Legislative Bargaining with Reconsideration[1]

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First Preliminary Version: November 12, 2007
This Version: July 20, 2010

[1]This version replaces our working paper formerly circulated under the title of "Existence and Computation of Pure-strategy Equilibrium in Models of Legislative Bargaining with Reconsideration," and incorporates some of the results of a second working paper entitled "Endogenous Limits on Proposal Power." For comments we thank Daron Acemoglu, David P. Baron, Marco Battaglini, John Duggan, Peter Eso, Tasos Kalandrakis, Hao Li, Adam Meirowitz, Maggie Penn and seminar participants at Northwestern University, Princeton University, UC-Berkeley, the Universities of Rochester and Toronto, the Canadian Institute for Advanced Research (CIfAR)'s Institutions, Organizations and Growth Group Meeting, the MPSA National Conference, the Political Economy of Bargaining Conference at Wilfrid Laurier University, and the Society for Economic Dynamics Annual Meeting. We also gratefully acknowledge financial support from the Canadian Institute for Advanced Research, the Wallis Institute of Political Economy at the University of Rochester, and the Ford Motor Company Center for Global Citizenship at the Kellogg School of Management, Northwestern University. All errors are our own.

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Abstract

We present a dynamic model of legislative bargaining with an endogenously evolving default policy and a persistent agenda setter. Policy-making proceeds until the agenda setter can no longer pass a new policy to replace an approved bill. We prove existence and necessary conditions of pure-strategy stationary equilibria for any finite policy space, any number of players and any preference profile. In equilibrium, the value of proposal power is limited compared to the case that disallows reconsideration, as voters are induced to protect each other's benefits in order to maintain their future bargaining positions. The agenda setter, in turn, would prefer to limit his ability to reconsider. The lack of commitment due to the possibility of reconsideration, however, enhances policy efficiency.

JEL Classification Numbers: C72, D72, D78.

Keywords: Legislative bargaining, reconsideration, evolving default, proposal power, lack of commitment, distributive politics, public goods, spatial model.

1 Introduction

The agenda-setting model of Romer and Rosenthal (1978; 1979) constitutes one of the central building blocks of political economy models of policy making. In their seminal paper, an agenda setter makes a policy proposal, which is then pitted against a default alternative in an up-or-down majority vote. This approach captures a prominent feature in many political institutions: the existence of an authority that effectively holds agenda control, with its power checked by the requirement of majority approval. This model and its applications have yielded two fundamental insights. First, the "power to propose" provides an agenda setter with the ability to bias policy outcomes in his favor even in the case where a median voter exists, by targeting a bare majority of the "cheapest" voters necessary to ensure approval and extracting all the additional surplus. Second, the policy outcome not only depends on voter's preferences but also on the position of the status quo, which defines the reservation utility of the voters.

The Romer-Rosenthal model assumes that decision-making on a given issue ends when a majority approves a proposal. This is appropriate in some policy domains, such as the school budget referenda studied by Romer and Rosenthal (1979), but not in others. In many areas, a policy once enacted persists until it is changed. This, for example, is true for entitlement programs such as social security (Baron, 1996). In turn policy persistence implies that policy makers may be able to reconsider a passed bill or an existing policy. In a dynamic policy environment, the passage of a bill does not only set the policy to be enacted but also changes the status quo when the same policy issue is reconsidered at a later date. This feature was first formally studied by Baron (1996), followed by Baron and Herron (2003), Kalandrakis (2004; 2007), Bernheim et al. (2006), Riboni (2010), Duggan and Kalandrakis (2010) and Anesi (2010).[1]

Once we consider dynamic policy environments we need to make a modeling choice on who will be the subsequent agenda setters once a policy is made. The existing literature has commonly adopted a universal proposal protocol, in which every policy maker or legislator has a chance to make a policy proposal in every round of proposal making and voting.[2] This assumption follows the legislative bargaining approach of

[1]See Section 9 for an extended discussion of the legislative bargaining literature.

[2]A rare exception is Riboni (2010), who models a monetary committee with an unchanged agenda setter that is interpreted as the chairman of the Federal Reserve.

Baron and Ferejohn (1989a), originally developed in the context of a one-time policy choice.

A bargaining protocol where each legislator may become the proposer of legislation is a plausible model for certain highly decentralized legislatures, such as the U.S. Congress (e.g. Knight 2005; Volden and Wiseman 2007; Battaglini and Coate 2007, 2008; Penn 2009). Yet, there are various other institutional contexts where a model with a persistent agenda-setter seems like a better formal representation of the political institution. Cheibub (2006) and Robinson and Torvik (2008) have argued that in various multiparty presidential countries in Africa and Latin America, elected presidents typically hold persistent legislative agenda-setting power. In parliamentary democracies effective agenda control rests with the cabinet typically dominated by the Prime Minister (Döring 1995). In these institutions, during the lifetime of a regime, the agenda setter is persistently the same, free to reconsider primary policy issues such as taxation and income redistribution. The same property holds for any other regulatory body or policy committee that makes collective decisions by majority rule but has a dominant chair who monopolizes proposal power over an extended time. A prominent example, discussed by Riboni (2010), is central banks that are often dominated by a strong, long-serving chairman, e.g. Alan Greenspan of the U.S. Federal Reserve, who persistently controls proposal power over monetary policies. Such policies, of course, still need to be approved by a majoritarian institution, here the members of the Board of Governors. None of these institutions is well captured by a framework with random recognition of agenda setters.

In this paper we propose a new theory of majoritarian decision-making in a dynamic environment with a single, persistent agenda setter. Proposal power is persistent in the sense that, after a policy proposal is approved by a majority and enacted, it is the same agenda setter who may initiate reconsideration of the same policy issue by making a new policy proposal. This assumption significantly distinguishes out theory from previous dynamic legislative bargaining models and leads to substantially different implications.

The most important insight of the Romer-Rosenthal model, preserved and elaborated by the Baron-Ferejohn model, is the "power to propose."[3] This may suggest that granting more *de jure* power, here the sole power to initiate reconsideration, to the agenda setter would only enhance his *de facto* power, i.e. allow the agenda setter

[3] This was also the title of a lesser known follow-up paper by Baron and Ferejohn (1989b).

to pass a more favorable proposal. To the contrary, our results show that the exact opposite holds: the agenda setter's power is weakened when he is granted power to reconsider the approved policy. Indeed, an agenda setter would prefer to commit himself not to reconsider any policy in the future. As we show below, the possibility of reconsideration in equilibrium induces a group of voters to "defend" each other. In particular, self-interested voters may decline any policy proposal when some other voters are substantially expropriated. In equilibrium, voters protect others as a means to prevent the agenda setter from playing off the voters against each other in the future. Intuitively, voter J protects voter K so that the agenda setter cannot use the low reservation value of K to exploit J when the policy is reconsidered. The incentive of mutual protection among the voters therefore effectively constrains the agenda setter's ability to expropriate, resulting in a more equal allocation of benefits. The equilibrium value of proposal power is thus substantially limited. This mechanism is illustrated in the following example.

Example. Consider a legislature with three players. The first player is the sole agenda setter over time. In each period the legislature must divide 10 units of benefit flow among its members, where each unit is assumed to be indivisible. Suppose that the initial status quo is $q = (3, 3, 4)$, where the i-th element of policy q refers to the amount that goes to the i-th player. If the legislature were restricted to make a policy choice once and for all, then the agenda setter would propose $y = (7, 3, 0)$, which would be approved by the second player, who is satisfied by her reservation value given by the status quo.

Now consider the case where the agenda setter is allowed to reconsider the policy as frequently as possible. In this case the second player would no longer accept policy y in equilibrium, even though this policy yields the second player exactly the same utility flow as the status quo. To see why, consider counterfactually what would happen if policy y were approved. Following the approval y would become the new status quo. The agenda setter would then have an incentive to reconsider the policy and propose a new policy $z = (10, 0, 0)$, which would be accepted by the indifferent player three. This means that that the second player would eventually be fully expropriated if she supported y in the very beginning.

Applying the same logic, we conclude that the agenda setter is not able to pass any policy proposal that yields the third player (whose vote is not necessary for policy approval) any amount less than 3 units. The equilibrium policy choice is thus

$(4, 3, 3)$, a much more egalitarian division of the benefits. In this equilibrium, the second player is induced to defend the benefit for the third player, since by doing so the second player secures her long-term bargaining position towards the agenda setter. Whereas the agenda setter has an incentive to expropriate as much as possible provided his policy obtains majority support, he is constrained by the voters who protect each other in equilibrium. So the agenda setter is unambiguously worse off with the power to reconsider. In other words, more formal power is less valuable power.

In this paper we show that the above intuition prevails in a general model with an arbitrary finite policy space, any number of players and any preference profile. The core of the analysis is an algorithm to construct a set of policy alternatives which would persist as status quo in equilibrium. With this algorithm we prove the existence and necessary conditions of stationary Markov perfect equilibria in pure strategies. In all such equilibria and regardless of the policy space, the proposal power is endogenously limited compared to the case that disallows reconsideration. Our theory applies to risk-neutral, purely self-interested agents. It does not depend on risk-aversion or any form of fairness concerns.

Whereas the agenda-setting model was originally proposed, and extensively applied, to democratic institutions, our dynamic theory with a single, persistent agenda setter also fits into the context of an autocracy. In contrast to its literal meaning, the power of an "autocrat" is rarely unchecked. Instead its survival typically requires support from its subordinate (Wintrobe 1990, Myerson 2008) or the selectorate formed by the political elite (Bueno de Mesquita et al. 2003, Besley and Kudamatsu 2008). Therefore, an autocrat in a nondemocratic regime could be interpreted as the single, persistent agenda setter, who has the power to make and reconsider policy at any time his wishes, but also needs majority support from the political elite. Here "majority voting" can occur in a formal setting as in the case of a monarch and an assembly of General States, or it may occur in informal procedures where political power consists in control over resources and arms.[4] With such an interpretation our theory offers a new explanation for why autocrats may be constrained from expropriating behaviors

[4] Recently Acemoglu et al. (2009a; 2010) used this interpretation to construct dynamic models with a sequence of proposal making and voting to conduct comparative studies between democracy and autocracy.

and adopt policies that benefit a broader constituency.[5] To facilitate the exposition throughout this paper we adopt the terms commonly used in democratic institutions such as "agenda setter" and "voter", but will make the connection to non-democratic institutions where appropriate.

Whether a policy choice is subject to reconsideration depends not only on institutional arrangements but also on the nature of the policy domain. Examples of continuing policies include taxation schedules, social security, monetary policy, allocation of land, property and privileges, and many others. Any issue within this policy category falls into the domain of our theory. Yet some other policy decisions have to be made once and for all, such as the invasion of another country, joining a currency union, or the signing of an international treaty. For these irreversible policy choices, the policy makers or legislators will lack the incentive to protect each other; the agenda setter thus can easily propose the policy that satisfies a minimum winning coalition of those cheapest legislators and biases the policy choice substantially in his favor. Our analysis thus implies that, the *de facto* power of the agenda setter is unambiguously stronger in policy domains such as foreign affairs and military decisions, which are more likely to be irrevocable decisions, than the policy domains of fiscal policy, taxation and redistributive programs, which are typically subject to reconsideration.

The possibility of reconsideration can be interpreted as lack of commitment by the agenda setter. Whereas it has been commonly understood that lack of commitment by policy makers could be a source of policy inefficiency, the model considered here may yield the opposite conclusion.[6] As the agenda setter has an incentive to fully

[5] Formal models of autocracy and dictatorship are still scarce. Acemoglu and Robinson (2005) focus on the conflict of interest between socioeconomic classes and shows that a dictator, who represents the rich, is constrained in policy-making when he needs to prevent revolt from the poor. Myerson (2008) explores that a political leader's temptation to deny costly payments to past supporters is a central moral-hazard problem in autocratic politics; a leader can do better by organizing constitutional checks on himself. Bueno de Mesquita et al. (2003) and Besley and Kudamatsu (2008) study the accountability problem between an autocrat and the selectorate that can decide on the survival or replacement of the autocrat. Egorov and Sonin (2009) analyze the relationships between dictators and their subordinates. None of these existing formal theories has looked at the mutual protection incentives among political elites.

[6] The commitment problem was first formally addressed by Kydland and Prescott (1977). More recent political economy studies of government policies include Persson and Svensson (1989), Tabellini and Alesina (1990), Besley and Coate (1998), Acemoglu and Robinson (2001), and Baron, Diermeier and Fong (2008), to name only a few. See Acemoglu (2003) for a comprehensive survey of the commitment literature in political economy.

exploit the other players with disadvantaged bargaining positions in the future, a majority of players implicitly coordinate to vote against any proposal that substantially expropriates some of the others. Therefore, lack of commitment by the agenda setter in equilibrium induces the whole legislature to effectively constrain the long-run policy choice to an effectively smaller set of policy alternatives. As a consequence, the possibility of reconsideration not only leads to more equal distributions but also enhances policy efficiency in models of pork-barrel politics or public good provision.

The remainder of this paper is organized as follows. Section 2 presents the model. Section 3 defines a political equilibrium that is Markov perfect and in pure strategies. Section 4 proposes an algorithm to construct the set of steady-state policies in equilibrium and characterizes the existence and necessary conditions of an equilibrium in the general model. Section 5 illustrates the key mechanism through a purely distributive model with three players and identifies the incentives of mutual protection between the players without proposal power. Section 6 discusses the insight and implications of constrained proposal power in the general dynamic setup with an arbitrary finite policy space. Section 7 argues that the main results in this paper are robust to the introduction of power turnover. Section 8 discusses welfare implications in the context of two stylized policy environments: public goods production and pork-barrel politics, and shows that lack of commitment by the persistent agenda setter may enhance policy efficiency. Section 9 discusses the related literature on dynamic legislative bargaining and the empirical implications of the results. Section 10 concludes. The appendix contains additional technical details and all the proofs.

2 The Model

We analyze a dynamic agenda-setting model with a persistent agenda setter. Consider a political system with a set of n players, $N = \{1, 2, ..., n\}$, where $n = 2m + 1$ and $m \in \mathbb{N}$. The political system must collectively make a policy choice from a finite policy space X.[7] Time is continuous. A policy $x \in X$, once enacted, yields each player ℓ a

[7] A discrete policy space limits the extent to which utilities are transferable among the players, and is critical to our main results. From the perspective of modeling real-life policy issues, however, this assumption seems innocuous. For example, entitlement programs usually involve a minimal spending unit, even if it is very small, say a dollar. Recently, Bernheim et al. (2006), Acemoglu et al. (2009b, 2010) and Anesi (2010), among others, all assume a discrete choice set in dynamic political economy models.

utility flow of $u_\ell(x)$ and remains in effect until it is replaced by a new policy. We refer to $u = (u_1, u_2, ..., u_n)$ as a preference profile and (X, u) as a policy environment.

Let $x(\tau)$ denote the policy in effect at time τ. Then the total payoff for player ℓ evaluated at time $\widehat{\tau}$ is defined as the discounted sum of utility flow given by

$$\int_{\widehat{\tau}}^{\infty} u_\ell(x(\tau))\,\rho e^{-\rho\tau} d\tau,$$

where $\rho > 0$ is a common discount rate. The total payoff is scaled by ρ so as to simplify our calculations.

There is one persistent agenda setter in the political system. Assume this position is taken by player 1. The agenda setter is conferred the sole power to make policy proposals from the policy space. All other players, $i \in N\backslash\{1\}$, are referred to as voters.

We aim to model the situation in which the agenda setter is free to make a policy proposal at any time he wishes, but want to avoid the counterfactual possibility that multiple policy shifts occur in an instance of measure zero. We thus require that any two consecutive proposals be separated by ϵ units of time, where $\epsilon > 0$ is exogenously given and can be small. In practice, we model the continuous time as consisting of an infinite sequence of policy periods with a duration of ϵ.

A status quo in any period t is defined to be the policy choice x^{t-1} made in the previous period. An initial status quo $q \in X$ is assumed to be exogenously given so that $x^0 = q$. In the beginning of any period t the agenda setter makes a proposal $y^t \in X$ and then all players vote.[8] We assume that proposal making and voting take no time. If a majority of players votes to approve proposal y^t, it is enacted in period t and $x^t = y^t$; otherwise the status quo remains in place so that $x^t = x^{t-1}$. After the vote no more legislative action is permitted until the next period commences.

In the analysis we will use a couple of basic facts summarized by the following lemma.

Lemma 1 Suppose that policy $x \in X$ is enacted in the beginning of period t and let $\delta_\epsilon \equiv \exp(-\rho\epsilon)$. Then any player ℓ receives a total payoff of $(1-\delta_\epsilon)\,u_\ell(x)$ within period t and discounts his total payoff evaluated at the beginning of period $t+1$ by a factor of δ_ϵ.

[8] We allow the possibility that the agenda setter chooses to maintain the status quo by proposing $y^t = x^{t-1}$. This can be interpreted as inaction by the agenda setter.

We refer to $\delta_\epsilon \in [0,1)$ as the per period discount factor. In the extreme case with $\epsilon = \infty$, $\delta_\infty = 0$ so our setup degenerates into the agenda-setting model of Romer and Rosenthal (1979). In this paper we focus on the opposite case in which $\epsilon > 0$ is sufficiently small, or equivalently, $\delta_\epsilon < 1$ is sufficiently large.[9] This approximates the situation in which the agenda setter is free to reconsider the policy as frequently as he wishes, and the policy periods sufficiently short in real time translates into a sufficiently high discount factor across periods.[10] The empirical relevance of this assumption should not be judged by the observed frequency of policy reconsiderations. As will be evident later, reconsideration may not occur in equilibrium even if it is permitted. Therefore, the validity of our key assumption hinges on whether reconsideration is technologically and institutionally feasible.

The possibility of reconsideration depends on both the nature of policy domain and the institutional arrangements. There are policy choices that must be made once and for all, for example, the invasion of a foreign country or the endorsement of an international treaty. For all such policy domains the model with $\epsilon = \infty$ applies. On the other hand, there are policies that, once enacted, remain to be in effect until replaced by new laws, such as the allocation of state-owned properties, taxation and income redistribution schemes, and the the assignment of bureaucratic and ministerial positions. For these policy domains, the institutional factors matter. For example, in a nondemocratic regime it is natural to assume that the autocrat as agenda setter can reconsider a policy at any time he wishes. In democratic institutions the allowed frequency of policy reconsideration may depend on specifications of the legislative procedures.

3 Equilibrium Definition

We define and characterize a stationary Markov perfect equilibrium in pure strategy, in which the agenda setter bases his policy proposal solely on the status quo.[11] From

[9] Formally, $\lim_{\epsilon \to 0} \delta_\epsilon = 1$ for any $\rho > 0$. See Lemma 2 and Theorem 2 for formal definitions of a "sufficiently small" ϵ.

[10] Some recent contributions to dynamic political economy theory also focuse on the case with a sufficiently high discount factor, or in our notation, the case with $\epsilon > 0$ sufficiently small. Examples include Acemoglu et al. (2009a; 2009b; 2010), Anesi (201) and Bandyopadhyay et al. (2010).

[11] See Baron and Ferejohn (1989a), Baron and Kalai (1993) and Austen-Smith and Banks (2005) for extensive discussions on equilibrium selection and justifications of stationary equilibria in legislative bargaining games.

now on, we drop the superscript t for the proposal round from the notations. The restriction to pure strategy leads to equilibria with simple and intuitive dynamics, and rules out some implausible behaviors.[12]

Let $f : X \to X$ be the stationary policy rule, which describes the unique transition of policy in each period from any status quo $x \in X$ to policy choice $f(x)$. For any player $\ell \in N$, let $U_\ell(x)$ denote his total payoff evaluated in the beginning of a period with policy choice x. Given policy rule f, the value function, $U_\ell : X \to \mathbb{R}$, thus can be defined recursively by

$$U_\ell(x) = (1 - \delta_\epsilon) u_\ell(x) + \delta_\epsilon U_\ell(f(x)). \tag{1}$$

By Lemma 1, player ℓ receives a payoff of $(1 - \delta_\epsilon) u_\ell(x)$ within the current period with policy choice x. Starting from the subsequent period, the policy choice will transition from x to $f(x)$, and thus the continuation value of this player, discounted to the current period, is given by $\delta_\epsilon U_\ell(f(x))$.

Given a set of value functions, $U = (U_1, ..., U_n)$, and any status quo x, a policy alternative y is politically feasible if, once proposed, it would be approved by a majority of the players including the agenda setter. As is standard in the theory of legislative voting, we assume that an player votes to approve a policy proposal when indifferent between the proposal and the status quo. Political feasibility thus implies two conditions jointly: (F1) $U_1(y) \geq U_1(x)$, and (F2) there exists coalition $M \subset N \backslash \{1\}$ such that $|M| = m$ and $U_i(y) \geq U_i(x)$ for all $i \in M$, where $|M|$ denotes the size of coalition M. The policy choice $f(x)$ in any period with status quo x must be the politically feasible alternative that maximizes the agenda setter's total payoff $U_1(x)$. We are now ready to define a stationary Markov perfect equilibrium.

Definition 1 A stationary Markov perfect equilibrium is a policy rule f and a set of value functions U, such that:

1. Given f, U satisfies the equation system defined by (1).

[12] See Diermeier and Fong (2008a) for the definition and characterization of a Markov perfect equilibrium that allows mixed strategies. For a distributive policy space, nondegenerate mixed-strategy equilibria are constructed in which, with any initial status quo, the persistent agenda setter strategically designs a sequence of proposals with randomization to achieve his ideal policy in the long run. Diermeier and Fong argue that if the legislature needs to make a collective decision by majority rule on whether to discuss the policy, i.e. to put it on the agenda, those mixed-strategy equilibria disappear and only the pure-strategy equilibria survive.

2. Given U, $f(x)$ solves the agenda setter's maximization problem for any status quo $x \in X$.

Given any policy rule f, policy x is a steady state if $f(x) = x$, and the collection of all steady-state policies is denoted $S_f \equiv \{x \in X : f(x) = x\}$. In words, a steady state remains forever. For any initial status quo $q \in X$, the deterministic policy path induced by policy rule f is denoted $\{f^t(q)\}_{t=0}^{\infty}$, where $f^0(q) \equiv q$ and $f^t(q) \equiv f(f^{t-1}(q))$ for all $t \in \mathbb{N}$. A policy rule f is *acyclic* if, starting from any initial status quo the policy path converges to a steady state; i.e. for any $q \in X$, there exists $T_f(q) \in \mathbb{N}$ as well as some steady-state policy, denoted $f^{\infty}(q)$, such that $f^t(x) = f^{\infty}(x)$ for all $t \geq T_f(q)$. We refer to $f^{\infty}(q)$ as the long-run policy choice resulting from an initial status quo q.

For some policy space, there exists a stationary Markov perfect equilibrium in which, starting from some initial status quo, the agenda setter proposes a policy shift in every period so that the policy oscillates forever.[13] In the analysis that follows we rule out such equilibria and restrict attention to those with an acyclic policy rule.

Definition 2 A political equilibrium is a stationary Markov perfect equilibrium with an acyclic policy rule.

4 Analysis

4.1 Preliminaries

To facilitate a concise presentation of the analysis, we define a binary relation for any $x, q \in X$. We write $x \succsim q$ and say x dominates q if two conditions hold: (D1) $u_1(x) \geq u_1(q)$, and (D2) there exists $M \subset N \backslash \{1\}$ such that $|M| = m$ and $u_i(x) \geq u_i(q)$ for all $i \in M$. Intuitively, policy x dominates policy q if the former yields at least the same utility flows as the latter to a majority of players including the agenda setter. For any status quo $q \in X$, let

$$F(q) \equiv \{x \in X : x \succsim q\}$$

[13] As an example, assume that $n = 3$, $X = \left\{x \in \{0,1\}^3 : x_1 + x_2 + x_3 = 1\right\}$, and $u_\ell(x) = x_\ell$ for all $\ell \in N$. Let $s^\ell \in X$ be such that $x_\ell^\ell = 1$. There exists a stationary Markov perfect equilibrium with policy rule f such that $f(s^1) = s^1$, $f(s^2) = s^3$ and $f(s^3) = s^2$. With an initial status quo $q = s^3$, the policy oscillates forever between alternatives s^2 and s^3.

denote the set of all policies that dominate the status quo. If the policy choice were to be made once and for all, i.e. $\epsilon = \infty$, then any policy in set $F(q)$ is politically feasible. We also write write $x \succ q$ if $x \succsim q$ and condition D1 holds strictly.

The next lemma explores a condition resulting from the assumption that the policy can be reconsidered sufficiently frequently. The proof is presented in the Appendix.

Lemma 2 Given any policy environment (X, u), there exists $\widehat{\epsilon} > 0$ such that, for any positive $\epsilon < \widehat{\epsilon}$ and in any political equilibrium (f, U), the long-run policy choice yields to a majority of players including the agenda setter at least the same utility flows as the initial status quo does; i.e., $f^{\infty}(q) \succsim q$ for any $q \in X$.

With a finite policy space and an acyclic policy rule, the policy must converge in a finite number of periods in equilibrium. Since each policy period is sufficiently short, any policy approved and enacted during the transitional periods only contributes insignificantly to the total payoff for the players. Therefore, the utility gain, if any, that occurs during the transitional periods is too small to compensate the utility loss for player ℓ if the long-run policy choice yields ℓ a strictly smaller utility flow than the initial status quo. What a player really cares about the transitional policies is thus the long-run policy choice they eventually lead to. Therefore, any transitional policy is not political feasible if that policy will eventually transition to a steady-state policy that makes either the agenda setter, or at least half of the voters strictly worse off in the long run.

To simplify the exposition of results we impose an additional assumption on the policy environment throughout Section 4.

Assumption A. For any distinct alternatives $x, y \in X$, either $u_1(x) > u_1(y)$ or $u_1(y) > u_1(x)$. In words, the agenda setter has strict preferences over the policy space.

The assumption of strict preferences is not critical to any of the main insights in this paper. Its function is to pin down a unique set of steady-state policies in all political equilibria. In the Appendix we present results for the general case in which the agenda setter has weak preferences.

4.2 Characterization of Steady-state Policies

We characterize necessary conditions for the steady-state policies in an arbitrary political equilibrium (f, U), assuming an arbitrary policy environment (X, u) that satisfies Assumption A. We consistently assume that the policy can be reconsidered with sufficient frequency.

An immediate observation is that the agenda setter's ideal policy, denoted $c_0 \equiv \arg\max_{x \in X} u_1(x)$, must be a steady state; i.e., $c_0 \in S_f$. Note that, provided his ideal policy is the status quo, the agenda setter will never want to change it.

Let $D_0 \equiv \{x \in X : c_0 \succ x\}$ be the set of policies that are strictly dominated by c_0. We then argue that none of these policies can be a steady state in equilibrium; i.e., $D_0 \cap S_f = \emptyset$. Suppose, to the contrary, that some $d \in D_0$ is a steady state. Then policy d, once enacted, would yield each player ℓ a perpetual utility flow of $u_\ell(d)$. At the same time, policy c_0, once enacted, would yield each player ℓ a perpetual utility flow of $u_\ell(c_0)$ since it is a steady state as well. By definition, $c_0 \succ d$. Therefore, with policy d in place as status quo, policy c_0 is politically feasible whereas the agenda setter is strictly better off with a policy shift from d to c_0. The contradicts the supposition that d is a steady state.

We have thus shown that policy c_0 is a steady state and any policy in set D_0 is not. So now we restrict attention to the rest of the policy space, denoted $Y_1 \equiv X \backslash (\{c_0\} \cup D_0)$. Let $c_1 \equiv \arg\max_{x \in Y_1} u_1(x)$ be the agenda setter's most favorite policy in set Y_1. Then policy c_1 must be a steady state in equilibrium. Suppose, to the contrary, that it is not true. This implies that with policy c_1 as the initial status quo, the long-run policy choice, $f^\infty(c_1)$, must be out of three possibilities: (1) $f^\infty(c_1) \in D_0$, (2) $f^\infty(c_1) = c_0$, or (3) $f^\infty(c_1) \in Y_1 / \{c_1\}$. Obviously $f^\infty(c_1) \notin D_0$, since by definition $f^\infty(c_1)$ must be a steady state whereas no steady state can lie in set D_0. We thus rule out possibility one and then assume that $f^\infty(c_1) = c_0$. Notice that $c_1 \notin D_0$, so policy c_0 does not dominate status quo c_1.[14] Provided $\epsilon < \widehat{\epsilon}$, this contradicts Lemma 2. We thus rule out possibility two as well. Finally we assume that $f^\infty(c_1) \in Y_1 \backslash \{c_1\}$. Since policy c_1 is the agenda setter's unique favorite policy among all alternatives in set Y_1, it must yield the agenda setter a strictly smaller utility flow than status quo c_1. In other words, the long-run policy choice $f^\infty(c_1)$ does not dominate status quo c_1. Once again, this contradicts Lemma 2. Thus we

[14] In fact, c_0 yields at least $m + 1$ voters strictly smaller utility flows than c_1 does.

conclude that policy c_1 must be a steady state in equilibrium; i.e., $c_1 \in S_f$.

By the same argument for D_0, any policy $x \in D_1 \equiv \{x \in Y_1 : c_1 \succ x\}$ cannot be a steady state in equilibrium. Thus we can further restrict attention to policies $Y_2 \equiv Y_1 \backslash (\{c_1\} \cup D_1)$ and hence we begin the next round of iteration. In this regard, with a subset Y_k of the policy space in iteration k, we can prove that that $c_k \equiv \arg\max_{x \in Y_k} u_1(x)$ is a steady state whereas any policy in set $D_k \equiv \{x \in Y_k : c_k \succ x\}$ is not. The analysis can move on recursively to the next round with a smaller subset $Y_{k+1} \equiv Y_k \backslash (\{c_k\} \cup D_k)$ of the policy space, until the entire policy space X is exhausted.

The preceding analysis points to an algorithm that constructs a unique policy set $C \equiv \{c_0, c_1, ...\}$, which includes only all the steady-state policies in any political equilibrium.

Algorithm 1 Given any policy environment (X, u) let set C be constructed recursively through the following steps:

Step 1. Let $Y_0 \equiv X$, $k = K = 0$.

Step 2. Step 2. Let $c_k \equiv \arg\max_{x \in Y_k} u_1(x)$.

Step 3. Step 3. Let $D_k \equiv \{x \in Y_k : c_k \succ x\}$.

Step 4. Step 4. Let $Y_{k+1} \equiv Y_k \backslash (\{c_k\} \cup D_k)$.

Step 5. Step 5. Let $C \equiv \{c_0, ..., c_K\}$ if $Y_{K+1} = \emptyset$; otherwise let $K = k + 1$ and repeat Steps 2-5.

This algorithm is well-defined as long as the maximization in Step 2 admits a unique solution in every iteration and Assumption A is an intuitive sufficient condition for this.[15]

The theorem below characterizes the necessary conditions for the steady-state policies in any political equilibrium. The complete proof can be found in the Appendix.

[15] In the rest of Section 4, all the results based on Assumption A thus also hold if Assumption A is replaced by a weaker assumption that the policy environment is such that the maximization in Step 2 of Algorithm 1 admits a unique solution in every iteration.

Theorem 1 Consider any policy environment (X, u) that satisfies Assumption A. For any positive $\epsilon < \widehat{\epsilon}$, the following two conditions hold in any political equilibrium (f, U):

1. A policy is a steady state if and only if it is a element of the set constructed by Algorithm 1; i.e., $S_f = C$.

2. The long-run policy choice must be a steady state that yields a majority of the players including the agenda setter at least the same utility flows as the initial status quo does; i.e., $f^{\infty}(q) \in F(q) \cap C$ for all $q \in X$.

4.3 Equilibrium Existence

The next theorem shows that a political equilibrium exists, given that a policy is allowed to be reconsidered with sufficient frequency. The proof can be found in the Appendix, where existence is established by construction.

Theorem 2 For any policy environment (X, u) that satisfies Assumption A, a political equilibrium exists for all positive $\epsilon < \widehat{\epsilon}$. Specifically, there exists a political equilibrium (f, U) that satisfies all the following conditions for any positive ϵ sufficiently small:

1. The collection of steady-state policies is given by the policy set constructed by Algorithm 1; i.e., $S_f = C$.

2. In any policy period (on or off the equilibrium path), the political system makes a policy choice from a steady-state policy that dominates the status quo; i.e., $f(x) \in F(x) \cap C$ for all $x \in X$.

3. Starting from any initial status quo, the policy immediately converges to a steady state; i.e., $f^{\infty}(q) = f(q)$ for all $q \in X$.

4. The value function for any player ℓ is given by $U_{\ell}(x) = (1 - \delta_{\epsilon}) u_{\ell}(x) + \delta_{\epsilon} u_{\ell}(f(x))$.

Establishing equilibrium in dynamic games that involve coalition formation with an endogenous status quo is non-trivial. A stationary equilibrium need not exist, and, if it does, it is usually in mixed strategies. This was shown in different models by Kalandrakis (2004; 2007), Fong (2006), Battaglini and Palfrey (2007) and Penn (2009). Duggan and Kalandrakis (2010) prove general existence of a pure-strategy stationary equilibrium for this class of dynamic games, but only with some suitably assumed randomness on preferences and the transition dynamics of the default policy. Our model, however, differs significantly from the Duggan-Kalandrakis framework and does not satisfy their sufficient conditions. Yet, pure-strategy stationary equilibria still exist for cases with $\epsilon > 0$ sufficiently small. This property makes our analytical framework tractable for specific applications. Theorem 2 and Algorithm 1 jointly provide a general methodology for solving such models.

Notice that permitting the agenda setter to reconsider a policy does not necessarily imply that the policy will fluctuate in equilibrium. In fact, reconsideration does not actually occur in any political equilibrium presented in Theorem 2. However, the *possibility* of reconsideration changes the nature of policy-making in the political system considered here, as the agenda setter is endogenously constrained to select a policy proposal from a (potentially) smaller choice set C instead of the entire policy space X.

Theorems 1 and 2 jointly indicate that, if we only want to focus on the mapping from any initial status quo to the long-run policy choice, we miss nothing by restricting attention only to those political equilibria in which no reconsideration occurs. Given any initial status quo q, Theorem 1 states that in any political equilibrium the long-run policy choice must be an alternative in set $F(q) \cap C$, whereas Theorem 2 implies that any alternative $x \in F(q) \cap C$ can be supported as the long-run policy choice in some political equilibrium where the policy immediately transitions to the steady state. We thus will henceforth focus on political equilibria where reconsideration does not occur on the equilibrium path.[16]

Theorem 2 also suggests the possibility of multiple equilibria. In particular, multiplicity arises if there exists some policy $x \in X$ such that set $F(x) \cap C$ is more than a singleton. Intuitively, different equilibria result from self-fulfilling expectations of

[16] Here is an example of a political equilibrium in which the policy may not immediately converge to a steady state. Assume that $n = 3$, $X = \left\{x \in \{0,1,2\}^3 : x_1 + x_2 + x_3 = 2\right\}$, and $u_\ell(x) = x_\ell$ for all $\ell \in N$. Let $s^\ell \in X$ denote the ideal point of player ℓ, such that $x^\ell_\ell = 2$ and $x^\ell_k = 0$ for any $k \in N \backslash \{\ell\}$. For all distinct $i, j \in N$, let $s^{ij} \in X$ be such that $s^{ij}_i = s^{ij}_j = 1$. There exists a political equilibrium with policy rule f such that $f(s^1) = f(s^2) = f(s^3) = f(s^{13}) = s^1$, $f(s^{12}) = s^{13}$, and $f(s^{23}) = s^{23}$. Consider the initial status quo $q = s^{12}$. Then it takes two proposal rounds for the policy to reach a steady state. Formally, $f^\infty(x^0) = f^2(x^0) = s^1$ and $f(x^0) = s^{13}$.

the players. In every policy period all players anticipate the policy to evolve in future periods according to the equilibrium policy rule, and based on this common expectation they calculate their reservation values, which in turn determine the policy choice in the current period. Stationarity requires that the expectations on the future policy rule to be consistent with the current policy rule. Multiple equilibria thus result from the existence of multiple mutually consistent pairs of expectation and policy rule.

5 A Distributive Model with Three Players

To illustrate the general results we discuss the paradigmatic policy environment for legislative bargaining models: distributive politics with three players. Players are indexed by $\ell \in \{1,2,3\}$,where player 1 is assumed to be the sole agenda setter. In this context, a policy is a continuing government program that allocates $\pi \in \mathbb{N}$ units of benefit flow among the players. The policy space is therefore denoted $\Delta \equiv \left\{x \in \mathbb{Z}_{+}^{3} : \sum_{\ell=1}^{3} x_{\ell} = \pi\right\}$. Given any policy $x = (x_1, x_2, x_3) \in \Delta$, player ℓ receives a utility flow of $u_{\ell}(x) = x_{\ell}$.[17] In the case where the policy is decided upon once and for all, the equilibrium allocation to the proposer would be $\pi - \min\{x_2, x_3\}$.

We now characterize the equilibrium properties for the case where reconsideration is allowed.[18] By Algorithm 1, for all $k = 0, 1, ..., \left\lfloor \frac{1}{2}\pi \right\rfloor$,

$$\begin{aligned}
Y_k &= \{x \in \Delta : \min\{x_2, x_3\} \geq k\}, \\
c_k &= (\pi - 2k, k, k), \\
D_k &= \{x \in \Delta : \max\{x_2, x_3\} > \min\{x_2, x_3\} = k\},
\end{aligned}$$

and $C = \{x \in \Delta : x_2 = x_3\}$. By Theorem 1, set C is the unique collection of steady-state policies in any political equilibrium, and for any initial status quo $q \in \Delta_{\pi}^{3}$, the long-run policy choice $f^{\infty}(x)$ is such that $f_2^{\infty}(q) = f_3^{\infty}(q) \geq \min\{q_2, q_3\}$ and $f_1^{\infty}(q) \leq \pi - 2\min\{q_2, q_3\}$. Notice that the agenda setter receives strictly less under the institution that permits reconsideration.

Theorem 2 can also be applied to construct all the political equilibria in which reconsideration does not actually occur. In particular, for any status quo $x \in \Delta$ we

[17] The same analysis applies as long as $u_{\ell}(x)$ is strictly increasing in x_{ℓ} for any player ℓ.

[18] Notice that the policy space considered here does not satisfy Assumption A. However, Algorithm 1 as well as Theorems 1 and 2 is still applicable as the maximization in Step 2 of the algorithm admits a unique solution in every iteration.

can let $f(x)$ be an arbitrary element from a subset of policies $F(x) \cap C$, where

$$F(x) \cap C = \left\{ (\pi - 2e, e, e) \in X : \min\{x_2, x_3\} \leq e \leq \tfrac{1}{2}(x_2 + x_3) \right\}.$$

Notice that for any status quo x in set C, $F(x) \cap C = \{x\}$ is a singleton so the status quo persists as a steady state.

Proposition 1 summarizes the analysis.

Proposition 1 Consider the policy environment (Δ, u) and assume $\epsilon > 0$ is sufficiently small.

A. In any political equilibrium (f, U), starting from any initial status quo $q \in \Delta$ the long-run policy choice is such that the agenda setter and at least one voter weakly improve their benefit allocations from the initial status quo, and the two voters receive the same benefit flow; i.e., $q_1 \leq f_1^\infty(q) \leq q_1 + (\max\{q_2, q_3\} - \min\{q_2, q_3\})$ and $\min\{q_2, q_3\} \leq f_2^\infty(q) = f_3^\infty(q)$ for all $q \in \Delta$.

B. For any function $e : X \to \mathbb{Z}_+$ such that, for all $x \in X$, $\min\{x_2, x_3\} \leq e(x) \leq \frac{1}{2}(x_2 + x_3)$, there exists a political equilibrium with policy rule f such that: (B1) Starting from any initial status quo, the policy immediately converges to a steady state. (B2) Any policy x is a steady state if and only if the two voters receive an equal benefit flow; i.e. $S_f = \{x \in \Delta : x_2 = x_3\}$. (B3) For any status quo $x \in X$ on or off the equilibrium path, $f_1(x) = \pi - 2e(x)$ and $f_2(x) = f_3(x) = e(x)$.

The equilibrium policy rule described in part B can intuitively be understood as follows: for any initial status quo $x \in \Delta$, the agenda setter seeks support from the voter with the lower status quo allocation and expropriates the other voter to the extent that the two voters receive identical benefit flows $e(x)$. The equilibrium benefit flows offered to the voters need to ensure that the agenda setter receives no less than his status quo allocation, i.e. $\pi - 2e(x) \geq x_1$, and that the two voters receive no less than the status quo allocation for the initially disadvantaged voter, i.e. $e(x) \geq \min\{x_2, x_3\}$. Crucially, this implies that the voter whose vote is not needed to pass the new policy is not fully expropriated by the agenda setter. In fact, the agenda setter can gain at most $\max\{x_2, x_3\} - \min\{x_2, x_3\}$ units of the benefits from the legislative process. As a consequence, the equilibrium benefit level received by the agenda setter is bounded above by $\pi - 2\min\{x_2, x_3\}$, and this is smaller than $\pi - \min\{x_2, x_3\}$, the agenda setter's equilibrium payoff in the institution where reconsideration is not allowed.

The reason why the agenda setter must allocate equal benefit flows to the voters is the key to understanding the mechanism of our model. Suppose that the agenda setter offers $e(x)$ units of benefits to player 2 but only some $k < e(x)$ units to player 3. It is obvious that player 3 will vote against the proposal since her benefit level is reduced. But so will player 2. To understand why, consider counterfactually, what would happen if player 2 approved the policy $y = (\pi - e(x) - k, e(x), k)$. Notice that policy y is only transitional. As soon as the next policy period is reached, the agenda setter will reconsider the policy issue and propose a new policy $f(y) = (\pi - 2e(y), e(y), e(y))$ according to his equilibrium strategy. This policy yields player 3 the same utility flow as y does and therefore would be approved by majority voting. Since $e(y) \leq \frac{1}{2}(e(x) + k) < e(x)$, by voting for policy y player 2 would be worse off in the long run. Anticipating such an adverse consequence, player 2 will always vote against the proposal of y, even if she will temporarily receive a high utility flow $e(x) \geq x_2$ from this policy. By this argument, player 2 will not allow the agenda setter to expropriate player 3 too much so that, in the subsequent periods, 3 will have a lower reservation value than hers and look more attractive for the agenda setter to ally with. As a consequence, the best the agenda setter can achieve is to offer both voters equal amount of benefits and just satisfy the voter who is given less by the initial status quo.

Intuitively, reconsideration leads to more egalitarian allocations as the possibility of reconsideration induces the two voters to "defend" the benefits for each other. In particular, a voter will decline a policy proposal if the other voter is substantially expropriated, as this prevents the agenda setter from playing off the voters against each other in the future.

Although the voters derive utilities only from the benefits they receive, in equilibrium they have induced preferences over the *distribution of benefits.* In the above example, player 2 strictly prefers $(\pi - 2e(x), e(x), e(x))$ to $(\pi - e(x) - k, e(x), k)$, for any $k < e(x)$, even though either policy, if enacted, yields her the same utility flow of $e(x)$. Through the dynamic link of an endogenous status quo, the allocation of benefits chosen in one period affects the distribution of bargaining power in the future periods. Therefore, the two voters effectively demand a more egalitarian allocation of resources between them. In particular, any voter does not allow the other voter to be sufficiently expropriated by the agenda setter. This demand for "fairer" allocations results from self-interested voters who want to improve their long-term bargaining positions with respect to the persistent agenda setter. It does not depend on primitive preferences for fair allocations or risk aversion.[19]

On the other hand, the agenda setter has an incentive to expropriate as much as possible. The agenda setter proposes less benefits for himself compared to the case without reconsideration because mutual protection between the voters imposes endogenous constraints on the set of policies that can be approved by majority voting in equilibrium. As a consequence, the agenda setter has limited ability to expropriate the voter whose vote is not needed.

Notice that the agenda setter is not always the player who receives the most benefit allocation. In fact, he could be the one who gets the least. As a numerical example, consider $\pi = 10$ and $q = (0, 5, 5)$. In this case mutual protection between the voters implies the inability for the persistent agenda setter to change the status quo. More generally, whenever the initial status quo policy disadvantages the agenda setter yet is approximately equally favorable to the the two voters, in any political equilibrium the policy is strongly inertial with the agenda setter continuing to be disadvantaged. Our theory thus identifies conditions in which the agenda setter lacks the ability to expropriate.

6 Endogenous Limits on Agenda-setting Power

The example of distributive politics illustrated an important insight of our model: granting a single agenda setter the ability to reconsider a continuing policy makes him worse off than if the decision is made once and for all. In this section we fully develop this idea in the general setup, with any number of players and any policy environment (X, u). For any initial status quo $q \in X$ we want to compare two distinct institutions, based on whether it is possible for the agenda setter to reconsider a policy or not.

We first consider the institution in which the policy is to be made once and for all, i.e. $\epsilon = \infty$. Then any policy outcome $g(q)$ resulting from this institution must

[19] Recently Battaglini and Palfrey (2007) and Bowen and Zahran (2009) analyze how risk aversion leads to more egalitarian legislative bargaining outcomes compared to the case with risk neutral players. Diermeier and Gailmard (2006) address the issue of fairness and entitlement concerns in legislative bargaining.

dominate the status quo, i.e., $g(q) \in F(q)$, and maximize the agenda setter's utility flow among all politically feasible alternatives, i.e., $u_1(g(q)) \geq u_1(y)$ for all $y \in F(q)$.

We then consider the institution that allows the agenda setter to reconsider the policy with arbitrary frequency , i.e., positive $\epsilon < \widehat{\epsilon}$. By Theorems 2 and 1, the long-run policy choice $f^{\infty}(q)$ must dominate the initial status quo and lie in the collection of steady-state policies; in other words, $f^{\infty}(q) \in F(q) \cap C$.

A comparison of the conditions in the two institutions shows that the agenda setter effectively faces a more stringent constraint when he is granted power to reconsider passed bills than when he is not allowed to do so. With positive ϵ sufficiently small, the agenda setter must make a policy choice such that eventually the policy converges to some alternative in set C. With this additional constraint, the value of proposal power is in general more limited than if reconsideration was not allowed. The next theorem formalizes this insight. The proof can be found in the Appendix.

Theorem 3 Consider any policy environment (X, u). For all positive $\epsilon < \widehat{\epsilon}$, in any political equilibrium (f, U) and for any initial status quo $q \in X$,

$$U_1(f(q)) \leq U_1(f^{\infty}(q)) \leq u_1(g(q)),$$

where $u_1(g(q))$ would be the agenda setter's equilibrium payoff if reconsideration was not allowed at all, i.e. $\epsilon = \infty$.

This theorem implies that, granting the agenda setter power to initiate reconsideration only limits the value of his power. In other words, if the agenda setter could choose, he would have committed to the institution in which he was restricted to making a proposal once and for all with no possibility for reconsideration. Paradoxically, more power granted by the legislative procedure in this case leads to less valuable power in practice.[20]

The possibility of reconsideration depends not only on the institutional setting but also on the nature of policy domain. For example, any decision on international relations such as a war is likely to be irrevocable whereas policy on internal affairs such as taxation and income redistribution may be subject to reconsideration at any time. Theorem 3 thus says that the value of agenda-setting power is generally more

[20] Our theory thus may provide a novel explanation for a recent finding by Knight (2005) that empirically estimated values of proposal power are smaller than predicted by the existing theory, such as the closed-rule model due to Baron and Ferejohn (1989a).

limited in the policy domain that is subject to reconsideration than in the policy domain that is irrevocable. This implies that an agenda setter could be potentially more powerful, in the sense that he could benefit more from exercising his agenda-setting power, in foreign affairs and military decisions than in internal affairs and fiscal policies.

7 Power Turnover

One possible concern with our model may be the robustness to power turnovers. However, the equilibrium phenomenon of mutual protection among the voters persists even if we allow for the possibility of power turnover, provided the policy is allowed to be reconsidered with sufficient frequency. To see why, assume that in every instance, the agenda setter may lose his agenda-setting power at a constant rate $\lambda \geq 0$. Moreover, assume that whenever an agenda setter loses power, his position will be taken by any of the other players with equal probability. This implies that if player i is the agenda setter who makes a policy proposal in policy period t, with probability $\alpha_\epsilon \equiv 1 - e^{-\lambda\epsilon}$ the same player will still be the agenda setter in the beginning of the next period. Notice that the baseline model presented in Section 2 is equivalent to the special case of $\lambda = 0$, in which the same player serves as the agenda setter forever.

If the policy is allowed to be reconsidered with sufficient frequency, then in any policy period it is commonly understood that the incumbent agenda setter will almost never lose power in the immediate next period. Formally, $\lim_{\epsilon\to 0} \alpha_\epsilon = 1$ for any $\lambda > 0$. Notice that with $\epsilon > 0$ sufficiently small, not only the players' per-period discount factor δ_ϵ is sufficiently close to 1, but also the persistence of agenda-setting power across "policy periods", α_ϵ, is sufficiently close to probability 1. Given a finite policy space, there always exists some $\epsilon > 0$ small enough so that the voters are induced to protect each other against exploitation from the incumbent agenda setter who is sufficiently likely to be the agenda setter again in the subsequent periods. The long-run policy choice during the (now stochastic) tenure of any agenda setter thus is endogenously constrained within the set of policy alternatives that survive reconsideration within any proposer's tenure.[21]

[21] Of course, new dynamics would arise as the agenda setter switches from one player to another, but this is beyond the scope of this paper.

8 Policy Efficiency

The possibility of reconsideration can be interpreted as lack of commitment by the agenda setter. It has been commonly understood that lack of commitment by policy makers could be a source of policy inefficiency, but our model illustrates a mechanism that works in the opposite direction in majoritarian environments. For example, we have seen that lack of commitment by the agenda setter leads to a less unequal allocation of public resources for a given initial status quo. If the players have concave utility functions then this translates into a higher social welfare measured by aggregate utility. To further investigate the issue of efficiency we consider two other commonly studied policy environments.

8.1 Public Goods Production

Assume that three players must jointly produce a good that they can divide and consume. In this case a policy $x = (x_1, x_2, x_3)$ specifies not only allocation but also size of the total benefits and the policy space is $X = \mathbb{Z}_+^3$. Public production is costly. The cost function is assumed to be quadratic and given by

$$\kappa(x) = \tfrac{1}{2}\phi \cdot (x_1 + x_2 + x_3)^2,$$

where ϕ affects the marginal cost of production. Each player ℓ is assumed to share equally the production cost, and for any policy $x \in X$, derive a utility flow of

$$u_\ell(x) = \mu x_\ell - \tfrac{1}{3}\kappa(x),$$

where μ is a common marginal utility of benefits consumption.[22]

This example can be interpreted as a model with local public good provision under distortionary taxation.[23] In particular, x_ℓ could be the local public good for the geographical district or the socioeconomic group that player ℓ stands for, while the production cost $\kappa(x)$ of public goods include the forgone private consumption of the individuals and the deadweight loss that any distortionary tax may incur.

The initial status quo is assumed to be $q = (0, 0, 0)$. That is, if no agreement can be reached, there will be no production and no consumption of the benefits. If

[22] For technical convenience, assume that the values of μ and ϕ are such that $\frac{\mu}{\phi}$ is an integer.

[23] See Diermeier and Fong (2008b, 2010) for models that use such a policy environment.

the policy was chosen by a benevolent dictator, the size of total benefits would be $\pi^* \equiv \mu/\phi$, at which level marginal social cost of production is equal to marginal utility of benefits consumption. Here, however, a policy is made through a specific political process.

Suppose first that the policy choice is irrevocable, i.e. $\epsilon = \infty$. Then the agenda setter needs to satisfy some voter, say j, at her reservation value $u_j(q) = 0$ and can fully expropriate the other one. By proposing any policy x associated with $\pi_x \equiv x_1 + x_2 + x_3$ units of total benefits, the agenda setter then must offer j at least $\frac{1}{3\mu}\kappa(\pi_x)$ units of the benefits to compensate her for the production cost, and can take at most $\left[\pi_x - \frac{1}{3\mu}\kappa(\pi_x)\right]$ units for himself. The agenda setter thus selects a policy x to maximize effectively

$$\mu\left[\pi_x - \left(\frac{1}{3\mu}\kappa(\pi_x)\right)\right] - \frac{1}{3}\kappa(\pi_x) = \mu\pi_x - \frac{2}{3}\kappa(\pi_x).$$

Since the agenda setter only internalizes the costs paid by himself and voter j, in equilibrium there is generally overproduction of benefits.

Now suppose that the agenda setter is allowed to reconsider the policy as frequently as possible, i.e. $\epsilon > 0$ is sufficiently small. An application of Algorithm 1 indicates that for any policy in the unique set of steady-state policies, the two voters must receive an equal amount of utility flow for each level of total benefits production. Therefore, by proposing any policy x associated with π_x units of total benefits, the agenda setter must offer both voters at least $\frac{1}{3\mu}\kappa(\pi_x)$ units of the benefits to compensate their production costs and therefore can take no more than $\left[\pi_x - 2\left(\frac{1}{3\mu}\kappa(\pi_x)\right)\right]$ units for himself. Otherwise neither voter would support the policy. In this case, the agenda setter selects a policy to maximize effectively

$$\mu\left[\pi_x - 2\left(\frac{1}{3\mu}\kappa(\pi_x)\right)\right] - \frac{1}{3}\kappa(\pi_x) = \mu\pi_x - \kappa(\pi_x).$$

Note that any politically feasible policy thus requires the agenda setter to fully internalize all costs and benefits of the joint production. As a consequence, in equilibrium the size of benefits production is socially efficient. In other words, once we allow for reconsideration, social welfare defined by aggregate utility is unambiguously improved.

8.2 Pork-Barrel Politics

Consider a political system with five players and the pork-barrel policy space formalized by Bernheim et al. (2006). Each player is associated with a distinct project. With a slight abuse of the notation, let N denote the set of players as well as the set of projects. Each project $\ell \in N$ produces a flow of benefit $b_\ell > 0$ to player ℓ and incurs a flow of cost $c_\ell > 0$ for everyone. A policy x consists of a list of projects to be implemented, so that the policy space X is the collection of all subsets of N including the empty set $\emptyset$. Given any policy $x \in X$, player ℓ then receives a utility flow of

$$u_\ell(x) = -\sum_{i \in x} c_i + \begin{cases} b_\ell, & \text{if } \ell \in x, \\ 0, & \text{otherwise.} \end{cases}$$

For illustrative purpose, we assume that every project is socially efficient, in the sense that the benefit b_ℓ of project ℓ is greater than its total cost $5c_\ell$. With this assumption, policy efficiency increases in the number of projects implemented. Without loss of generality, label the players such that $c_i < c_j$ for any distinct $i, j \neq 1$. The initial status quo is assumed to be $\emptyset$. That is, no project will be implemented if agreement cannot be reached.

If the policy choice is to be made once and for all, i.e. $\epsilon = \infty$, the agenda setter must seek voting support from a bare majority of the cheapest players and thus selects the policy consisting projects for himself (player 1) as well as 2 and 3. The agenda setter thus obtains a utility of $b_1 - \sum_{i=1}^{3} c_i$.

Now suppose that the agenda setter is allowed to reconsider the policy as frequently as possible, i.e. $\epsilon > 0$ is sufficiently small. Iterations in Algorithm 1 thus lead to

$$\begin{aligned} c_1 &= \{1\}, \\ c_2 &= \{1, 2, 3, 4\}, \\ c_3 &= \{2, 3, 4, 5\}, \end{aligned}$$

and a unique policy set $C = \{c_1, c_2, c_3\}$. Then the unique political equilibrium outcome is the policy consisting of projects for all players but 5. Compared to the case that prohibits reconsideration, the agenda setter's equilibrium payoff drops but policy efficiency unambiguously improves as now project 4 is also implemented in equilibrium.

9 Discussion

Our model is unique in showing how majoritarian decision making with a single, persistent proposer generates endogenous limits on proposal power. This difference is particularly striking when we compare our approach with existing models where the *ex post* value of proposal power can be extreme. Bernheim et al. (2006), for example, consider a collective decision-making body in which a policy is made through predetermined, finite rounds of proposal making and majority voting. In each proposal round the status quo is the policy approved in the previous round. Once proposal making and voting concludes that most recent status quo becomes the final policy. If a sufficient number of players can make proposals in turn and the sequence of proposals is common knowledge before the legislative procedure begins, the unique equilibrium outcome is passage of the last proposer's ideal policy.[24] Thus the value of proposal power is maximal for the last proposer. In contrast, in our model persistent monopoly of proposal power induces additional constraints on the agenda setter due to voters' mutual protection incentives.

Another example of extreme proposal power is Kalandrakis (2004), who studies distributive politics in a dynamic legislative bargaining institution with three players, random recognition and a moving status quo. Kalandrakis constructs a class of mixed-strategy stationary equilibrium in which in the long run in every period the current agenda setter captures all the benefits.[25] This is in stark contrast to our pure-strategy stationary equilibria presented in Section 5. The intuition for Kalandrakis' results relies on the fact that it is a dominant incentive for a non-proposing player to favor the least equitable allocation, holding his own allocation fixed. This is the case because each player has a chance to be recognized as the agenda setter in the future; with an unequal status quo allocation, every player as future agenda setter will be able to expropriate others to the maximal extent. This effect is absent in our model since we assume a single, unchanged agenda setter. Instead, we identify exactly the opposite phenomenon, a mutual protection incentive among *permanent* non-proposers which

[24] For example, in the five-player example presented in Section 8.2, the unique equilibrium policy outcome for the model of Bernheim et al. is $\{1\}$.

[25] Kalandrakis (2007) further extends the model to allow for an arbitrary number of players and an arbitrary distribution of recognition probabilities, and again focuses on mixed-strategy equilibria.

arises in pure strategies as policy can be reconsidered with sufficient frequency.[26]

The model with persistent policy and persistent agenda setter allows us to derive a variety of new empirical implications. First of all, the *de facto* power of a persistent agenda setter is unambiguously stronger in policy domain such as foreign affairs and military decisions, which are more likely to be irrevocable decisions, compare to the domains of fiscal policy, taxation and redistributive programs, which are likely to be subject to reconsideration. Such an implication especially applies to policy making in nondemocratic regimes where the continuity of the autocratic power requires ongoing support from the political elite. Second, among continuing government policies, the *de facto* power of the agenda setter is stronger in the institutions that do not put any restriction on the possible reconsideration of passed bills than in those institutions that do. Third, the analysis of distributive policy domains shows that the persistent agenda setter will lack the ability to change the status quo policy substantially if the legislative parties without proposal power originally receive similar payoffs from the status quo. In other words, more egalitarian distributions among the non-proposing parties will tend to be more stable.

We are, of course, not the first to identify endogenous constraints on proposal power. The existing theories, however, rely on very different mechanisms. Baron and Ferejohn (1989a) show that agendas that allow for amendments, the so-called "open amendment rules," may effectively lead to weaker proposer premiums and more egalitarian allocation of benefits. As an agenda setter gives away more benefits to more voters in the legislature, this reduces the probability that some other legislator submits an amendment; therefore the original proposal is more likely to be approved. The limited benefits of proposal power in that model thus results from more dispersed proposal power. In our theory the limit on proposal power, on the contrary, emerges from more concentrated proposal power. Indeed, the result is driven by voters with no proposal power whatsoever. One way to see the difference in mechanisms is to consider the effect of changes in the discount factor. The open-rule mechanism has the strongest impact if the discount factor is small (Baron and Ferejohn 1989a, Table 1). In contrast, we identify the mechanism of mutual protection for the case where

[26] We can construct an analog of the Kandrakis equilibrium in mixed strategies in our model. Such an equilibrium, however, is not robust to modifications of the game form. For example, the mixed-strategy equilibrium would disappear if we add a procedural stage at the beginning of the game, where the three players can collectively decide on whether to enter the legislative policy game defined by our model.

the per period discount factor is sufficiently large.

Another approach is due to Baron (1996). He presents a dynamic model of legislative bargaining with a one-dimensional policy space, single-peaked preferences, and an endogenously evolving status quo. It is shown that the players are willing to propose and accept policies that are more central than their ideal points, so as to constrain any future proposer that may appear to be from the other side of the median player. In the long run the policy converges to the ideal point of the median player. In our model with a persistent agenda setter, if the policy space is one-dimensional and preferences are single-peaked, then whether or not the institution allows reconsideration will not make a difference. This holds because with a one-dimensional policy the agenda setter is unable to play off the voters against each other, and as a consequence there is no need for the voters to defend for each other. The incentive of mutual protection arises only with multidimensional policy space. Therefore, our theory and Baron (1996) not only differ in mechanism but also apply to different policy environments.

There are other recent theoretical developments that account for the empirically constrained proposal power by dispersed allocation of proposal power and risk aversion (Baron and Herron 2003, Battaglini and Palfrey 2007, Bowen and Zahran 2009). Like Baron (1996), these theories highlight the incentive of the incumbent proposer to give up some current payoffs in order to tie the hands of future proposers through the endogenous status quo. The voters' incentives are not addressed in this line of research.

One methodological contribution of our paper is the proof of equilibrium existence in pure strategies. Duggan and Kalandrakis (2010) and Anesi (2010) prove general existence of pure-strategy stationary equilibria for dynamic legislative bargaining models with an endogenous status quo and characterize necessary conditions for those equilibria. Duggan and Kalandrakis (2010) allow a very general setup with a compact policy space and assume random shocks on preferences and the status quo, whereas Anesi (2010), like us, focuses on the case with a finite policy space and assumes a sufficiently large discount factor.[27] The existence results in these models, however, are critically based on the common assumption that in ever period every player has a strictly positive chance to be recognized as the agenda setter. To the

[27] As the players are sufficient patient, Anesi (2010) also shows the policy choice converges to the von Neumann-Morgenstern stable set in the long run.

contrary, we prove the existence of and characterize stationary equilibria for the case where the agenda setter is persistently the same player, an institutional assumption different from these papers. Our theory thus provides a different set of sufficient conditions for equilibrium existence in dynamic legislative bargaining models. In passing, we note that our analytical framework also requires a different proof technique based on math induction, which is new to this literature.

10 Conclusion

We propose a new theory of collective decision-making in which a single persistent proposer combined with a policy that can be reconsidered with sufficient frequency creates mutual protection incentives among legislators without proposal power. We have seen how this limits the benefits allocated to the agenda setter and leads to more egalitarian payoff distributions. It may also increase policy efficiency compared to the case where a policy is decided once and for all, or the case where the agenda setter can commit never to reconsider a policy again. The analytical framework developed in this paper is tractable and, using the proposed algorithm, can be applied to models of public finance, macroeconomic policy choice and other economic domains.

Our theory studies the pure case in which proposal power is persistently controlled by a single player, i.e. the agenda setter. We have shown that in such case each voter has an incentive to protect his bargaining position against any future agenda setter. This creates an incentive for a voter to protect the other voters's bargaining positions. Existing models with random recognition, however, have shown that, conditional on being selected as agenda setter in the future a current voter has an incentive to weaken the bargaining position of other voters, as this allows him to fully exploit his future role as an agenda setter. Thus the possibility of being a proposer in the future undermines the mutual protection incentive of voters in a model with a persistent proposer.

Understanding the exact trade-offs between various conflicting incentives is a promising venue for future work, that eventually may lead to the systematic investigation of the role of proposal power allocation in policy-making. Since different legislative systems can be understood as specific combinations of agenda control, voting rights and veto power, such an approach could create additional insights and guide future empirical studies on how legislative procedures and political institutions shape policy outcomes, completing the already existing literature of comparative constitutions that has mainly focused on the economic effects of electoral rules.

Appendix: Technical Matters and Proofs

Section A defines the uniform upper bound of ϵ, or equivalently the uniform lower bound of δ_ϵ, that applies to Lemma 2 and all the theorems given each policy environment. Section B presents additional lemmas that lead to Lemma 2 presented in the main text. Section C presents a general algorithm that applies to an arbitrary finite policy environment, even for cases in which the agenda setter has weak preferences over the policy space. Sections D characterizes steady-state policies in any political equilibrium. Section E proves the existence of a political equilibrium. Sections D and E both present and prove general versions of the theorems that hold without Assumption A and then explain how Theorems 1 and 2 presented in the main text are special cases of the general results. Finally, Section F proves Theorem 3.

A A Uniform Upper Bound for ϵ

Consider any finite policy environment (X, u). For any $\ell \in N$ such that $u_\ell(x) = u_\ell(y)$ for all $x \in X$, let $\widehat{\delta}_\ell \equiv 0$. Otherwise let

$$\begin{aligned} \Phi_\ell &\equiv \max_{x,y\in X} \left(u_\ell(x) - u_\ell(y)\right), && (2) \\ \phi_\ell &\equiv \min_{x,y\in X} \quad |u_\ell(x) - u_\ell(y)| && (3) \\ &\quad\ \text{s.t.} \quad |u_\ell(x) - u_\ell(y)| > 0. \end{aligned}$$

and

$$\widehat{\delta}_\ell \equiv \left(\frac{\Phi_\ell}{\Phi_\ell + \phi_\ell}\right)^{\frac{1}{|X|-2}}. \qquad (4)$$

We then define

$$\widehat{\delta} \equiv \max_{\ell\in N} \widehat{\delta}_\ell,$$

and

$$\widehat{\epsilon} \equiv -\tfrac{1}{\rho} \ln \widehat{\delta}.$$

B Proofs of Lemmas

The next two lemmas present some inequalities useful in the analysis.

Lemma 3 For any finite policy space X, any positive $\epsilon < \widehat{\epsilon}$ and any $\ell \in N$, $\left(1 - \delta_\epsilon^{|X|-2}\right) \Phi_\ell - \delta_\epsilon^{|X|-2} \phi_\ell < 0.$

Proof of Lemma 3. Take any finite policy space X, any positive $\epsilon < \widehat{\epsilon}$ and any $\ell \in N$. By definitions (2) and (3), $\Phi_\ell > 0$ and $\phi_\ell > 0$. Therefore $\widehat{\delta}_\ell \in (0, 1)$. Let

$$\Upsilon_\ell(\delta_\epsilon) \equiv \left(1 - \delta_\epsilon^{|X|-2}\right) \Phi_\ell - \delta_\epsilon^{|X|-2} \phi_\ell.$$

By definition (4), $\Upsilon_\ell\left(\widehat{\delta}_\ell\right) = 0$. Notice that $\Upsilon_\ell(\delta_\epsilon)$ is decreasing in δ_ϵ. Therefore, $\Upsilon_\ell(\delta_\epsilon) < 0$ for all $\delta_\epsilon > \widehat{\delta}_\ell$. Recall that $\delta_\epsilon \equiv \exp(-\rho\epsilon)$ is decreasing in ϵ. Since $\epsilon < \widehat{\epsilon}$, we have $\delta_\epsilon > \widehat{\delta} \geq \widehat{\delta}_\ell$. ■

Lemma 4 Consider any finite policy space X, and consider any positive $\epsilon < \widehat{\epsilon}$ and any political equilibrium (f, U). Then for all $x \in X$ and $\ell \in N$:

1. $U_\ell(f(x)) \geq U_\ell(x) \Leftrightarrow U_\ell(f(x)) \geq u_\ell(x)$.
2. $u_\ell(f^\infty(x)) < u_\ell(x) \Rightarrow U_\ell(f(x)) < u_\ell(x)$.

Proof of Lemma 4. Part 1 directly follows (1). To prove Part 2, take any $x \in X$ and $\ell \in N$ such that $u_\ell(f^\infty(x)) < u_\ell(x)$. Let $T \in \mathbb{N}$ be such that (a) $f^t(x) = f^\infty(x)$ for all $t \geq T$, and (b) either $T = 1$ or $f^{t+1}(x) \neq f^t(x)$ for all $t \leq T - 1$. Due to acyclicity, such T exists. Then

$$U_\ell(f(x)) = (1 - \delta_\epsilon)\left(\textstyle\sum_{t=1}^{T-1} \delta_\epsilon^{t-1} u_\ell\left(f^t(x)\right)\right) + \delta_\epsilon^{T-1} u_\ell(f^\infty(x)).$$

Since the policy space is finite, from an initial status quo x to the stead state resulting from x it could take at most $|X| - 1$ periods; i.e. $1 \leq T \leq |X| - 1$. Then we have

$$\begin{aligned}
& U_\ell(f(x)) - u_\ell(x) \\
= \;& (1 - \delta_\epsilon)\left(\textstyle\sum_{t=1}^{T-1} \delta_\epsilon^{t-1}\left(u_\ell\left(f^t(x)\right) - u_\ell(x)\right)\right) + \delta_\epsilon^{T-1}\left(u_\ell(f^\infty(x)) - u_\ell(x)\right) \\
= \;& (1 - \delta_\epsilon)\left(\textstyle\sum_{t=1}^{T-1} \delta_\epsilon^{t-1}\left(u_\ell\left(f^t(x)\right) - u_\ell(x)\right)\right) - \delta_\epsilon^{T-1}\left|u_\ell(f^\infty(x)) - u_\ell(x)\right| \\
\leq \;& (1 - \delta_\epsilon)\left(\textstyle\sum_{t=1}^{(|X|-1)-1} \delta_\epsilon^{t-1} \Phi_\ell\right) - \delta_\epsilon^{T-1} \phi_\ell \\
= \;& \left(1 - \delta_\epsilon^{|X|-2}\right) \Phi_\ell - \delta_\epsilon^{|X|-2} \phi_\ell,
\end{aligned}$$

where the second equality is implied by the supposition that $u_\ell(f^\infty(x)) < u_\ell(x)$. Given that condition that $\epsilon < \widehat{\epsilon}$, $U_\ell(f(x)) - u_\ell(x) < 0$ by Lemma 3. ■

Now we are ready to prove Lemma 2 presented in the main text.

Proof of Lemma 2. This directly follows Lemmas 3 and 4. ■

C A General Algorithm

Algorithm 2 Given any policy environment (X, u), construct policy set $\widehat{S} \subset X$ recursively through the following steps:

Step 1. Let $Y_0 \equiv X$, $k = K = 0$.

Step 2. Let C_k be any nonempty subset of $C_k^* \equiv \arg\max_{x \in Y_k} u_1(x)$.

Step 3. Let $D_k \equiv \{x \in Y_k \backslash C_k : \exists\, y \in C_k \ s.t.\ y \succeq x\}$.

Step 4. Let $Y_{k+1} \equiv Y_k \backslash (C_k \cup D_k)$.

Step 5. Let $\widehat{S} \equiv \bigcup_{k'=0}^{k} C_{k'}$ if $Y_{K+1} = \emptyset$; otherwise let $K = k + 1$ and repeat Steps 2-5.

We say a policy set $\widehat{S}$ is constructed by Algorithm 2 along with $\{C_k, C_k^*, D_k, Y_k\}$ if through the iterations that construct $\widehat{S}$ we obtain sets C_k, C_k^*, D_k, and Y_k in iteration k. Let $\mathcal{S}$ be the collection of all policy sets that can be constructed by Algorithm 2. Obviously, $\widehat{S} \neq \emptyset$ for all $\widehat{S} \in \mathcal{S}$, since any policy set constructed by Algorithm 2 must contain at least an ideal policy of the agenda setter. A noticeable feature of Algorithm 2 is that there may exist multiple policy sets that can be constructed by it. This is due to the degree of freedom in constructing C_k in Step 2 when C_k^* is not a singleton.

The next lemma presents the relationship between Algorithms 1 and 2 under Assumption A, i.e. the assumption that the agenda setter has strict preferences over the policy space.

Lemma 5 For any policy environment (X, u) that satisfies Assumption A, the unique policy set that can be constructed by Algorithm 2 is equal to the policy set C constructed by Algorithm 1.

Proof of Lemma 5. Consider any policy environment (X, u) that satisfies Assumption A. Then the maximization problem defined in Step 2 of Algorithm 2 always has a unique solution, denoted c_k, so that $C_k = C_k^* = \{c_k\}$ is a singleton in each

each iteration k. Provided the agenda setter has strict preferences, for any distinct $x, y \in X$, if $y \succeq x$ then $y \succ x$. Therefore, In Step 3 of each iteration k, Algorithms 1 and 2 obtain an identical set D_k. The rest is trivial. ■

D Characterization of Steady-state Policies

Theorem 4 characterizes the set of steady-state policies in any political equilibrium.

Theorem 4 Consider any policy environment (X, u). For any positive $\epsilon < \widehat{\epsilon}$, the following two conditions hold in any political equilibrium (f, U):

1. The set of steady-state policies is one of the policy sets constructible by Algorithm 2; i.e., $S_f \in \mathcal{S}$..In other words, there exists $\widehat{S} \in \mathcal{S}$ such that $f^{\infty}(x) \in \widehat{S}$ for all $x \in X$.

2. The long-run policy choice must be a steady state that yields a majority of the players including the agenda setter at least the same utility flows as the initial status quo does; i.e., there exists some $\widehat{S} \in \mathcal{S}$ such that $f^{\infty}(q) \in F(q) \cap \widehat{S}$ for all $q \in X$.

Proof of Theorem 4.

Part 1. Take any equilibrium (f, U). The proof proceeds by math induction through Claims 1-5.

CLAIM 1. For any $\{C_k, C_k^*, D_k, Y_k\}$ constructed by Algorithm 2, $C_0^* \cap S_f \neq \emptyset$.

PROOF. Suppose that $C_0^* \cap S_f = \emptyset$. Note that $C_0^* \neq \emptyset$ so take any $x \in C_0^*$. Since $f^{\infty}(x) \in S_f$, $f^{\infty}(x) \notin C_0^*$ by supposition. Then $u_1(x) > u_1(f^{\infty}(x))$ by Step 2 of Algorithm 2 for $k = 0$. By Lemma 4, $u_1(x) > U_1(f(x))$ and $U_1(x) > U_1(f(x))$. This contradicts the optimality of $f(x)$ for the agenda setter.

CLAIM 2. Take any $K \in \mathbb{Z}_+$ and let $\{C_k, C_k^*, D_k, Y_k\}$ be constructed by Algorithm 2 such that $Y_K \neq \emptyset$ and $C_K \subseteq S_f$. Then $(D_K \backslash C_K^*) \cap S_f = \emptyset$.

PROOF. Suppose that $(D_K \backslash C_K^*) \cap S_f \neq \emptyset$ and take any $x \in (D_K \backslash C_K^*) \cap S_f$. Also take any $y \in C_K$. Since $C_K \subseteq S_f$, $y \in S_f$. By Steps 2 and 3 of Algorithm 2 for $k = K$, (a) $u_1(y) > u_1(x)$ and (b) there exists $M \subset N \backslash \{1\}$ such that $|M| = m$ and $u_i(y) \geq u_i(x)$ for all $i \in M$. Since $x, y \in S_f$, $U_\ell(x) = u_\ell(x)$ and $U_\ell(y) = u_\ell(y)$ for all $\ell \in N$. Therefore, $U_1(y) > U_1(x)$ and $U_i(y) \geq U_i(x)$ for all $i \in M$. This implies that $f(x) \neq x$ and $x \notin S_f$, which is a contradiction.

CLAIM 3. There exists $\{C'_k, C^{*\prime}_k, D'_k, Y'_k\}$ constructible by Algorithm 2 such that $C'_1 \subseteq S_f$ and $D'_1 \cap S_f = \emptyset$.

PROOF. Let $\{C'_k, C^{*\prime}_k, D'_k, Y'_k\}$ be constructed by Algorithm 2 such that $C'_1 = C^{*\prime}_1 \cap S_f$. By Claim 1, $C'_1 \neq \emptyset$. By construction, $C'_1 \subseteq S_f$ and $(C^{*\prime}_1 \backslash C'_1) \cap S_f = \emptyset$. By Claim 2, $(D'_1 \backslash C^{*\prime}_1) \cap S_f = \emptyset$. Note that $D'_1 = (D'_1 \backslash C^{*\prime}_1) \cup (C^{*\prime}_1 \backslash C'_1)$. Therefore $D'_1 \cap S_f = \emptyset$.

CLAIM 4. Take any $K \in \mathbb{N}$ and let $\{C_k, C^*_k, D_k, Y_k\}$ be constructed by Algorithm 2 such that, for all $k \leq K$, $Y_K \neq \emptyset$, $C_k \subseteq S_f$ and $D_k \cap S_f = \emptyset$. If $Y_{K+1} \neq \emptyset$, then (A) $x \in Y_{K+1} \Rightarrow f^\infty(x) \in Y_{K+1}$, and (B) $C^*_{K+1} \cap S_f \neq \emptyset$.

PROOF. Part A. Take any $x \in Y_{K+1}$ and suppose that $f^\infty(x) \notin Y_{K+1}$. Since $f^\infty(x) \in S_f$, $f^\infty(x) \notin \bigcup_{k=0}^K D_k$. Then $f^\infty(x) \in \bigcup_{k=0}^K C_k$ by Steps 4 and 5 of Algorithm 2. Without loss of generality assume that $f^\infty(x) \in C_k$ for some $k \leq K$. Since $x \in Y_{K+1} \subset Y_k$ and $x \notin (C_k \cup D_k)$, $u_1(f^\infty(x)) \geq u_1(x)$ and $f^\infty(x) \not\succeq^* x$. This implies that there exists $M_+ \subset N \backslash \{1\}$ such that $|M_+| = m+1$ and $u_i(x) > u_i(f^\infty(x))$ for all $i \in M_+$. By Lemma 4, for all $i \in M_+$, $u_i(x) > U_i(f(x))$ and $U_i(x) > U_i(f(x))$. This contradicts political feasibility of $f(x)$.

Part B. The argument is in parallel to that for Claim 1. Suppose that $C^*_{K+1} \cap S_f = \emptyset$. Note that $C^*_{K+1} \neq \emptyset$ since $Y_{K+1} \neq \emptyset$. So take any $x \in C^*_{K+1}$. Note that $x \in Y_{K+1}$ and therefore $f^\infty(x) \in Y_{K+1}$ by Part A of the claim. Since $f^\infty(x) \in S_f$, $f^\infty(x) \notin C^*_{K+1}$ by supposition. Since $x \in C^*_{K+1}$ and $f^\infty(x) \in Y_{K+1} \backslash C^*_{K+1}$, $u_1(x) > u_1(f^\infty(x))$ by Step 2 of Algorithm 2 for $k = K+1$. By Lemma 4, $u_1(x) > U_1(f(x))$ and $U_1(x) > U_1(f(x))$. This contradicts the optimality of $f(x)$ for the agenda setter.

CLAIM 5. Suppose that, for some $K \in \mathbb{N}$, $\{C_k, C^*_k, D_k, Y_k\}$ is constructed by Algorithm 2 such that, for all $k \leq K$, $C_k \subseteq S_f$ and $D_k \cap S_f = \emptyset$. If $Y_{K+1} \neq \emptyset$, then there exists $\{C'_k, C^{*\prime}_k, D'_k, Y'_k\}$ constructible by Algorithm 2 such that, for all $k \leq K+1$, $C'_k \subseteq S_f$ and $D'_k \cap S_f = \emptyset$.

PROOF. The argument is in parallel to that for Claim 3. Let $\{C'_k, C^{*\prime}_k, D'_k, Y'_k\}$ be constructed by Algorithm 2 such that $C'_k = C_k$ for all $k \leq K$ and $C'_{K+1} = C^{*\prime}_{K+1} \cap S_f$. By Claim 4, $C'_{K+1} \neq \emptyset$. By construction, $C'_{K+1} \subseteq S_f$ and $\left(C^{*\prime}_{K+1} \backslash C'_{K+1}\right) \cap S_f = \emptyset$. Since $C'_{K+1} \subseteq S_f$, $\left(D'_{K+1} \backslash C^{*\prime}_{K+1}\right) \cap S_f = \emptyset$ by Claim 2. Note that $D'_{K+1} = \left(D'_{K+1} \backslash C^{*\prime}_{K+1}\right) \cup \left(C^{*\prime}_{K+1} \backslash C'_{K+1}\right)$. Therefore $D'_{K+1} \cap S_f = \emptyset$.

Part 2. Suppose that $u_1(x) > u_1(f^{\infty}(x))$. Then by Lemma 4, $u_1(x) > U_1(f(x))$ and $U_1(x) > U_1(f(x))$. This contradicts the optimality of $f(x)$ for the agenda setter. Suppose to the contrary that there exists $M_+ \subset N \setminus \{1\}$ such that $|M_+| = m+1$ and $u_i(x) > u_i(f^{\infty}(x))$ for all $i \in M_+$. Then by Lemma 4, for all $i \in M_+$, $u_i(x) > U_i(f(x))$ and $U_i(x) > U_i(f(x))$. This contradicts political feasibility of $f(x)$. ■

Notice that Theorem 1 presented in the main text is a special case of Theorem 4 by Assumption A and Lemma 5.

E Existence

Theorem 5 establishes equilibrium existence by construction of a class of political equilibria in which reconsideration does not actually occur.

Theorem 5 For any policy environment (X, u), a political equilibrium exists for all positive $\epsilon < \widehat{\epsilon}$. Specifically, for any $\widehat{S} \in \mathcal{S}$ and any positive ϵ sufficiently small, there exists a political equilibrium (f, U) that satisfies all the following conditions

1. For all $x \in X$ and all $\ell \in N$,
$$U_\ell(x) = (1 - \delta_\epsilon) u_\ell(x) + \delta_\epsilon u_\ell(f(x)); \tag{5}$$

2. For all $x \in \widehat{S}$, $f(x) = x$.

3. For all $x \notin \widehat{S}$, $f(x)$ is an element of
$$F(x) \cap \widehat{S} = \left\{ y \in \widehat{S} : y \succeq x \right\}. \tag{6}$$

Proof of Theorem 5. Consider a proposal strategy f and a set of value functions U that satisfy conditions 1-3 in the theorem for some $\widehat{S}$ constructed by Algorithm 2 along with $\{C_k, C_k^*, D_k, Y_k\}$. Through a series of claims we prove that (f, U) constitutes a political equilibrium. Claim 1 shows that $F(x) \cap \widehat{S} \neq \emptyset$ for all $x \notin \widehat{S}$ and therefore $f(x)$ is well-defined. Claims 2 and 5 provide instrumental results useful for the rest of the proof. Claim 3 shows that U solves the equation system defined by (1), so Condition 1 of Definition 1 is satisfied. Claims 4 and 6 jointly show that $f(x)$ solves the maximization problem of the agenda setter for any status quo $x \in X$, so Condition

2 of Definition 1 is satisfied. Respectively, Claims 4 and 6 prove that $f(x)$ is politically feasible and that no other politically feasible policy can do strictly better than $f(x)$ for the agenda setter.

CLAIM 1. For all $x \notin \widehat{S}$, $F(x) \cap \widehat{S} \neq \emptyset$.

PROOF. Take any $x \notin \widehat{S}$. Without loss of generality, assume that $x \in D_k$ for some $k \in \mathbb{Z}_+$. Note that $C_k \neq \emptyset$ since $D_k \neq \emptyset$. Then take any $y \in C_k$. By Steps 3 and 5 of Algorithm 2, $y \succeq x$ and $y \in \widehat{S}$. Therefore $y \in F(x) \cap \widehat{S}$.

CLAM 2. For all $x \in X$ and $\ell \in N$, (a) $U_\ell(f(x)) = u_\ell(f(x))$; and (b) $u_\ell(x) > u_\ell(f(x))$ if and only if $U_\ell(x) > U_\ell(f(x))$.

PROOF. These directly follow (5) and the fact that $f(f(x)) = f(x)$ for all x.

CLAIM 3. For all $\ell \in N$, U_ℓ satisfies equation (1).

PROOF. This directly follows (5) and Claim 2.

CLAIM 4. For all $x \in X$, (a) $U_1(f(x)) \geq U_1(x)$; and (b) there exists $M \subset N \backslash \{1\}$ such that $|M| = m$ and $U_i(f(x)) \geq U_i(x)$ for all $i \in M$.

PROOF. The claim is obviously true for all $x \in \widehat{S}$, so take any $x \notin \widehat{S}$. By (6), $u_1(f(x)) \geq u_1(x)$ and there exists $M \subset N \backslash \{1\}$ such that $|M| = m$ and $u_i(f(x)) \geq u_i(x)$ for all $i \in M$. Then by Claim 2, for all $j \in M \cup \{1\}$, $U_j(f(x)) \geq U_j((x))$.

CLAIM 5. Suppose that For all $x, y \in X$ and $\ell \in N$, if $u_\ell(f(x)) > u_\ell(f(y))$ then $U_\ell(x) > U_\ell(y)$, $U_\ell(x) > U_\ell(f(y))$ and $U_\ell(f(x)) > U_\ell(y)$.

PROOF. This claim directly follows Lemma 3 and the assumption that positive $\epsilon < \widehat{\epsilon}$. Intuitively, since $\epsilon > 0$ is sufficiently small, $U_1(y)$ and $U_1(x)$ are sufficiently close to $u_1(f(y))$ and $u_1(f(x))$, respectively.

CLAIM 6. For all $x, y \in X$, either $U_1(f(x)) \geq U_1(y)$, or there exists $M_+ \subset N$ such that $|M_+| \geq m + 1$ and $U_i(x) > U_i(y)$ for all $i \in M_+$.

PROOF. Let $k(x), k(y) \in \mathbb{Z}_+$ be such that $f(x) \in C_{k(x)}$ and $f(y) \in C_{k(y)}$. We discuss the three cases below. Case 1. Suppose that $u_1(f(x)) > u_1(f(y))$. Then by Claim 5, $U_1(f(x)) > U_1(y)$. Case 2. Suppose that $u_1(f(x)) < u_1(f(y))$. Then $k(x) > k(y)$.[28] This implies that $f(x) \in Y_{k(y)} \backslash \left(C_{k(y)} \cup D_{k(y)}\right)$. By definition of

[28]Suppose to the contrary that $k(x) \leq k(y)$, then $f(y) \in Y_{k(x)}$. Since $f(x) \in C_{k(x)}$, $u_1(f(x)) \geq u_1(f(y))$. This contradicts the condition that $u_1(f(x)) < u_1(f(y))$.

$D_{k(y)}$, there exists $M_+ \subset N$ such that $|M_+| = m + 1$ and $u_i(f(x)) > u_i(f(y))$ for all $i \in M_+$. Then by Claims 5, $U_i(x) > U_i(y)$ for all $i \in M_+$. Case 3. Suppose that $u_1(f(x)) = u_1(f(y))$. If $u_1(y) > u_1(f(y))$, then by Claim 2, $U_1(y) > U_1(f(y))$. This contradicts the optimality of $f(y)$ for the agenda setter. Therefore, it must be the case that $u_1(y) \leq u_1(f(y)) = u_1(f(x))$. Then by Claim 2, $U_1(f(x)) = U_1(f(y)) \geq U_1(y)$. ■

Notice that Theorem 2 presented in the main text is a special case of Theorem 5 by Assumption A and Lemma 5.

F Proof of Theorem 3

Consider an arbitrary policy environment (X, u) and any initial status quo $q \in X$. For the institution in which $\epsilon = \infty$, the policy outcome $g(q)$ must solve

$$\max_{x \in F(q)} u_1(x). \tag{7}$$

For the institution in which $\epsilon > 0$ is sufficiently small, consider any political equilibrium (f, U). Notice that, for any $t \in \mathbb{Z}_+$, the agenda setter cannot be strictly worse off by choosing $f^{t+1}(q)$ when the status quo is $f^t(q)$. Therefore, $U_1(f^t(q)) \leq U_1(f^{t+1}(q))$ and as a consequence $U_1(f(x)) \leq U_1(f^\infty(x))$. Moreover, the long-run policy choice $f^\infty(q)$ must be such that $f^\infty(q) \in F(q) \cap \widehat{S}$ for some $\widehat{S} \in \mathcal{S}$. Then by (7), $U_1(f^\infty(q)) = u_1(f^\infty(q)) \leq u_1(g(q))$.

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