simpler pivotal-politics models.[4] Surprisingly, legislators are able to agree to delegate authority to an independent agency despite being unable to agree on a direct change to policy via legislative decree (i.e., nondelegation). Moreover, the delegation of authority is supportable in equilibrium not just in spite of—but, more accurately, *because of*—supermajoritarianism. In equilibrium, instead of political outcomes drifting over time to the detriment of most everyone's risk-averse preferences, the agency exercises its discretion to tailor policies, hence realized outcomes, to respond desirably to changing conditions. The resulting outcome is consistent with not only the preferences of the agency but also the preferences of the delegating congressional supermajority. In our model, then, the putative runaway bureaucracy does not subvert the congressional will. Rather, it implements congressional preferences dynamically and more precisely than the Congress itself can do via unilateral statutory decree. More concisely, the freedom of the agency to move policy without legislative interference is a feature, and not a bug, of institutional design. Or, as Sir Francis Bacon would summarize: policy outcomes are "altered for the better designedly."

The paper proceeds as follows. Section 2 presents the assumptions of the model of gridlock, delegation, and drift. There is nothing particularly novel about the gridlock and delegation components other than their combination. The conception and formalization of drift, however, is unique, as is its consideration in the context of separation of powers. Section 3 discusses a set of progressive benchmarks that serves as a bridge between past and present analyses. We begin with the standard pivotal politics model, (re)characterize its equilibrium using our notation, and then incrementally add distinctive features that culminate in our most general model. This rather rudimentary analysis helps to clarify which of three important features of our approach—dynamics, delegation, and drift—matters under supermajoritarianism, and why. Section 4 then considers the case of unconstrained (or hands-off) delegation in a changing world. This

[3]See, however, Volden (2002) for a static model with several features that overlap with ours.

[4]See Krehbiel (1996) and Brady and Volden (2006).

analysis exposes the central intuition regarding risk spreading that propels our main insight and provides a normative benchmark for assessing democratic efficacy. In our last set of results, we allow for delegation to be constrained as well as unconstrained and show how the presence of drift can be exploited by some at the expense of the collective. Section 6 is a summary and discussion.

2 The Model

We develop and analyze a game of dynamic policy-making in a changing world. A two-branch, sequential governmental process occurs in each of two time periods denoted by $t = 1, 2$. The institutions of policy making are a *legislature* and an executive branch *agency*.

The legislature has an arbitrary number of legislators with heterogeneous preferences and operates via supermajority rule. Three legislators are of special importance and, as such, are modeled explicitly: the median, M, and two supermajority pivots, L and R, on the left and the right sides of the median, respectively.[5] Preferences are determined by the outcomes that are realized after policies are implemented. Each legislator has an ideal outcome, or *ideal point*, m, l, or r, respectively, where $l \leq m \leq r$ are exogenous.

The agency, A, is modeled as a unitary actor with ideal point, a. The agency's ideal point will be treated as exogenous, too, although we sometimes consider the question of how the legislators might design or select an agency whose behavior would be in their best interests.[6]

A pervasive challenge of policy-making is that outcomes cannot be selected directly. Rather, the object of choice is a *policy* $p \in \mathbb{R}$ whose *implementation* produces an outcome according to a mapping λ. The outcome produced by λ depends on the policy chosen and the state of the world ω_t at that time such that $\lambda : \mathbb{R} \times \mathbb{R} \to \mathbb{R}$. This mapping is of the form of Gilligan and Krehbiel's (1987) representation, $\lambda(p, \omega) = p + \omega$.

A key novelty of our model is the notion of a *drift in a changing world*. We assume that the mapping from policies to outcomes can change from one period to the next, due to an exogenous shock or a gradual, inexorable flow of changing circumstances. Such possibilities are inherent in nearly all episodes of policy-making. Indeed, to assume

[5]It will soon become clear why keeping the remaining $N - 3$ legislators in the background spares us from a lot of inconsequential hence unnecessary notation and bookkeeping.

[6]We are short-shrifting the president in an analytically innocuous way. Technically the pivot is the more interior of the president's ideal point or the 2/3-pivot legislator's. Tending to this glitch requires the addition of another player and, with him or her, results in a sharp increase in the clutter-to-insight ratio.

otherwise—that the world were static and unchanging—would be the more unrealistic and extreme. Examples of a changing world are everywhere: From global warming and the increasing awareness that a policy response is required, to the gradual realization of the perils of tobacco and the imposition of a modernized regulatory regime. The importance of change in the world and the notion of drift in policy-making environments has been gaining increasing currency in recent times, evident most prominently in the work of Hacker and Pierson (2010a, 2010b). Our compatible take-off point is to presuppose that the world is changing and so policy outcomes drift over time. We then ask how drift affects policy-making by strategic actors within institutions.

Formally, we model change with a parameter, ω_t, embedded into a two-period model. In each period t a policy p_t and the state-of-the-world parameter ω_t are mapped into a realized outcome by a known function $\lambda(p, \omega)$. In the first period the state of the world is public knowledge and equal to zero, so $\omega_1 = 0$ and $\lambda(p_1, 0) = p$. The mapping can be written more simply still as $\lambda_1(p) = p$. Between periods the world is shocked in a specified way such that potentially $\omega_2 \neq 0$. For present purposes it suffices to model this shock in a simple binary form where $\omega_2 \in \{-\gamma, \gamma\}$ where each possible shock occurs with $\frac{1}{2}$ probability. The second period mapping is then $\lambda(p_2, \omega_2) = p_2 + \omega_2$, or, alternatively, $\lambda_2(p|\omega)$. (Time-period subscripts are omitted when no confusion results.) By way of comparison, we will also consider the benchmark case of no shock—i.e., an unchanging world—when $\omega_2 = 0$ with certainty, so $\lambda_2(p|0) = p$, as in period 1 above.

The shock to the environment occurs between periods and is fully observed by all players. Consequently, in each period, policy is made under full knowledge of the mapping, and there are no policy experts as no player holds an informational advantage over others. Therefore, the uncertainty is isolated to the state of knowledge in period 1 about the realized drift (ω_2) prior to period 2. The full timing and sequence of the game is described in the next section.

For simplicity, we assume that all players have quadratic losses in utility over outcomes, which implies that a legislator's preferences are symmetric around her ideal outcome. Although risk-aversion plays an important role in our analysis, quadratic loss specifically is not necessary.[7] For policy p producing outcome $x = \lambda(p, \omega)$, the median legislator's utility in period t is: $u_t^M = -(x - m)^2$. To avoid additional notation without losing any insight, we assume players do not discount across time, such that total utility for M is: $U^M = u_1^M + u_2^M$. The utility for all other players is analogous.

[7] And, as is well-known, linear utility curves produce risk aversion when the ideal outcome is internal to the outcome space, as is generally the case in political models.

2.1 Sequence

The sequence of moves and notation are summarized in Table 1. In each period, policy-making has two distinct phases: *lawmaking* (or, more akin to our terminology, statute-passing) and *implementation*. The legislature proposes bills and passes statutes, and the agency selects and implements policy. The legislature's statute may specify exactly which policy the agency is to implement, or it may delegate some authority over this choice to the agency. In either case, the agency phase of each period culminates in a policy choice p_t that is allowable within the statute, and this policy is subsequently mapped into an outcome.

In the legislative phase, the median voter proposes a bill b_t and the legislature as a whole votes on it. If it passes, the bill becomes the new statute $s_t = b_t$; otherwise the pre-existing statute remains in effect, i.e., $s_t = s_{t-1}$. The legislative phase of the game is a form of pivotal politics model (Krehbiel 1998). We streamline the agenda process by granting the median legislator M the right to propose a bill b_t.[8] To pass, the bill requires a supermajority, which is to say both of the pivotal voters, L and R (and the median M), must consent to changes in the pre-existing statute.[9,10] Common empirical referents of the supermajority pivots are the Senate's filibuster pivot as determined by the cloture threshold ($\frac{3}{5}$ or $\frac{2}{3}$ depending on the rules of the time), and the veto pivot ($\frac{2}{3}$) as determined by the Constitution.[11]

[8] A rarely recognized (and often misrepresented) feature of the pivotal politics model is that the median voter need *not* be a monopoly agenda setter. The equilibrium bill and outcome are the same when amendments are permitted as long as the proposal right extends to at least one senator on the non-status-quo side of the median voter. An open rule is a special case of this very weak condition. That said, it is a technically convenient and analytically insignificant shortcut simply to treat the median voter as agenda setter, so we do this henceforth while urging the reader to remember that this is not a closed-rule, Romer-Rosenthal, setter model.

[9] Formally, passing a bill requires legislator R and all legislators to her left, or legislator L and all legislators to his right. In the environment we analyze, a necessary and sufficient condition for this is that both pivotal legislators (and M) support the legislation.

[10] In many models this would be called a status quo point. In this model, the notion of a status quo would be confounded by its different meaning in different stages in the game, therefore, we avoid using the term altogether and will instead write of pre-existing (or inherited) statutes or pre-existing policies at a given period.

[11] Applications in non-congressional settings are also increasingly common. These include Brazil (Zucco and Lauderdale 2011; Neto, Cox, and McCubbins 2003), Latin America (Crisp, Desposato, Kanthak 2009 and Colomer 2005), Kansas and Nebraska (Wright and Schaffner 2002), Missouri (Wilkins and Young 2002), and U.S. states generally (Alt and Lowry 2000, and Rogers 2005).

Players	Actions	Items Chosen or Realized
Period 1: Inherited statute s_0; mapping $\lambda_1(p) = p$ $(\omega_1 = 0)$		
Legislature	b_1, s_1	Bill and statute
Agency	p_1	Policy
–	x_1	Period 1 outcome
Period 2: Inherited statute $s_1 \in \{s_0, b_1\}$; mapping $\lambda_2(p\|\omega_2) = p + \omega_2$, $\omega_2 \in \{-\gamma, \gamma\}$		
Legislature	b_2, s_2	Bill and statute
Agency	p_2	Policy
–	x_2	Period 2 outcome

Table 1: Structure of the supermajoritarian delegation game

2.2 Delegation

In every period the agency is responsible for implementing a policy. We say that authority is *delegated* if the agency has some discretion over which policy to implement. Formally, a statute (or a bill) specifies a set of policies that are permissible, that is, $s_t \subseteq \mathbb{R}$. The agency is then required to choose a policy that is in this set, $p_t \in s_t$.[12] The size of the set of permissible policies measures the degree of discretion granted to the agency.

One extreme is when the statute specifies only a single policy—i.e., the permissible set contains only one point—and so there is *no delegation*, just a *decree*. At the other extreme the statute does not restrict policy choice at all—i.e., the permissible set contains every policy—and so the agency has complete discretion to choose whichever policy it desires. This is a case of *unconstrained delegation*. Between these extremes, the permissible set is more than a singleton but less than the entire policy space. These are intermediate cases of *constrained delegation*. Our analysis of constrained delegation restricts attention to closed interval constraints, in which the statute specifies values $\underline{d}$ and $\overline{d}$ such that the only permissible set of policies lie in $[\underline{d}, \overline{d}]$. To capture the act of delegating authority, we set the inherited statute at the beginning of play, s_0, to be a decree.

2.3 Gridlock

Gridlock has been defined elsewhere as an equilibrium condition in which a status quo does not change (Krehbiel, 1998). In the standard single-period, complete-information pivotal politics model, gridlock is a property of policies and outcomes alike in that nei-

[12] Gailmard (2002) allows for the possibility that the agency violates the statute.

ther changes when gridlock takes hold. The structure of our delegation game, however, is such that the previous definition cannot be applied directly and unambiguously. Nevertheless, we can use the concept rigorously and maintain its essence by using the term in a branch-specific or, equivalently, an instrument-of-choice-specific way. Specifically, we say that *statutory gridlock* is a characteristic of an equilibrium in which the legislature's equilibrium statute at one period is the same as the statute inherited from the previous period, i.e., $s_t^* = s_{t-1}^*$. Analogously (but less common in the literature), we define *policy gridlock* as a characteristic of an equilibrium in which the agency's equilibrium policy choice at one period is the same as policy inherited from the previous period, i.e., $p_t^* = p_{t-1}^*$. For completeness but of less importance, we define *outcome gridlock* as a characteristic of equilibrium in which the outcome in one period is the same as in the previous period of the game. We will see that these forms of gridlock are not synonymous and, indeed, that there are sometimes counter-intuitive relationships between the forms of gridlock.

2.4 Information and Equilibrium

The game is one of symmetric and complete (albeit uncertain) information and its various forms are easily solved by backward induction. The solution concept is subgame perfect Nash equilibrium. As is common in policy-making games, bills are proposed that leave one pivotal legislator indifferent. We break such ties by assuming that an indifferent legislator votes for a bill. Conversely, we suppose the median legislator offers a bill only if he strictly prefers it to the inherited statute (to avoid degenerate equilibria in which he proposes the inherited statute as the new bill and subjects it to a meaningless vote). Similarly, we assume that the legislature delegates discretion to the agency only if the discretion meaningfully affects outcomes. This assumption avoids equilibria in which an agency is provided discretion but the discretion is not decision-relevant and is never used.

2.5 Clarification of Terms

At the risk of repetition, some distinctions may require elaboration to obtain a sharp understanding of the unique features of the model. The first of these is the difference between statutes and policies. These are law-like actions in different branches of government. A *statute* is a collective choice of a legislative body, while a *policy* is a choice by an agency.

Another important distinction is that between a policy and an outcome. A *policy* is a regulatory instrument that has meaning but no consequences until it is implemented. Implementation of a policy p transforms it into an *outcome* x, i.e., an economic or social state of well-being in the world. The mechanism of this transformation is a postulated mapping $x = \lambda(p, \omega_t)$.

A final point of clarification concerns *drift* and *uncertainty*. In many previous models, policy making is confounded by players' not knowing the exact outcome any given policy will produce upon its implementation. This form of uncertainty, when experienced by some players but not others, provides a role for policy expertise and strategic use of information.[13] Perhaps contrary to first appearances, this type of uncertainty is *not* present in our model. In fact, at the start of both periods 1 and 2, all players know not only the mapping between policies and outcomes in that period but also the value of the random variable for that period. That is, there is no within-period uncertainty whatsoever. Similarly, in period 1, all players are aware that they live in a world with inevitable change that will occur between periods 1 and 2. Their only uncertainty occurs during period 1 and is about the precise nature of drift that will occur across periods, that is, between periods 1 and 2. More precisely still, players are symmetrically uncertain during period 1 about the value of ω_2, which represents drift. It must be stressed, furthermore, that, between periods, all players learn the value of ω_2, and, therefore, they also ultimately make decisions in period 2 without uncertainty.

In total, our model of gridlock and delegation combines elements from several independently influential classes of models from different subfields of political institutions. In addition to integrating selective elements of these frameworks, we also extend the model over two periods to allow for drift in a changing world.

3 Progressive Benchmarks

We set a benchmark for analysis by initially summarizing the standard model of gridlock, recasting it as a special case of the framework that we subsequently develop more fully. Although ultimately we identify and interpret equilibrium behavior in a dynamic model with a changing world and with the possibility of different forms of delegation, it is more instructive to add these embellishments in a piecewise fashion. Our typology of benchmark models and the corresponding formal results are laid out in Table 2.

[13] See, for example, Gilligan and Krehbiel (1987) and Huber and McCarty (2004).

3.1 Standard Pivotal Politics

The standard model of pivotal politics involves a single period, has no delegation (indeed, no implementation phase at all), assumes complete information, and ignores the distinction between policies and outcomes. From this set-up emerges the so-called *gridlock interval*. This is the set of points between and including the legislature's supermajority pivots, or, in our notation, $[l, r]$, for which no new statutes are passed. For pre-existing statutes outside this interval, a bill is proposed that moves inside the gridlock interval, selecting the policy that is most attractive to the median legislator. We state the standard result for completeness and later comparison.

Formally, the standard model corresponds to our setting by restricting the game to the single, first period, and requiring bills to be decrees. (We can retain the agency phase of policy making, although, with decrees only, the agency plays no active role.)[14] We denote equilibrium values with an asterisk.

Lemma 1 *Restrict the model to a single period and require that statutes be decrees (nondelegation). For each $s_0 \in [l, r]$, no bill passes the legislature, and legislative gridlock holds. For each $s_0 \notin [l, r]$, a bill, $b_1^* \in [l, r]$, is proposed and passes the legislature. The equilibrium bill is:*

$$b_1^* = \begin{cases} \max\{m, 2r - s_0\} & if \quad s_0 > r, \\ \min\{m, 2l - s_0\} & if \quad s_0 < l. \end{cases}$$

The key feature of this result to carry forward is that, within the gridlock interval, policy-making is purely adversarial among the pivotal legislators. Movement in any direction makes one of the legislative pivots worse off. Only for a pre-existing statute outside the gridlock interval do the pivots share a common interest in policy-making. In this case, movement toward the gridlock interval benefits both pivotal legislators and the median and wins the support of each of them.

The equivalence of legislative, policy, and outcome gridlock is imposed directly by the complete information and single-period features of the standard model. As we consider more general formulations in coming sections, we will prise these notions apart.

3.2 Dynamics without Delegation or Drift

We begin the transition to the full model by adding a second period of policy making.

Lemma 2 establishes that this extension has no substantive impact on the standard model's gridlock result. Furthermore, to the extent that gridlock does not hold in the

[14] An accessible reference for this result, and the standard model more generally, is Krehbiel (1998).

	Dynamic	Delegation	Drift
Lemma 1:	–	–	–
Lemma 2:	✓	–	–
Lemma 3:	✓	✓	–
Lemma 4:	✓	–	✓

Table 2: Typology of Benchmark Cases

first period, its absence is only temporary as, regardless of the initial statute, all forms of gridlock—statutory, policy, and outcome—take hold in the second period.

Lemma 2 *Restrict statutes to be decrees and assume there is no policy drift, i.e.,* $\omega_2 = 0$. *Behavior in the first period is as described in Lemma 1. This implies that* $s_1 \in [l, r]$ *for all* s_0. *In the second period, no bill passes the legislature. Therefore, legislative, policy, and outcome gridlock all hold.*

The striking feature is that this is a null result: The shadow of the future has *no* impact on policy-making in the short term. As the first-period behavior pushes the reigning statute inside the gridlock interval, policy-making immediately stabilizes and legislative action grinds to a halt. Moreover, it is not difficult to see that this result extends immediately to any arbitrary number of periods. Regardless of how many periods there are, behavior in the first period is identical to that in the one-period model, and thereafter gridlock is perpetual.

3.3 Dynamics and Delegation without Drift

To dynamics, we next add delegation. This extension of pivotal politics, too, has no impact on policy-making, whereas the ability to delegate authority is never used by legislators when policy outcomes are not subject to drift. Within each period the intuition is straightforward. The legislature can predict precisely the policy that a self-interested agency will select, therefore, the median will not delegate authority unless the agency and the median hold the exact same preferences. Yet, even in that event, the median need not delegate, as he can simply legislate his own preferences directly via decree. Lemma 3 establishes that this logic is sound even in a dynamic setting, for both unconstrained and constrained delegation.

Lemma 3 *In a dynamic world with delegation but without drift* ($\omega_2 = 0$)*, equilibrium behavior is the same as in Lemma 2, thereby again replicating the standard pivotal politics gridlock result.*

3.4 Additional Assumption

Lemmas 1-3 make it clear that behavior is demarcated according to whether the initial statute is within or outside the interval $[l, r]$. To emphasize most clearly the impact of delegation in a world with drift, we restrict attention hereafter to environments in which gridlock is otherwise endemic. We refer to these as *moderate policy environments*, and define them by amending the classic gridlock interval to accommodate drift within a changing world.

Definition 1 *A policy environment is moderate if the pre-existing statute $s_0 = p_0$ is sufficiently centrally located within $[l, r]$ and the drift factor ω_2 is not too large, such that following each possible realization $\omega_2 \in \{-\gamma, \gamma\}$, if the pre-existing statute remained in effect, it produces an outcome inside $[l, r]$. Formally: $\lambda_1(p_0) \in [l, r]$ and $\lambda_2(p_0|\omega_2) \in [l, r]$ for all ω_2.*

In a moderate policy environment, the outcome of the initial statute remains within the classic gridlock interval regardless of the drift that is realized. The existence of a moderate environment depends, therefore, on both the initial statute and the range of drift values that are possible. Putting the pieces together, the bite of the condition is that s_0 is farther than γ from either boundary of the standard gridlock interval; that is, that $s_0 \in [l + \gamma, r - \gamma]$. Without drift, the definition of a moderate environment is equivalent to the classic gridlock environment. For moderate environments, therefore, the predictions of the benchmark models are unambiguous: nothing will pass the legislature, and, therefore, legislative, policy, and outcome gridlock will all take hold. Consequently, by focusing on moderate policy environments, demonstrating the gridlock-breaking potential of delegation is most difficult.[15]

3.5 Dynamics and Drift without Delegation

Our final benchmark incorporates drift in a dynamic, changing world, albeit without the possibility of delegation. The impact of a changing world is, perhaps surprisingly, trivial: legislative gridlock takes a firm grip on policy-making and behavior is the same as in the preceding lemmas. Thus, the addition of unpredictable change prior to the second period of policy-making is not by itself enough to break statutory or policy gridlock.

[15]The underlying mechanism remains at work in non-moderate policy environments, although it coexists with the desire of legislators to center outcomes (i.e., move within the gridlock interval as in case (ii) of Lemma 1); for pedagogical convenience, therefore, we focus the formal analysis exclusively on moderate policy environments.

Lemma 4 *In a dynamic world with drift, a moderate policy environment, and with statutes restricted to decrees, legislative and policy gridlock occur in both periods as in Lemma 1.*

There is somewhat more to Lemma 4 than first meets the eye. While the first period statute and policy remain in force throughout the game, the drift caused by the changing world necessarily generates one of two *different* realized outcomes in the second period of the game. In other words, outcome gridlock does not hold despite legislative and policy gridlock being in effect. Furthermore, because the change in realized outcome may be either positive or negative, the movement in outcome in the second period outcome is certain to be objectionable to one of the two pivots, L or R (and possibly M as well), reflecting the adversarial nature of policy-making within the gridlock interval.

Collecting the benchmark results together, three takeaway points emerge. First, by itself, the static-to-dynamic extension of the pivotal politics model is without consequence. Once in the gridlock interval, statutes, policies, and outcomes stick. Second, taking an additional step and allowing for delegation as well does not change the behavioral basics of gridlock either. If a supermajority of the legislature knows what it wants, it can get what it wants and lock it in by decree—that is, via refusing to delegate to the agent. Third, by itself, the notion of drift is not necessarily significant, at least in moderate environments. In the following sections we show that these conclusions do not carry over to environments with drift and the prospect of delegation. We now turn to analysis of the general model.

4 Unconstrained Delegation in a Changing World

If a group of self-interested legislators cannot agree by the requisite supermajority to change policy, how can they be expected to agree to delegate authority to an agency to do so? Although this would seem like merely "kicking the can down the road" of abdication of responsibility, our next result establishes that this is exactly what rational legislators do in equilibrium when faced with the prospect of drift. Moreover, this delegation of authority strictly improves legislators' welfare. Proposition 1 shows that delegation emerges in equilibrium for a range of agency types, even when the delegation of authority is required to be unconstrained (i.e., the delegation of authority is all or nothing).

Proposition 1 *In a dynamic, moderate policy environment with drift and statutes restricted either to decrees or unconstrained delegation, the legislature delegates in period 1 if the agency's ideal point a is in the non-empty interval:*

$$a \in \left[r - \sqrt{(r - s_0)^2 + \frac{\gamma^2}{2}}, l + \sqrt{(s_0 - l)^2 + \frac{\gamma^2}{2}} \right].$$

If delegated to, the agency implements its ideal outcome via $p_1^* = a$ *in the first period. In period 2, no bill passes the legislature and legislative gridlock occurs; the agency chooses policy*

$$p_2^* = \begin{cases} a - \gamma & \text{if } \omega_2 = \gamma, \\ a + \gamma & \text{if } \omega_2 = -\gamma, \end{cases}$$

and the outcome is $x_2^* = \lambda_2 (p_2^* | \omega_2) = a$*. If a is outside the interval, the legislature does not delegate, behavior is as in Lemma 4, and legislative and policy gridlock occur in both periods.*

The striking feature of this result is that, despite there not existing a policy that they can agree to enact, legislators are able to agree to delegate authority unconditionally to a third party. Delegation, therefore, breaks legislative gridlock in the first period. This specific kind of breaking gridlock is short-lived, inasmuch as, in the second period, statutory (legislative) gridlock re-emerges. But with unconstrained delegation now being the inherited statute, policy gridlock does not occur. With complete policy-making freedom, the agency adjusts to the vicissitudes of drift in the changing world and thereby smooths out the consequences of any such fluctuations to the benefit of all legislators.

Figure 1 depicts the interval of agency ideal points, or *delegation range*, for which unconstrained delegation of policy-making occurs in equilibrium. This interval is always non-empty. The left boundary is a function of the right pivot's ideal outcome, r, and the right boundary is a function of the left pivot's ideal outcome, l. For an agency to be delegated complete discretion, both pivotal legislators and the median must concur. As values of a increase, the left pivot is less and less pleased with the agency's ideal-point-yielding outcome, and so the boundary condition for the delegation range is determined by his indifference between retention of the pre-existing statute $s_1 = s_0$ and a grant of unconditional delegation. The inverse holds for the left boundary of the interval and the right pivot's indifference. Because the median legislator M is more moderate than the pivots, if the pivots L and R are at least weakly in favor of delegation, then so too is M. Therefore, the median's ideal point m does not appear in either boundary

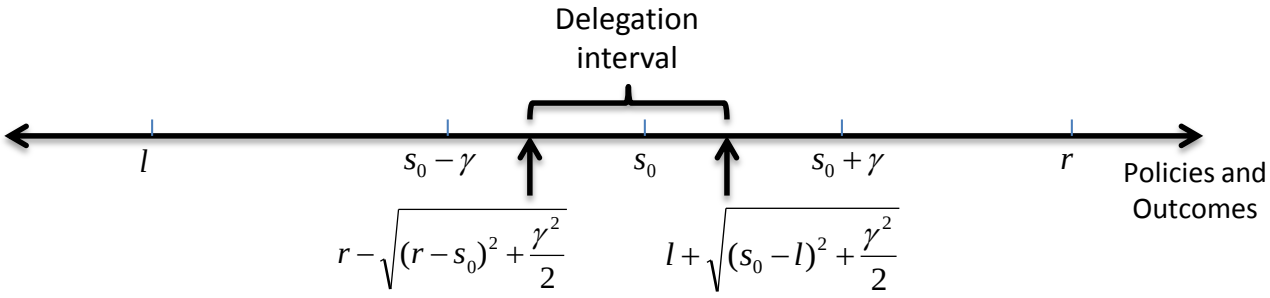

Figure 1: Unconstrained Delegation

expression, and the median's incentive constraint never binds. The following example puts some context on these effects.

Example 1 *Set $l=0$, $r=2$, $s_0=\frac{3}{2}$, $\gamma=\frac{1}{2}$. When statutes are restricted to be decrees or unconstrained delegation, the legislature delegates in period 1 if and only if:*

$$a \in \left[2-\sqrt{\frac{3}{8}}, \sqrt{\frac{19}{8}}\right] = [1.39, 1.54]\,.$$

To understand the proposition (and the example) it is useful to begin at the end and work backwards, following the logic of backward induction. In the second period, the inter-period shock has been realized and policy is made under complete information. This subgame reduces, therefore, to the standard model of pivotal politics, and, by Lemma 1, legislative gridlock holds (if the inherited statute is not extreme). Critically, this logic holds even if authority had been delegated in the first period. The legislators rationally deduce that if power is left in the hands of the agency, the agency will implement a policy that achieves outcome a. Hence, the second-period game reduces to the classic gridlock problem with delegation rendered equivalent to a decree of $s_2 = a - \omega_2$.

The legislators are not naive, however, and backing up to the first period, they anticipate that, if they were to delegate authority to the agency in the first period, such delegation will in fact be permanent. In a changing world, a reasonable intuition is that legislators would want to retain authority as much as possible. Proposition 1 establishes that this intuition is wrong. In a changing world legislators are, in fact, more apt to abdicate authority. And, surprisingly, they do this precisely because a one-time abdication of authority is rendered permanent by institutional design.

To see why delegation is optimal, the outcomes it produces must be compared to what happens otherwise, that is, off the equilibrium path. Suppose, then, that authority

is not delegated in the first period and that a bill does not pass the legislature (hence, legislative gridlock). Thus, $s_1 = s_0$ and in the first period this produces outcome $x_1 = s_1$. By the definition of a moderate environment, legislative gridlock again holds in the second period, regardless of the realized shock ω_2, and the outcome produced is $x_2 = s_1 \pm \omega_2$, each with equal probability.

The range of outcomes possible in this case is broad and uncertain at the time policy is made in the first period. This variance in outcomes is undesirable to the legislators as they are risk averse. By delegating to the agency, in contrast, these fluctuations are completely eliminated, and they are eliminated regardless of the drift realized between periods. Smoothing out the outcomes in this way benefits *all* the legislators. It is in this way that an *efficiency* component to policy making emerges from a purely ideological policy environment.[16] Even within the standard gridlock interval, policy-making is not purely adversarial between the pivots when policy-making is appropriately viewed with a longer time horizon than a single period. The efficiency benefit from outcome smoothing is such that a legislator is willing to tolerate an ideological cost to receive it. That is to say, a legislator, say R, is willing to accept an ideological outcome to the left of s_0, if it involves no fluctuations over time. This trade-off, by legislators on both the left and the right, is what generates the interval of agency ideal points that are amenable to delegation.

To complete the logic, it is necessary to ask why the legislature can't smooth the outcomes itself within the legislature. After all, the agency does not hold an expertise advantage and every legislator knows how, in principle, to achieve an efficient stream of outcomes. The legislature's inability to do this is a problem of commitment. Suppose the legislature tried to capture the benefits of outcome-smoothing via decrees. In the first period, legislators see that, in the long run, they will all be better off if, upon learning between periods whether the drift is positive or negative, they simply adjust to the new outcome state by moving policy γ to the left or to the right from some agreed-upon period-1 statute s_1. The problem with this ostensibly sensible plan is that the pivotal legislators—as self-interested individuals with different preferences—cannot credibly commit to following through on such a deal. When the second period is reached, the heretofore unrecognized impediment to such commitment surfaces: namely, the legislature's supermajoritarian requirement that accounts for the statutory gridlock interval in the first period. More specifically, if the inter-period shock is $+\gamma$, then the right-side pivot benefits and will not honor her period-1 commitment to make the

[16]By *ideological* we do not necessarily mean liberal versus conservative. Rather, we are referring to whatever the spatial (distributive) component of preferences represents in a given application.

adjustment. The same is true of the left-side pivot and a shock of $-\gamma$, of course. In brief, the contemplated behavior is not subgame-perfect, and the inability of legislators to commit to second-period actions in the first period dooms any possible two-period, Pareto-improving deal.

The deal can be implemented via delegation, however. After granting the agency unrestricted autonomy, the legislature's first-period statute is inherited by the legislature and, therefore, serves as the reversion statute in the second period. Then, and with noteworthy irony, the same supermajority requirement that was the impediment to legislators' committing to the deal at the outset is essential to enforce the deal in the end. Precisely because the delegation of authority shelters the agency within a supermajority bunker, the agency is able to change policy in response to drift, thereby smoothing outcomes and implementing a Pareto-improving bargain.

4.1 Derivation

In constructing the equilibrium, the key comparison is between the utility from unrestricted delegation and leaving the initial statute s_0 in place. As described above, if the initial statute is left in place in the first period, it remains in place in the second period. The total utility for legislator L from this is given by the following:

$$U_L' = -\left(s_0 - l\right)^2 - \frac{1}{2}\left(s_0 + \gamma - l\right)^2 - \frac{1}{2}\left(s_0 - \gamma - l\right)^2,$$

where the final two terms are the possible outcomes in the second period, weighted by the probability of each eventuating.[17]

If authority is delegated, all variance in outcomes is removed, both within and across periods. The total utility for legislator L is then:

$$\begin{aligned} U_L'' &= -\left(a - l\right)^2 - \left(a - l\right)^2 \\ &= -2\left(a - l\right)^2. \end{aligned}$$

[17]The efficiency gain from delegation can be seen by expanding and rearranging this expression, as this gives:

$$U_L' = -\left(s_0 - l\right)^2 - \left(s_0 - l\right)^2 - \gamma^2,$$

where the second period utility simplifies to two separate terms, one for expected ideological loss and the second the variance of outcomes around this point. This is a manifestation of the standard mean-variance representation of expected utility when the utility function is quadratic. This formulation shows that the efficiency gain from removing fluctuations is independent of ideal points and, thus, constant across legislators.

Legislator L prefers to delegate authority if $U_L'' > U_L'$. This condition will hold if the agency ideal point, a, is not too far from the legislator's ideal point, l. The value of a at which the legislator is indifferent between delegating and not we refer to as L's *certainty equivalent*.[18] We denote this value by o_L^{ce}. Thus, at $a = o_L^{ce}$ we have that $U_L'' = U_L'$, and:

$$-2\left(o_L^{ce} - l\right)^2 = -\left(s_0 - l\right)^2 - \frac{1}{2}\left(s_0 + \gamma - l\right)^2 - \frac{1}{2}\left(s_0 - \gamma - l\right)^2$$

Rearranging to solve for o_L^{ce}:

$$o_L^{ce} = l + \sqrt{\left(s_0 - l\right)^2 + \frac{\gamma^2}{2}}.$$

To see the usefulness of this concept, observe that the expression for o_L^{ce} is the right-side boundary of the condition in Proposition 1. Defining the certainty equivalent for legislator R analogously as o_R^{ce}, we get that:

$$o_R^{ce} = r - \sqrt{\left(r - s_0\right)^2 + \frac{\gamma^2}{2}},$$

which is the left-side boundary in the proposition.

With these expressions in hand, the interval in Proposition 1 can be restated concisely as $a \in [o_R^{ce}, o_L^{ce}]$. Stated this way, it becomes obvious that $[o_R^{ce}, o_L^{ce}] \subset (s_0 - \gamma, s_0 + \gamma)$ and the delegation interval is within the range of possible outcomes from not delegating. For legislator L the worst outcome she can receive from not delegating is $s_0 + \gamma$ (see again Figure 1), so obviously her certainty equivalent is less extreme than this point. The same holds for pivot R.

4.2 Remarks

The model gives the median voter in the legislature an apparent agenda-setting advantage, so one substantive question it can shed some light on is: When the median's right to propose is advantageous, how advantageous is it? A related and readily available implication of the proposition centers on the M's preferences over agency types within the delegation interval.

Corollary 1 *For all $a \in [o_R^{ce}, o_L^{ce}]$ in Proposition 1, the median legislator's utility is strictly decreasing in $|m - a|$.*

[18] The certainty equivalent is a commonly used concept in studies of decision making under risk. As the name suggests, it is the outcome that, if received with certainty, leaves the decision maker indifferent between it and a particular lottery.

This result is not surprising. If given a choice, the median legislator will choose the agency with preferences most consonant with her own. The interesting element is that this desire of the median legislator still leaves scope for a gap to open up between the median legislator and the agency, what is sometimes referred to as agency shirking.[19] If the median's ideal point is within the delegation interval, $m \in [o_R^{ce}, o_L^{ce}]$, she chooses an agency that is an ideological clone of himself, whereas, if it is outside, then his ideal agency has distinct preferences from his own.

Although straightforward, this result is of interest for two reasons. First, it explains why agencies will not perfectly represent the will of the median legislator, even if she were to hold monopoly agenda setting power. This underscores the importance of taking seriously legislative supermajority requirements when modeling legislative-agency interactions. Second, it provides a reason for the agency to pull policy away from the legislative median even in the absence of a policy expertise advantage. Several accounts explain this phenomenon as the payoff to the agency to induce it to undertake the costly acquisition of expertise (Callander 2008; Gailmard and Patty 2007). This incentive plays no role in this model as there are no policy experts. Instead, the agency impact on policy choice is an indirect by-product of supermajoritarianism in the legislature.

5 Constrained and Unconstrained Delegation in a Changing World

Unconstrained delegation is a blunt tool inasmuch as the legislature abdicates *all* of its right to make policy adjustments to changing policy environments. In more plausible empirical scenarios, it is possible that legislators find a middle ground that is more advantageous. What if they not only delegate to, but also constrain the actions of, the agency? To address this question, we model delegation as a variable, endogenous constraint. That is, a statute is a specific pair of values that define a *delegation interval* $\left[\underline{d}, \overline{d}\right]$ from which the agency must choose and implement a policy.[20] Note that this formulation is the general case, allowing for delegation to be constrained or unconstrained, where unconstrained is simply the special case of setting $\underline{d} = -\infty$ and $\overline{d} = \infty$; at the

[19]The term shirking sometimes also means effort-reduction, consistent with agency theory in economics.

[20]This restriction is with loss of generality given the binary shock structure we employ. In more general environments the interval restriction is efficient (Alonso and Matouschek 2008); thus, as we view our set-up as the most simple representation of the general problem we can develop, we impose the restriction here.

other extreme of $\underline{d} = \overline{d}$ the statute is a decree and no authority is delegated.

The equilibrium is stated in Proposition 2 and illustrated in Figure 2. The logic for the use of constrained delegation has two components. First, by constraining the behavior of the agency, delegation is supportable to agencies with a greater range of ideal outcomes than in Proposition 1. This causes the delegation interval to span the entire interval $(s_0 - \gamma, s_0 + \gamma)$. Second, by constraining the agency, the median legislator and the majority he represents are able to benefit more from their proposal rights and move the policy outcomes closer to their ideal points. This leads the median legislator to propose constrained delegation in equilibrium for every possible agency, with only a single exception, even for agency ideal points within $[o_R^{ce}, o_L^{ce}]$ where the other legislators would gladly vote for unconstrained delegation.

For simplicity, we use the notation o_R^{ce} and o_L^{ce} in the statement of equilibrium, and impose the restriction $m \leq s_0 - \gamma$, such that the median legislator's ideal point is not in the interval of delegation. If the opposite holds and $m > s_0 - \gamma$, equilibrium behavior is substantively very similar, although with additional notational complexity to deal with changes in the direction of delegation around m.

Proposition 2 *In a dynamic, moderate policy environment with drift, and $m \leq s_0 - \gamma$, the legislature delegates in period 1 if the agency's ideal point a is in the interval:*

$$a \in (s_0 - \gamma, s_0 + \gamma)\,.$$

The constraints on delegation depend on the agency's ideal point, a, as follows:
(i) For all $a \in (s_0 - \gamma, a')$, delegation is left-constrained with $\underline{d} \in (a, a + \gamma)$ and $\overline{d} = \infty$, where $\frac{d\underline{d}}{da} < 0$, and $\underline{d}$ is given by:

$$\underline{d} = r - \frac{1}{3}\gamma - \frac{1}{3}\sqrt{-3a^2 + 6ar + 9r^2 - 24rs_0 + 4\gamma^2 + 12s_0^2}.$$

The boundary a' is the value of a where $\underline{d} = a$.
(ii) For all $a \in (a', o_R^{ce})$, delegation is left-constrained with $\underline{d} \in (a - \gamma, a)$ and $\overline{d} = \infty$, where $\frac{d\underline{d}}{da} < 0$, and $\underline{d}$ is given by:

$$\underline{d} = r - \gamma - \sqrt{-3a^2 + 6ar + r^2 - 8rs_0 + 2\gamma^2 + 4s_0^2},$$

and has the property that $\underline{d} \to a - \gamma$ as $a \to o_R^{ce}$.
(iii) For $a = o_R^{ce}$ delegation is unconstrained.
(iv) For all $a \in (o_R^{ce}, a'')$, delegation is right-constrained with $\underline{d} = -\infty$ and $\overline{d} \in (a, a + \gamma)$,

where $\frac{d\overline{d}}{da} < 0$*, and* $\overline{d}$ *is given by:*

$$\overline{d} = r + \gamma - \sqrt{-3a^2 + 6ar + r^2 - 8rs_0 + 2\gamma^2 + 4s_0^2}.$$

The boundary a'' *is the value of* a *where* $\overline{d} = a$*.*
(v) For all $a \in (a'', s_0 + \gamma)$*, delegation is right-constrained with* $\underline{d} = -\infty$ *and* $\overline{d} \in (a - \gamma, a)$*, where* $\frac{d\overline{d}}{da} < 0$*, and* $\overline{d}$ *is given by:*

$$\overline{d} = r + \frac{1}{3}\gamma - \frac{1}{3}\sqrt{-3a^2 + 6ar + 9r^2 - 24rs_0 + 4\gamma^2 + 12s_0^2},$$

and has the property that $\overline{d} \to s_0$ *as* $a \to s_0 + \gamma$*.*
Following delegation, legislative gridlock holds in the second period.
For all $a \notin (s_0 - \gamma, s_0 + \gamma)$*, legislative gridlock obtains in both periods.*

In all five cases the agency possesses autonomy in policy-making, however, only in case (iii) is delegation unconstrained. In cases (i) and (ii) the agency is left-constrained in that the constraints preclude the agency from moving policy to the left as much as it desires. In cases (iv) and (v) the agency is right-constrained similarly. The difference between cases (i) and (ii) is that in case (ii) the left-constraint binds only in the second period and only after the positive drift $\omega_2 = \gamma$ is realized, whereas in case (i) the left-constraint binds in the first period as well as following the positive shock. Similarly, in case (iv) the right-constraint binds only in the second period following the negative shock $\omega_2 = -\gamma$, whereas in case (v) the right-constraint binds in the first period as well. Continuing the example from the previous section, we recall that $o_R^{ce} = 2 - \sqrt{\frac{3}{8}} = 1.39$ and the regions are as follows.

Example 2 *Set* $l = 0$*,* $r = 2$*,* $s_0 = \frac{3}{2}$*,* $\gamma = \frac{1}{2}$*, and* $m < 1$*. The legislature delegates in period 1 for all* $a \in [1, 2]$*, and the cases in Proposition 2 correspond to:*

$$\begin{aligned} \textit{(i)}\ a &\in (1.00, 1.30)\,, \quad \textit{(ii)}\ a \in (1.30, 1.39)\,, \quad \textit{(iii)}\ a = 1.39, \\ \textit{(iv)}\ a &\in (1.39, 1.55)\,, \quad \textit{(v)}\ \ a \in (1.55, 2.00)\,. \end{aligned}$$

To see the equilibrium constraints more clearly, a table and two figures are helpful. Table 3 describes policies and outcomes for each case and following each shock.[21]

[21]The relationship between the values of $\underline{d}$ and $\overline{d}$ in the various cases of the proposition exhibit some noteworthy features. The values of $\underline{d}$ and $\overline{d}$ differ only by a constant 2γ. This implies that at the crossover point of case (iii), equilibrium behavior is continuous and actually given by the same curve

	Legislature: Statutory Delegation		Agency: Policies and Outcomes					
Case: $a \in$	$\underline{d}$	$\overline{d}$	p_1^*	x_1	$p_2^*(-\gamma)$	$x_2(-\gamma)$	$p_2^*(+\gamma)$	$x_2(+\gamma)$
i. $(s_0-\gamma, a')$	$(a, a+\gamma)$	∞	$\underline{d}$	$\underline{d}$	$a+\gamma$	a	$\underline{d}$	$\underline{d}+\gamma$
ii. (a', o_R^{ce})	$(a-\gamma, a)$	∞	a	a	$a+\gamma$	a	$\underline{d}$	$\underline{d}+\gamma$
iii. o_R^{ce}	$-\infty$	∞	a	a	$a+\gamma$	a	$a-\gamma$	a
iv. (o_R^{ce}, a'')	$-\infty$	$(a, a+\gamma)$	a	a	$\overline{d}$	$\overline{d}-\gamma$	$a-\gamma$	a
v. $(a'', s_0+\gamma)$	$-\infty$	$(a-\gamma, a)$	$\overline{d}$	$\overline{d}$	$\overline{d}$	$\overline{d}-\gamma$	$a-\gamma$	a

Table 3: Equilibrium behavior and outcomes under conditional delegation

The basic logic in all cases is the same as for unconstrained delegation in the previous section. Once delegated to, the agency is autonomous and protected behind a figurative iron curtain of supermajority legislative gridlock. Thus, in all five cases delegation breaks legislative gridlock in the first and only the first period. When the delegation of authority is unconstrained (case iii), outcome gridlock but not policy gridlock occurs, and the agency uses its freedom to adjust policy perfectly to the changing world. In the remaining four cases, however, this result breaks down and neither outcome gridlock nor policy gridlock take hold following all shocks as the agency is constrained in its ability to fine-tune policy to ameliorate the unwanted consequences of drift.

Figures 2 and 3 present this data graphically. Figure 2 depicts the statutory constraints on delegation as the agency's ideal outcome varies on the horizontal axis (depicting only the value of $\underline{d}$- and $\overline{d}$ that binds; i.e., the constraint that is not $\pm\infty$). As is evident, the relevant constraint is $\underline{d}$ to the left of o_R^{ce} and the constraint is above a for values of a to the left of a'. Similarly, to the right of o_R^{ce} the relevant constraint is $\overline{d}$ and this value is below a for values of a more extreme than a''.

Figure 3 depicts the outcomes that these constraints produce, again as the agency ideal outcome varies on the horizontal axis. The thick solid (blue) line depicts the first period outcome, and the 45° lines represent the agency's ideal outcome. The important observation is that the solid line tracks the 45° line only for moderate values of a. The dashed (green) and dot-dashed (red) lines represent second-period outcomes for $-\gamma$ and γ shocks, respectively. Agency behavior that is unconstrained is represented by outcomes on the 45° line; this holds for the dashed line for values of a to the left of o_R^{ce}, and for the dot-dashed line for values of a to the right of o_R^{ce}. Wherever these lines depart from the 45° line, the legislature-imposed constraint on agency behavior

as the constraint in case (ii) is on $\underline{d}$, whereas in case (iv) the constraint is on $\overline{d}$. The values for $\underline{d}$ and $\overline{d}$ in cases (i) and (v) also differ by a constant value, in this case $\frac{2}{3}\gamma$, although as these cases are non-continguous the implication of this relationship is less obvious.

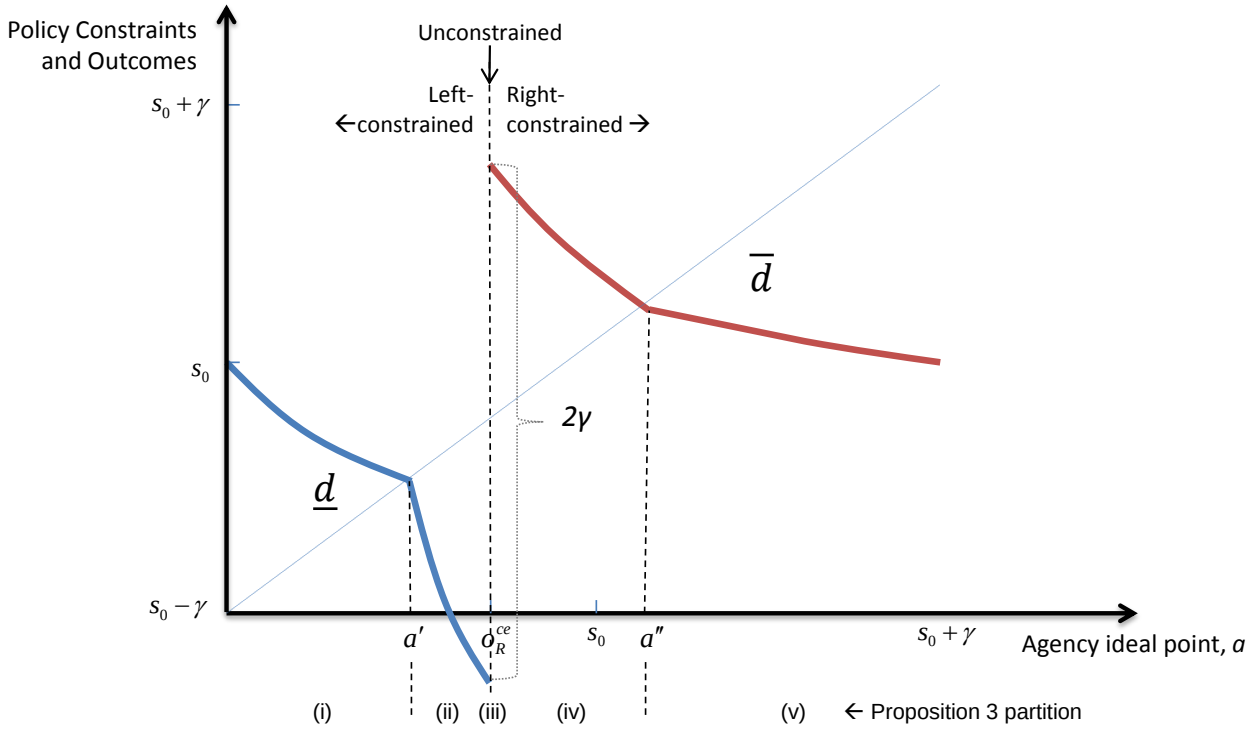

Figure 2: Constraints on Delegation in Equilibrium

is binding. Only at the critical value of $a = o_R^{ce}$, which defines case (iii), is behavior unconstrained. Here, all three lines intersect at the 45° line.

To understand the nature and origin of the delegation constraints, consider case (ii). In this interval, the agency's ideal point is too far from the right pivot R for R to support unconstrained delegation; he prefers instead the initial statute s_0 (without delegation) despite the outcome fluctuations it induces. Furthermore, for constrained delegation to be supported in equilibrium, the policy choices must be pushed to the right to be more appealing to R. This is achieved by left-constraining the agency in equilibrium.

Ideally, the agency would be compelled to implement outcome o_R^{ce} in both periods, thereby just winning the support of legislator R and making L and M as well off as supermajoritarianism permits. However, it is not possible to structure the delegation constraints in such a way to do this. To generate outcome o_R^{ce} in the first period requires $\underline{d} = o_R^{ce}$, but then this leave the agency ill-equipped to address a positive drift γ in the second period.

The failure of this possibility is due to the fact that policy implementation is the responsibility of the autonomous and self-interested agency. As such, the median legislator's problem is non-trivial: How can he manipulate the delegation constraints to win R's support subject to the agency's post-drift optimizing behavior, and do it in such a way that it moves policy outcomes as close to her own ideal point as possible?

In case (ii), the optimal delegation scheme pushes the constraint $\underline{d}$ so that policy

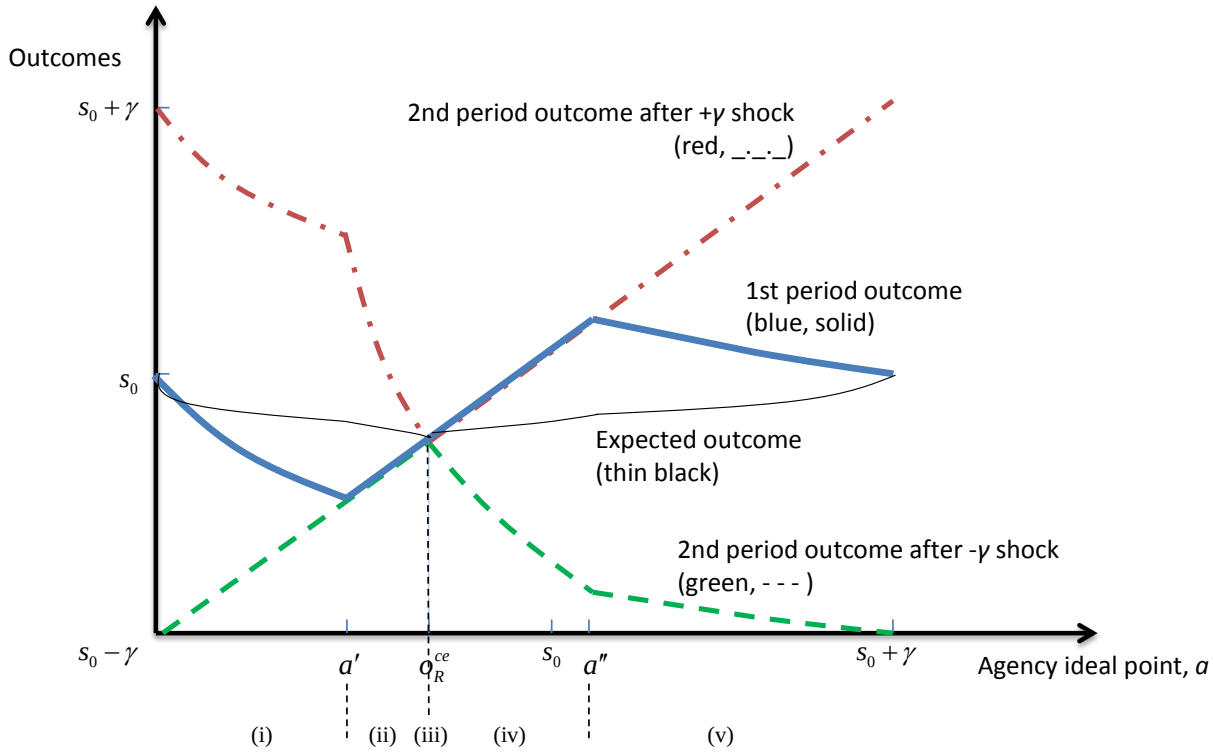

Figure 3: Equilibrium Outcomes Under Constrained Delegation

implemented in the second period following the $+\gamma$ shock is to the right of the agency's ideal outcome and closer to R's. This distortion must deliver to R the same utility as he would receive from outcome o_R^{ce} with certainty (as this, by definition, is the same utility as from not delegating at all). Thus, a minimal requirement is that the second period outcome following shock $+\gamma$ (the dot-dash line) is to the right of o_R^{ce}. It turns out in equilibrium, as in this case the value of a is close to o_R^{ce}, that this distortion is sufficient to win R's support. For values of a to the left of a' (case (i)), however, constraining only second period behavior in this way is not sufficient to win R's support, because the agency ideal point is more distant from o_R^{ce}, and the equilibrium constraint is $\underline{d} > a$ such that the first period policy choice as well is pushed toward R's ideal outcome.

For agencies with ideal points closer and closer to the boundary $s_0-\gamma$, the delegation constraints must be increasingly distorted to win the support of R. Ultimately, at the boundary the constraint $\underline{d}$ reaches $a+\gamma$, and, as a is approaching $s_0-\gamma$, the constraints bind completely. At the boundary the statute is rendered equivalent to a decree of $s_1 = s_0$, and no authority is delegated.

This behavior is mirrored for agency ideal points to the right of o_R^{ce}, although now the agency is right-constrained in cases (iv) and (v). In these cases the right-pivot legislator strictly prefers unconstrained delegation to not delegating. This causes the constraints to flip over as the median legislator can move proposed statutes to the left and still win R's support. This is the reverse of cases (i) and (ii) as the median's problem

now becomes how to move the agency's policy choices to the left so as to minimize the distance between the outcome and the median voter's ideal point while keeping the support of R. In case (iv) only second-period behavior following the $-\gamma$ shock can be distorted without losing R's support, whereas for values of a farther to the right—and closer to R's ideal outcome—first-period behavior as well can be distorted to the left, while still gaining the critical vote of the right-side pivot.

The careful reader may have noticed that while the analysis for unconstrained delegation in the previous section depended on the indifference condition of both the left and right-side pivots, the analysis in this section has invoked the right-side pivot exclusively. The indifference condition for the left pivot disappears from the statement of equilibrium because in this environment the interests of M and L are approximately aligned. In all cases, the median legislator uses his right to propose to constrain the agency and force the outcomes farther to the left than the agency would otherwise implement. Because, by definition, the left-pivot is to the left of the median, he is made better of by this left movement as well. Moreover, as he is farther from the expected outcome than even the median legislator, he gains more from the constraints than does the median legislator due to their risk aversion. Consequently, if the median legislator is made better off by delegating constrained authority, then so too is the left-pivotal legislator.

5.1 Remarks

We can now revisit the question posed in the section on unconstrained delegation. Which agency within the delegation interval maximizes the median legislator's utility? Surprisingly, it is no longer the agency with ideal outcome most similar to the median legislator's. Rather, the median legislator strictly prefers to delegate to a more distant agency, specifically the agency at $a = o_R^{ce}$, for whom equilibrium delegation is unconstrained.

Corollary 2 *For the environment in Proposition 2, the median legislator's utility is strictly maximized when* $a = o_R^{ce}$.

This result goes beyond the logic of Corollary 1 for unconstrained delegation. It says that not only is the median legislator subject to supermajority rule in selecting an agency, but that even among the agencies that are acceptable to the pivotal legislators—that is, even agencies within the delegation interval—the median legislator would not choose the agency with preferences most like his own.[22]

[22]This property also holds for $m \in [s_0 - \gamma, o_R^{ce})$ and $m > o_L^{ce}$. For $m \in [o_R^{ce}, o_L^{ce}]$, unconstrained delegation is supportable in equilibrium to a agency clone of the median legislator, by Proposition 1,

Why is this so? As is evident most clearly in Figure 3, when delegation is constrained, outcome gridlock does not occur; rather, outcomes fluctuate across time and depend upon realized drift. These fluctuations are costly not only to the left pivot but also to all other legislators. Constrained delegation therefore produces inefficient outcomes. Corollary 2 establishes that the inefficiency of constrained delegation is sufficiently large that it outweighs the benefit to the median of delegating to an agency with an ideal point closer to the median's.

To understand the result, recall that the price for any deal on delegation is the support of the right pivot, R. For R to support a statute, he must be at least as well off under its delegation than he is with the outcome o_R^{ce} with certainty. For any bill with delegation that does not smooth outcomes perfectly, therefore, R requires an expected outcome closer to his ideal point than is o_R^{ce}. Such a deal from the median's perspective, however, produces a worse expected outcome (plus non-smoothed outcomes) than the outcomes from unconstrained delegation to the agency at $a = o_R^{ce}$. This fact is evident in the thin black line in Figure 3 that depicts the expected outcome across periods and across shocks that are always below s_0 yet have a lower bound of o_R^{ce}, reaching this value only at $a = o_R^{ce}$.

For agencies with ideal points to the left of o_R^{ce}, unconstrained delegation is not supportable in equilibrium, as we have shown, so the inefficiency of constrained delegation can reasonably be viewed as the price to pay for any delegation at all. An important feature of our result is that the median proposes constrained delegation even for agency ideal points within the interval $[o_R^{ce}, o_L^{ce}]$—notwithstanding the resulting inefficiency and notwithstanding the fact that unconstrained delegation and perfect efficiency are supportable in equilibrium (Proposition 1).

The presence of this inefficiency by choice brings us back to an issue raised at the outset. As a normative matter, even a democracy that is constrained by the institutions of supermajoritarian lawmaking and separate executive policy-implementation can theoretically accommodate change and corresponding drift to eliminate all uncertainty costs. As a positive matter, however, the presence of drift provides opportunities for rent-seeking by legislators with proposal rights to extract a surplus for themselves at the expense of foregone collective benefits from outcome smoothing. Strikingly, these benefits and costs that accrue are not merely distributional as in the classic account of Romer and Rosenthal (1978). Rather, those with agenda rights willfully impose an inefficiency on *all* legislators and policy-makers so that they can produce a better out-

and delegation is to the nearest agency.

come for themselves. To use the analogy of pie-splitting, by choosing statutes with constrained delegation when unconstrained delegation is also feasible, the proposer in the legislature deliberately decreases the size of the pie so that he and like-minded legislators receive larger slices. This form of distribution-information tension is not unique within the delegation literature (Gilligan and Krehbiel 1987, Epstein and O'Halloran 1999), but, unlike earlier works, our model does not require specialization, asymmetric information, or signaling.

6 Summary and Discussion

Exogenous forces in the political environment cause the outcomes of fixed policies to *drift* and thereby pose serious challenges for representative governance. One's perspective on how drift impacts policymaking is distorted if the elements of the policymaking apparatus are viewed in isolation. Specifically, when lawmaking via supermajority is considered in isolation, legislative gridlock ensues in moderate environments, and government is unresponsive to the changing world. Similarly, when delegation is considered in isolation, agency shirking or regulatory capture ensues and government *may be* responsive to exogenous changes in policy consequences, but the nature of its responses are likely to be inconsistent with the preferences of elected representatives. However, by characterizing formally a conception of drift and embedding it in a single dynamic model that integrates both gridlock and delegation, the resulting whole model is greater than the sum of its isolated parts. Indeed, each of its two major components—gridlock and delegation—tend to address the other's isolated shortcoming. Delegation to a moderate agency does not preclude all statutory gridlock, but it ameliorates its pernicious consequences by breaking both policy and outcome gridlock should statutes prove to be unchangeable. In a dynamic model, then, a more favorable governmental response to drift is achieved than the supermajoritarian legislature can enact by itself, and more representative outcomes are achieved than an unconstrained agency would enact by itself.

Like all theories of this sort, our model starkly simplifies the many complexities of lawmaking, delegation, and policy implementation. Even so, it embodies several non-incremental innovations that are realism-enhancing and uniquely explanatory. Critical to our approach are the conceptual and formal distinctions between *statutes* passed by the legislature, *policies* implemented by the agency, and *outcomes* whose consequences are borne by all—phenomena that are one and the same in, for example, static, complete-

information legislative models, but that are significantly different from one-another in our model and in the world. Closely related, the assumptions and structure of our model made it not just permissible but actually valuable to abandon the conventional conception of a single status quo point in Euclidean space. Here, too, the framework we developed seems more accurate descriptively and more powerful predictively. A well-specified policymaking environment must state what happens when policymakers at a given stage cannot agree on how to change that over which they have control (e.g., a legislature's inability to pass a new statute). In an environment such as ours, an inability or unwillingness to change course—or to address drift—has different consequences for different institutions at different stages. It therefore makes sense not only to differentiate legislative gridlock (reversion to a pre-existing *statute*) from agency gridlock (reversion to or reaffirmation of a pre-existing *policy*), but also it is necessary to do so in order to characterize the conditions under which realized outcomes change and, ultimately, to assess how well governing institutions perform. Two more unique features of our approach are the representation of change as a mapping $\lambda(p, \omega)$ that takes policies into outcomes differently over time with a fixed policy p, and the combination of all of the above into a single model that embodies both supermajoritarianism and delegation.[23] Cumulatively, these features show promise as a first step in exploring the impact of change on policy-making processes and on the design of political institutions.

With an optimistic outlook for continuation of this research agenda, we conclude by identifying some questions and concerns that, while not addressed directly, are foreshadowed by our framework.

First, perhaps most conspicuously absent from our analyses is the president. Our silence about the policy-making role of the chief executive is born out of convenience rather than ignorance. Along with McCarty and Razaghian (1999), Moe (1990), Moe and Howell (1999), Lewis (2008) and many others, we affirm the importance of the president in bureaucratic policy-making via his appointment powers and other, more informal rights and resources. However, this concession does not render our framework analytically useless in presidential accommodation. As a first approximation, bringing the president into the discussion is a simple matter of reinterpreting one of our legislative pivots' ideal points, l or r, as president-determined rather than legislature-determined.[24]

[23]Volden (2002) also presents a model with both delegation and supermajoritarianism, but it is a one-period model, does not have drift, and is based on a traditional reversion point. His purpose—to inspect analytically and empirically an assertion of Epstein and O'Halloran about discretion and divided government—is also much different from ours.

[24]More accurately, the analytically appropriate pivot would be the interior-most of the president's ideal point or the 2/3-pivot's ideal point.

Another, more ambitious extension to which our framework is also amenable is the modeling of appointments with our agency a being an endogenous choice. So, while models of appointments are not new, their reconsideration within the context of the dynamics of drift is likely to provide interesting points of contrast from existing exclusively one-shot (and overwhelmingly complete-information) appointment games.

A similar point and counterpoint hold for courts. Shapiro (2003) makes a meticulous, comprehensive, and compelling argument that administrative procedures over three highly developed democracies—the U.S., the U.K., and France—have all evolved into separation-of-power systems in which nearly all legislative delegation to executive agencies is unconstrained. Only as a last resort do the courts intervene to nullify behavior deemed "arbitrary or capricious" behavior.[25] Shapiro's interpretation of these countries' histories is that the standard principal-agent framework is, at best, a loosely applicable metaphor, and then, only with a major modification. One ought to consider the courts as secondary agents (of the legislature-as-principal) whose job it is to police and control the otherwise unconstrained primary agent, namely, the delegation-receiving agency. This, admittedly, is a much more complicated set of strategic interactions than our framework can readily accommodate. About the most that can be said is that Shapiro's argument implies that our unconstrained-delegation model may be more empirically relevant, as a first approximation, than our constrained-delegation model.

Other topics on the agenda include: extraction of predictions pertaining to the size of winning coalitions, consideration of changing preferences[26] as opposed to changing policy mappings as the exogenous phenomena of interest, modeling longer time horizons and a larger class of policy-to-outcome mappings, and a more thorough comparison of rationales for delegation including most notably the expertise-based theories which have been dominant to date.

A final, less well-defined but much-talked-about area for future research is on the dynamics of policy-making in the presence of an enduring commitment problem. Commitment is invariably at the core of delegation, even though the topic doesn't regularly surface in the literature. In a nutshell, the issue is: If the legislature at time t delegates to an agency with different preferences in order for the agent to (variously) exert effort, acquire expertise, exercise autonomy and set policy, what is to keep the legislature at time $t+1$ from reneging on its grant of autonomy and correcting whatever form of

[25] These are the key legal concepts for the U.S. For the U.K and France the legal terms are somewhat different but the practical consequences are the same.

[26] "The preferences of whom?" is an obvious first question. It could be the public; it could be the Congress; it could be the agency (as in exogenous or endogenous parameter); or, to tie-in best with a voluminous but mostly overlooked literature in the bureaucracies field, it could be the president's.

agency expropriation the delegation elicited? To the best of our knowledge, the analysis in this paper speaks to—and solves—this very general commitment problem in a previously unrecognized way. Under specified conditions, a supermajoritarian legislature in a changing world can effectively commit to conferring a statutory grant of executive autonomy precisely because it is supermajoritarian. Meanwhile and furthermore, supermajoritarianism combined with delegation enables policy responsiveness through executive action, not only in the presence of—but actually due to— legislative gridlock. It could be that the underlying processes of institutional development are random accidents of evolution, or it could be that they are products of rational calculations. We are agnostic about these possibilities. Suffice it to say, however, that, in the first case, the supermajority solution to the commitment-to-delegation problem is fortuitous; in the latter case, it is ingenious.

7 Proofs

Proof of Lemma 1: Case i. $s_0 \in [l, r]$. For s_0 and a proposal b_1, R's total utility is:

$$\begin{aligned} U_R(b_1) &= -(b_1 - r)^2, \\ U_R(s_0) &= -(s_0 - r)^2. \end{aligned}$$

$U_R(b_1) > U_R(s_0)$ iff $s_0 < b_1 < r + (r - s_0) > r$. Similarly for L, $U_L(b_1) > U_L(s_0)$ iff $l - (s_0 - l) < b_1 < s_0$. Thus, $\{b_1 | U_R(b_1) > U_R(s_0) \text{ and } U_L(b_1) > U_L(s_0)\} = \varnothing$ and no bill can pass the legislature.

Case ii. $s_0 \notin [l, r]$. For $s_0 < l$, $U_R(b_1) > U_R(s_0)$ iff $s_0 < b_1 < r + (r - s_0) > r$ and $U_L(b_1) > U_L(s_0)$ iff $s_0 < b_1 < l + (l - s_0)$. Thus, $\{b_1 | U_R(b_1) > U_R(s_0) \text{ and } U_L(b_1) > U_L(s_0)\} = (s_0, 2l - s_0)$, which is not empty. The Median legislator optimizes within this set. The case for $s_0 > r$ is analogous. ■

We now state three additional lemmas that are invoked repeatedly throughout the remainder of the proofs. Define an outcome pair $\{x_1, x_2\}$ as outcomes received in periods 1 and 2, respectively. An outcome pair is zero-variance if $x_1 = x_2$, and it is positive variance otherwise. Where not otherwise stated, gridlock refers to legislative gridlock.

7.1 Preliminary Results

Lemma 5 *In the second period subgame, the bill proposed by the legislature, b_2^*, is always a decree.*

Proof of Lemma 5: The subgame is one of complete information as ω_2 has been realized. For any statute $s_2 \subseteq \mathbb{R}$, the agency optimizes with policy $p_2(s_2) = \arg\min_{p \in s_2} |p + \omega_2 - a|$. The statute s_2 is, therefore, behaviorally equivalent to the decree $\tilde{s}_2 = p_2(s_2)$. The lemma follows by the maintained assumption that discretion is offered iff it materially changes behavior. ■

Lemma 6 *In any equilibrium, behavior in the second period subgame is as in Lemma 1.*

Proof of Lemma 6: Given Lemma 5, the only difference to the setting of Lemma 1 is that the inherited statute, s_1, may allow for discretion. Applying again the argument in the proof of Lemma 5, an inherited statute s_1 is behaviorally equivalent to the inherited statute being the decree $\tilde{s}_1 = p_2(s_1) = \arg\min_{p \in s_1} |p + \omega_2 - a|$ following the realized shock ω_2. Thus, the proof for Lemma 1 applies here as well. ■

Lemma 7 *For outcome pair $\{x_1, x_2\}$ where $x_2 = \hat{x} + \Delta$ and $x_1 = \hat{x} - \Delta$, total utility for every player is strictly decreasing in Δ when $\Delta \geq 0$.*

Proof of Lemma 7: The median's total utility is:

$$\begin{aligned} U_M &= -(x_1 - m)^2 - (x_2 - m)^2 \\ &= -(\hat{x} - \Delta - m)^2 - (\hat{x} + \Delta - m)^2 \\ &= -2(\hat{x} - m)^2 - 2\Delta^2, \end{aligned}$$

which is clearly maximized at $\Delta = 0$. As this argument holds for arbitrary m, the result holds for all players. ■

7.2 Progressive Benchmarks

Proof of Lemma 2: Case i: $s_0 \in [l, r]$. If the first period bill fails and $s_1 = s_0$, Lemma 6 implies that $s_2 = s_1$ and the outcome pair is $\{s_0, s_0\}$. As $s_0 \in [l, r]$, no zero-variance outcome pair exists that makes both pivots better off (as in the proof of Lemma 1) and,

thus, no positive-variance outcome pair exists either by Lemma 7. The result follows.
Case ii: $s_0 \notin [l, r]$. Without loss of generality, set $s_0 < l$. By voting no in the first period, L guarantees the outcome pair $\{s_0, \min\{m, 2l - s_0\}\}$. If the bill $b_1 = 2l - s_0$ for $2l - s_0 \leq m$, passes it produces the outcome pair $\{b_1, b_1\}$ by Lemma 6. L is indifferent and votes for b_1. As the outcome pair is zero-variance and $b_1 \in [l, r]$, where preferences are adversarial, no bill makes M better off and still wins L's support. ■

Proof of Lemma 3: This extends Lemma 5 to two periods. For any statute $s_1 \subseteq \mathbb{R}$, the agency optimizes with policy $p_t(s_1) = \arg\min_{p_t \in s_1} |p_t + \omega_t - a|$ in period t. As $p_1(s_1) = p_2(s_1)$, statute s_1 is behaviorally equivalent to the statute $\tilde{s}_1 = p_1(s_1)$, which is a decree. The lemma follows by the maintained assumption that discretion is offered iff it materially changes behavior. ■

Proof of Lemma 4: If b_1 fails, by Lemma 6 and the definition of a moderate environment, gridlock holds in the second period and the outcome pair is either $\{s_0, s_0 + \gamma\}$ or $\{s_0, s_0 - \gamma\}$ with equal probability.
Case i. $b_1 \in [l + \gamma, r - \gamma]$. Were the bill to pass then, again by Lemma 6, the outcome pair is either $\{b_1, b_1 + \gamma\}$ or $\{b_1, b_1 - \gamma\}$ with equal probability. As all possible outcomes are in $[l, r]$, adversarial preferences implies that b_1 makes one of the pivots worse off and the bill fails.
Case ii. $b_1 \notin [l + \gamma, r - \gamma]$. Without loss of generality suppose $b_1 > r - \gamma$. This leaves two subcases.
Case iia. $b_1 \in (r - \gamma, r + \gamma]$. The realization $\omega_2 = -\gamma$ implies $b_1 - \gamma \in [l, r]$ and legislative gridlock holds in the second period, whereas $\omega_2 = \gamma$ implies that gridlock fails in the second period and $b_2 = \max\{m, b_1 - 2(b_1 + \gamma - r)\}$. For the latter proposal, L's total utility is:

$$\begin{aligned} U_L &= -(b_1 - l)^2 - \frac{1}{2}(b_1 + \gamma - 2(b_1 + \gamma - r) - l)^2 - \frac{1}{2}(b_1 - \gamma - l)^2 \\ &= -(b_1 - l)^2 - \frac{1}{2}(2r - b_1 - \gamma - l)^2 - \frac{1}{2}(b_1 - \gamma - l)^2. \end{aligned}$$

Differentiating:

$$\begin{aligned} \frac{dU_L}{db_1} &= -4b_1 + 2l + 2r \\ &= -4\left(b_1 - \frac{l + r}{2}\right) \\ &< 0 \end{aligned}$$

as $b_1 > \frac{l+r}{2}$ by the condition of the case. If $b_2 = m$ then L is even worse off. Thus, L votes against b_1.
Case iib. $b_1 > r + \gamma$. For either shock, $b_1 \pm \gamma > r$ and for $b_2 = b_1 - 2(b_1 + \gamma - r)$,

$$\begin{aligned} U_L &= -(s_1 - l)^2 - \frac{1}{2}(s_1 + \gamma - 2(s_1 + \gamma - r) - l)^2 - \frac{1}{2}(s_1 - \gamma - 2(s_1 - \gamma - r) - l)^2 \\ &= -(s_1 - l)^2 - \frac{1}{2}(2r - s_1 - \gamma - l)^2 - \frac{1}{2}(2r - s_1 + \gamma - l)^2. \end{aligned}$$

Differentiating produces the same expression as Case 2. ■

7.3 Delegation

Proof of Proposition 1: If authority is not delegated in the first period, Lemmas 6 and 4 imply that legislative and policy gridlock must hold in both periods and the outcome pair is either $\{s_0, s_0 + \gamma\}$ or $\{s_0, s_0 - \gamma\}$ with equal probability.

If authority is delegated for any t, the agency chooses p_t such that $\lambda(p_t, \omega_t) = a$, which delivers the agency's maximal utility. Thus, upon reaching the second period with $s_1 = \mathbb{R}$, the inherited statute is behaviorally equivalent to the inherited decree $\tilde{s}_1 = p_2(s_1) = \arg\min_{p_2 \in s_1} |p_2 + \omega_2 - a|$, and Lemma 6 describes second period behavior. Now consider the possible values for a.
Case i. $a \in [l, r]$. The outcome pair is $\{a, a\}$ with certainty. The derivation in Section 4.1 establishes that both pivots vote for delegation if and only if $a \in [o_R^{ce}, o_L^{ce}]$.
Case ii. $a \notin [l, r]$. For $a < l$, gridlock fails in the second period and $b_2 = \min\{m + \omega_2, l + (l - a) - \omega_2\}$, so that the outcome is $\min\{m, 2l - a\}$ regardless of the shock. The outcome pair is then $\{a, \min\{m, 2l - a\}\}$, with expected outcome $\frac{a + \min\{m, 2l-a\}}{2} \leq l$. By Lemma 7 and adversarial preferences in $[l, r]$, R votes against the bill. The analysis for $a > r$ is analogous. ■

Proof of Corollary 1: The outcome pair is $\{a, a\}$ and the Median's total utility is:

$$U_M = -(a - m)^2 - (a - m)^2,$$

which is strictly decreasing in $|m - a|$. ■

Proof of Proposition 2: As in Proposition 1, if authority is not delegated in the first period the outcome pair is either $\{s_0, s_0 + \gamma\}$ or $\{s_0, s_0 - \gamma\}$ with equal probability.

We begin by ruling out delegation to an agency with $a \notin (s_0 - \gamma, s_0 + \gamma)$. We start with $a \in [s_0 + \gamma, r]$ and $a \in \left[\underline{d}, \overline{d}\right]$ and prove that delegation is vetoed by L. If

delegation is unconstrained, L's veto follows from Proposition 1. Following $\omega_2 = \gamma$, the agency desires $p_2 = \max\{a - \gamma, \underline{d}\}$. If $\underline{d} + \gamma \leq r$ this produces outcome $\max\{a, \underline{d} + \gamma\}$, and if $\underline{d} + \gamma > r$ the legislature overrides to deliver outcome $r - (\underline{d} + \gamma - r) > a - \gamma$. Following $\omega_2 = -\gamma$, the agency desires $p_2 = \min\left\{a + \gamma, \overline{d}\right\}$, which produces outcome $\min\left\{a, \overline{d} - \gamma\right\}$. L's utility is strictly increasing as $\overline{d} \to a^+$. Thus, for $a + \gamma \leq r$, the best case outcome pairs are $\{a, a\}$ or $\{a, a - \gamma\}$ with equal probability. This is dominated by not delegating as $a > s_0 + \gamma$. And for $a + \gamma > r$ the first of these outcome pairs becomes at best $\{a, a - \gamma\}$. Yet again, this is dominated by not delegating, establishing the result.

This logic applies *a fortiori* for more extreme agencies, $a > r$, and the reverse logic applies for $a \leq s_0 - \gamma$ and pivot R. Thus, delegation in equilibrium can only be to $a \in (s_0 - \gamma, s_0 + \gamma)$, which we assume hereafter.

We next prove that if authority is delegated it remains in force in both periods. If $\underline{d} + \gamma > r$, the agency desires $p_2 = \underline{d}$ after shock $\omega_2 = \gamma$, producing outcome $\underline{d} + \gamma$. This is overridden by the legislature to produce outcome $r - (\underline{d} + \gamma - r)$. (As $m < s_0 - \gamma$, $r - (\underline{d} + \gamma - r) > m$.) The utility of L and M are strictly increasing as $\underline{d} \to \min\left\{a, \overline{d}\right\}$. If $\overline{d} \leq a$ this implies no discretion and the bill fails by Lemma 4. So set $\underline{d} = a$ and consider shock $\omega_2 = -\gamma$. In this event the agency chooses $p_2 = \min\left\{a + \gamma, \overline{d}\right\}$ that produces outcome $\min\left\{a, \overline{d} - \gamma\right\}$. The best case for L is when $\overline{d} = a$, but this again implies no delegation and delegation must fail. This establishes the claim.

We hereafter assume that if authority is delegated, it remains in effect for both periods. Our next step is to show that either $\underline{d} \leq a - \gamma$ or $\overline{d} \geq a + \gamma$. Suppose not, such that $\underline{d}, \overline{d} \in (a - \gamma, a + \gamma)$, and $p_2 = \overline{d}$ following $\omega_2 = -\gamma$ and $p_2 = \underline{d}$ following $\omega_2 = \gamma$. For $a \in \left[\underline{d}, \overline{d}\right]$, consider the alternative delegation statute $\tilde{s}_1 = \left[\underline{d} + \varepsilon, \overline{d} - \varepsilon\right]$. The median's utility is:

$$U_M = -(a - m)^2 - \frac{1}{2}\left(\overline{d} - \varepsilon - \gamma - m\right)^2 - \frac{1}{2}\left(\underline{d} + \varepsilon + \gamma - m\right)^2$$

Differentiating:

$$\begin{aligned} \frac{dU_M}{d\varepsilon} &= \left(\overline{d} - \varepsilon - \gamma - m\right) - \left(\underline{d} + \varepsilon + \gamma - m\right) \\ &= 2\gamma - \left(\overline{d} - \underline{d}\right) - 2\varepsilon \\ &< 0, \end{aligned}$$

by the requirement that $\underline{d}, \overline{d} \in (a - \gamma, a + \gamma)$. As this holds for arbitrary m, the utility of

all players is strictly increasing by expanding the discretion interval in a mean-preserving manner. This holds until either $\underline{d} = a - \gamma$ or $\overline{d} = a + \gamma$. The same logic applies for $\underline{d} > a$ via the alternative statute $\hat{s}_1 = \left[\underline{d} + \varepsilon, \overline{d} - 3\varepsilon\right]$. The case $\overline{d} < a$ is analogous.

The implication of this result is that, if delegated to, agency behavior is constrained in the second period for at most one realization of the shock. Straightforward utility calculations establish that under this condition the utility of L and M are strictly decreasing in $\underline{d}$ and $\overline{d}$, whereas the utility of R is strictly increasing. Thus, M's optimal (constrained) delegation is simply given by the $\left[\underline{d}, \overline{d}\right]$ such that R is indifferent between delegating and not.

Consider $a \geq o_R^{ce}$. If $\underline{d} > a - \gamma$ the outcome pair is either $\{a, a\}$ or $\{a, \underline{d} + \gamma\}$, and R strictly prefers to delegate by the definition of o_R^{ce}. Thus, $\underline{d} \leq a - \gamma$. For $a > o_R^{ce}$, R strictly benefits from unconstrained delegation, thus delegation must be right-constrained with $\overline{d} < a + \gamma$.

For $\overline{d} \in (a, a + \gamma)$, R's utility is:

$$\begin{aligned} U_R &= -(r-a)^2 - \frac{1}{2}(r-a)^2 - \frac{1}{2}\left(r - \overline{d} - \gamma\right)^2 \\ &= -\frac{3}{2}(r-a)^2 - \frac{1}{2}\left(r - \overline{d} - \gamma\right)^2. \end{aligned}$$

Recall, R's utility from s_0, should he vote no, is $U_R = -2(r - s_0)^2 - \gamma^2$. Equating the two expressions and rearranging gives the condition in part (iv) of the proposition.

As R's utility is increasing in a, the value $a = a'' < s_0 + \gamma$ is reached for which the solution is $\overline{d} = a''$. For $a > a''$, $\overline{d} < a$ and R's utility is:

$$U_R = -\left(r - \overline{d}\right)^2 - \frac{1}{2}(r-a)^2 - \frac{1}{2}\left(r - \overline{d} + \gamma\right)^2$$

Equating this expression with that from not delegating gives the condition in part (v) of the proposition. Straightforward algebra establishes that the solution satisfies $\overline{d} \in (s_0, a)$ for $a < s_0 + \gamma$, thereby satisfying the requirement for effective delegation.

At $a = o_R^{ce}$. R is indifferent for unconstrained delegation. The argument for $a \in (s_0 - \gamma, o_R^{ce})$ is similar, with delegation left-constrained. ■

Proof of Corollary 2: If R is indifferent between constrained delegation and not, he is indifferent to delegation and unconstrained delegation to $a = o_R^{ce}$. As constrained delegation implies that outcome pairs have positive variance, indifference requires that the expected outcome is to the right of o_R^{ce}. From M's perspective, constrained delegation is dominated by $a = o_R^{ce}$. ■

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