

Policy Persistence in Multi-Party Parliamentary Democracies¹

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Abstract

In a series of papers Persson and Tabellini (2001, 2003, 2004) showed that the fiscal policies in proportional-parliamentary democracies exhibit a ratchet effect: economic downturns lead to a lasting expansion of outlays and welfare spending in proportion to GDP that is not reversed during upturns. We provide an institutional explanation of this effect using a formal model of policy choice in proportional-parliamentary democracies. These polities are characterized by the presence of multi-party systems and executive control over the proposal process. To capture these features we develop a model based on the dynamic legislative bargaining framework developed by Diermeier and Fong (2007) and apply the to model to the case of public good provision with distortionary taxes. We show that in contrast to other bargaining models in equilibrium proposers are less able to expropriate other members of the legislature. This makes it more difficult for proposers to secure approval for a contraction of government spending in cyclical upturns. On the other hand spending increases in down-turns can always be supported in equilibrium which account for the ratchet effect. We then extend our analysis to a multi-period model where the government needs to respond to random temporary income shocks. We show that these dynamic considerations create additional incentives for strategic behavior consistent with the ratchet effect.

1 Introduction

Recent theoretical and empirical studies on comparative constitutions have deepened our understanding of how political institutions shape economic policies. Models by Persson and Tabellini (1999), Lizzeri and Persico (2001), and Milesi-Ferretti et al. (2002), for example, compared how different electoral rules lead to different fiscal policies such as the size of general public goods, targeted transfers, local public goods, and corruption. Pagano and Volpin (2006) investigated how electoral rules shape government regulations on corporate governance. There also have been a few studies investigating the economic effects of legislative institutions. Persson and Tabellini (2000) compared the consequences of presidential versus parliamentary constitutions on fiscal policy. More recently, Battaglini and Coate (2007a, 2007b) analyzed inefficient public investment and dynamics of public debt resulting from legislative bargaining. Finally, Fong (2006) and Baron, Diermeier, and Fong (2007) showed how coalition formation and voting under proportional representation can lead to policy inefficiency. This last approach combined both legislative and electoral institutions into a single, integrated model.

These theoretical advances have been accompanied by related empirical investigations. In some cases the purpose was to test some of the theoretical predictions of the models, in others to establish new relationships. Persson and Tabellini (2001, 2003, 2004), for example, created a comprehensive data set on political institutions and then used the data to empirically investigate how constitutional arrangements shape fiscal policies.

Most of the existing studies, however, were based on static models or focus on static policy issues like the sizes of total government spending, welfare expenditures, or the level of waste and corruption.¹ This is in marked contrast to the earlier generations of political economy models with their emphasis on dynamic phenomena such as political business cycles (Rogoff 1990, Alesina, Roubini and Cohen 1997), accumu-

¹Among the cited papers Battaglini and Coate (2007a, 2007b), Fong (2006) and Baron et al. (2007) presented dynamic models.

lation of public debt (Alesina and Drazen 1991, Alesina and Tabellini 1990, Persson and Svensson 1989, and Aghion and Bolton 1990), dynamics of welfare programs (Hassler et al. 2003 and 2005), and economic growth (Alesina and Rodrik 1994, Persson and Tabellini 1994 and Krusell 1996). However, these earlier models relied on very simplified models of political decision-making, such as the median voter theorem and two-party electoral competition that were unable to capture constitutional differences across countries. To model constitutional difference an institutionalist approach is necessary.

This state of affairs leaves an important gap in our understanding of the relationship between political institutions and economic policy. It seems that we can either focus on institutional accounts of static economic policy making or on dynamic policy models without institutional details, but not both.² This state of affairs is particularly lamentable as recent work by e.g. Persson and Tabellini (2001, 2003, 2004) provided some empirical evidence of the constitutional effects on political business cycles, fiscal deficits as well as the responsiveness of government to income shocks. The main difficulty is the absence of suitable political economy frameworks, i.e. institutionally rich models with changing economic state variables. Existing legislative decision-making approaches run into technical difficulties once we enrich the choice space to include dynamic economic policy. Continuing policies in multi-period models usually generate discontinuity or lack of concavity of equilibrium value functions and policy rules that make the characterization of equilibria a challenging task (Baron and Herron 2003, Kalandrakis 2003, Fong 2006, Baron, Diermeier and Fong 2007, Duggan and Kalandrakis 2007).

In this paper, we introduce a new model of legislative decision-making (Diermeier and Fong 2007) to investigate the institutional determinants of economic policy choice. The legislative choice model is characterized by two key features: (1) a policy, once enacted, is in effect until a new law is passed. (2) legislators with agenda-setting power may repeatedly make new proposals to amend a policy. The first feature is

²See, however, the recent work by Battaglini and Coate (2006, 2007), Fong (2006) and Baron et al. (2007).

reminiscent of Bernheim et al.'s (2006) concept of an evolving default policy. The idea is that during a legislative session (i.e. before a new election must be held) policies can always be reconsidered.³ The second feature distinguishes our model from all others in the literature. While most dynamic legislative bargaining models are extremely difficult to solve, our model is tractable and exhibits continuous value functions, a rarity in models of collective choice. As a consequence it can be applied to richer economic choice environments.

The focus of our paper is the so-called "ratchet effect" of government spending, i.e. the observation that in some countries government spending, measured as a fraction of GDP, increases during recessions, but does not decrease during cyclical upturns, leading to a step-wise increase in overall public spending. The ratchet effect was first established by Persson and Tabellini (2001, 2003, and 2004). Specifically, Persson and Tabellini divide democratic countries into four constitutional groups defined by their respective electoral rules (majoritarian or proportional representation) and their legislative systems (presidential or parliamentary). The U.S., for example, would fall in the majoritarian-presidential category, the UK in the majoritarian-parliamentary, Argentina in the proportional-presidential group, and Germany in the proportional-parliamentary category. Persson and Tabellini then show that the ratchet effect only occurs in one of the groups: parliamentary countries with proportional representation electoral rules.

More precisely, we find the following differences: First, government expenditure, fiscal deficit and welfare spending are more persistent in this group than in the others. Second, downturns lead to a lasting expansion of outlays and welfare spending in proportion to GDP that are not reversed during upturns. Third, the difference in the size of government between this group and the others grew particularly large in the period up to the early 1980s (or the early 1990s in the case of welfare spending).

What could account for the special status of proportional-parliamentary democracies? In this chapter, we develop a formal model of policy choice in parliamentary democracies with proportional representation and then show that this model can

³The relationship of our model with Bernheim et al. (2006) is discussed in more detail below.

explain the ratchet effect. Our model is based on two distinct observations. The first observation is related to the political institutions that characterize proportional-parliamentary democracies. This groups is distinct in two respects, one related to the electoral, the second to the legislative process. The first feature is a consequence of the electoral rule: proportional representation. It is well known that proportional representation leads to minority parliaments ; i.e. multiple represented parties with no party controlling a majority of seats in parliament (Duverger 1952). This is true even if voters can vote strategically (Austen-Smith and Banks 1989, Baron and Diermeier 2001), and if governments can strategically manipulate future status quos (Fong 2006, and Baron, Diermeier, and Fong 2007). Therefore government policy needs to be conceptualized as bargaining among multiple parties, either among *all* parties represented in the parliament (Diermeier and Merlo 2000) or among the parties represented in the governing coalition (Baron and Diermeier 2001, Fong 2006, and Baron, Diermeier, and Fong 2007). In contrast majoritarian systems, e.g. the plurality rule used in the UK or U.S., usually lead to two major political parties (Duverger 1952). Except for the rare case of a hung parliament, the party who controls a majority of seats usually has full control over policy.

The second feature focused on the particular structure of agenda-setting that is typical of the legislative process in parliamentary democracies. Comparative scholars have long observed that compared to presidential systems the constitutional features of parliamentary systems lead to high levels of agenda control for the executive, i.e. the cabinet (Doering 1995). In many cases, that power is concentrated within the prime minister. We capture this feature formally by considering a single, persistent agenda-setter during a given legislative period. On the other hand, presidential democracies (whether multi-party or two-party) lack the constitutional feature of effective agenda control by the executive. So, our model combines the features typical of parliamentary democracies (the government's agenda control) with multi-party bargaining typical of proportional representation.

The second observation is related to the composition of government budgets. In modern democratic countries a majority proportion of total government spending is

conducted in the form of entitlement programs. For example, in 2007 the U.S. government spent 586 million dollars on social security, 394.5 million dollars on medicare, 276.4 million dollars on medicaid, 367 million dollars on unemployment insurance and other welfare programs, and 72.6 dollars on veteran subsidy. Together these entitlement programs compose more than 60 percent of the total budget of 2.8 trillion dollars. In entitlement programs benefits are distributed and once enacted, they are in effect until they are reformed in subsequent legislative periods. In many cases, e.g. the U.S. Social Security Act of 1935, beneficiaries can sue the government if benefits are with-held.

Our model of the political process is based on the legislative bargaining framework by Diermeier and Fong (2007). The model has three important features. First, the default policy of legislative bargaining is endogenous and evolves over time. Second, any policy may be revisited and changed after it is passed in the first place. Third, any legislator with agenda-setting power is allowed to make a new policy proposal at any time and as frequently as possible; there is not a well-defined last round of policy making. The first two features are reminiscent of Bernheim et al.'s (2006) concept of an evolving default policy. The passage of a bill does not stop the legislature from revisiting the same policy issue. The passed bill simply serves as a new default policy as the legislators negotiate in the next round. The third feature distinguishes our model from Bernheim et al.

Here we investigate equilibrium behavior in a public goods environment with a distortionary income tax. One of the key findings of our analysis is how in a dynamic legislative bargaining equilibrium the initial status quo policy may lead to policy persistence and inefficiencies. The intuition is a resistance of the government to reduce government spending due to corner solutions. That is, if the initial status quo government size is large, due to some exogenous reason e.g. a war or economic crisis, in equilibrium the agenda setter may not be able to further reduce expenditures because the other groups are already at their constraint. To further reduce expenditures the agenda setter has to cut down spending on his own group, whereas reduced deadweight loss is shared by all. In this case the agenda setter does not internalize

all the economic benefits from reducing an inefficiently large budget. The reverse, however, is not true. If the status quo government size is too small, the agenda setter is always able to increase expenditures, although he may also raise spending on some other groups in order to compensate the additional tax burden they bear.

We then expand the model to a dynamic policy environment that captures the government's response to random shocks that may affect the marginal cost of taxation. As discussed, above a sizable fraction of total government expenditure is related to continuing entitlement programs. When an economy is hit by a temporary negative income shock, the party that controls agenda setting faces a strong resistance on expenditure cuts. This is because a more stringent entitlement program on any socioeconomic group implies a worse status quo in the future and therefore a permanently lower bargaining power of that group or party. Fiscal adjustment in response to a temporary shock has a permanent effect. This makes it even more difficult for a persistent agenda setter to cut spending on the other groups. On the other hand, with a temporary positive income shock, the leading party can easily satisfy its coalition partners' reservation values and pass a more generous entitlement program to benefit the socioeconomic group it represents. An asymmetric, upward, movement of public spending thus results.

1.1 Comparison to Existing Approaches: Models of Political Bargaining

Our point of departure is the Baron and Ferejohn model (1989). They analyzed how legislators bargain over a pie with majority rule and find a unique stationary equilibrium where only a bare majority of legislators receive positive shares of the pie, while the agenda setter captures a disproportionate share. The seminal paper was recently tested by Knight (2005) using US data on the distribution of the budget earmarked for transportation projects. The evidence supports the key qualitative prediction that proposal power is valuable, but more constrained than predicted by the model. In our model, we show that the possibility to reconsider a policy issue substantially

weakens the proposal power for an agenda setter, even if he has the sole authority to make policy proposals throughout the whole legislative session. In existing legislative bargaining models a single proposer would always be able to capture the entire pie. However, this is not the case in our model, as legislators, out of fear that the agenda setter will use his agenda setting power to exploit legislators with low reservation values in the future, do not approve any policy that substantially lower the reservation values of others.

The paper belongs to the literature of dynamic legislative bargaining with a moving status quo where intertemporal trade-off between current legislative and future status quo may lead to complex patterns of policy dynamics. With one-dimensional policy space and single-peaked preferences, Baron (1996) showed that, in the long run, the policy will converge to the alternative preferred by the median voter. Baron and Herron (2003) and Fong (2004) study the game in a multidimensional policy space. Recently, Duggan and Kalandrakis (2007) established general existence results for models with a moving status quo and provide a technical characterization of equilibrium strategies and value functions in these models. Kalandrakis (2004) analyzed an infinitely repeated Baron-Ferejohn legislative bargaining game where three players with linear utility divide a dollar in each period. The Markov perfect equilibrium in his model has the characteristic that irrespective of the discount factor or the initial division of the dollar, the proposer eventually extracts the whole dollar in all periods. In contrast, in the dynamic version of our model, full expropriation by the agenda setter rarely occurs. The distribution is more egalitarian.

In models of a parliamentary democracy with proportional representation, Fong (2006) showed that an incumbent coalition government strategically manipulates to lower the bargaining position of the outside parties in order to create cheap coalition partners in the future. The incentive leads to more non-central policy outcomes and inefficiency. Baron et al. (2007) showed that with strategic voters the problem of inefficiency is worsened, since a more extreme status quo favors the incumbent parties in future elections.

Bernheim et al. (2006) examined legislative policy making in institutions with

real-time agenda setting and evolving default. Assuming finite rounds of proposal-making and voting within a pork barrel model of redistributive politics, the last proposer is able to pass his favorite policy under relatively weak conditions. As a consequence, the final policy outcome is highly unequal, and the last proposer is able to obtain his ideal policy. As the authors point out in the concluding section, it is natural to wonder whether particular procedures effectively promote a more egalitarian distribution of political power. Our model maintains the idea of an evolving default policy, but assumes an agenda setter with persistent power throughout the legislative session and no *ex ante* known last round of negotiation. Surprisingly, this framework does not necessarily lead to extreme proposal power, but constrains the agenda setter. Specifically, we show that legislators have indirect preferences over distributions of benefits to third parties. That is, each legislator cares not only about his own allocation of benefits but also about the allocation to other legislators. This holds not because of altruistic preferences, but because current distributions affect each legislator's bargaining power in the future. As a consequence, in equilibrium, the legislators not included in the winning coalition are not fully expropriated, and the value of agenda-setting can be significantly smaller than what is predicted in other proposer models such as Baron and Ferejohn (1989) or Bernheim et al. (2006). This result of constrained proposal power is consistent with some recent empirical findings (e.g. Knight 2005).

1.2 Comparison to Existing Approaches: Policy Inertia

This paper belongs to the literature of policy inertia. There have been other political economy theories that account for the failure to adopt socially beneficial economic reforms or the long delay before an adoption.⁴

Fernandez and Rodrik (1991) argued that the status quo bias of economic policies may result from uncertainty caused by potential reforms. If voters or interest groups are uncertain about the *ex post* distribution of costs and benefits, due to risk aversion

⁴For an extensive survey of related studies see Drazen (2002).

they may vote against the reform even if they believe this is a socially beneficial reform *ex ante*. Note however, that this approach, does not explain why such uncertainty would be higher in proportional-parliamentary democracies.

Inspired by Olson's (1982) *The Rise and Decline of Nations*, a common view is that policy inertia results as vested interest groups are opposed to a policy reform. Krusell and Rios-Rull (1996) presented a dynamic model in which vested interest groups who have invested in old technologies support policies that block the entry of newer superior technologies and thus cause stagnation.

Policy persistence may result when there are asymmetric information and conflicts over the burden of reform. Alesina and Drazen (1991) as well as Drazen and Grilli (1993) presented a model in which the government is running a deficit due to the failure of interest groups to agree on a deficit reduction program. There is disagreement on how the burden of higher taxes should be distributed across groups or which government programs should be cut down. As different groups are unsure about the others' preferences, they wait for the others to concede and accept a reform with unfavorable distributional implications. While Alesina and Drazen (1991) assumed that consensus (unanimity) is required to pass a reform, we assume a simple majority rule. Nevertheless, in the impulse response analysis, we show that the proposer of an fiscal reduction faces strong resistance from the other groups so that he has to reduce the size of government programs for his own group. This equilibrium implication of our model may provide a micro-foundation for Alesina and Drazen's *ad hoc* assumption that any proposer of stabilization has to bear an unequally large burden resulting from the reform.

Riboni and Ruge-Murcia (2007) applied a two-player bargaining model with unanimity rule and random shocks to show that preference heterogeneity and dynamic consideration generate inertial monetary policy and explain why nominal interest rate under the central bank's control is infrequently adjusted. Their argument relies on the fact that, in a stochastic environment, a policy superior for the current moment may not be as efficient in the future. If the central bank committee members foresee that in the future it is difficult to reverse a policy change made today, they behave

inactively even now. Our model how fiscal policies can persist even under majority rule.

1.3 Comparison to Existing Approaches: Political Economy of Government Size

Our paper also speaks to the political economy literature of government size. A central question in this literature is what are the fundamental factors, either political or economic, that determine the size of total government expenditure. This literature begins with the seminal paper by Meltzer and Richard (1981), who applied the median voter theorem to a simple macroeconomic setup. They assume that the policy issue is a one-dimensional variable, the size of government, so that the policy choice is dictated by the voters with median income level. As voting rights are extended from the elite groups to a broader electorate, or as income distribution becomes more unequal so that the median voters are relatively poorer, there is more redistribution of income through government programs which leads to a larger government size. Krusell and Rios-Rull (1999) extended this model to a dynamic setup in which voters also have to trade-off consumption and savings.

Hassler et al. (2003) studied the dynamics of redistributive policy and explain the survival of a big welfare program, again, in the analytical framework of the median voter theorem. Their model demonstrate how beliefs about future political outcomes and policy making may affect private investment decisions, which affect the sizes of different groups (for example, the rich and the poor) and therefore fulfill the beliefs in the first place. They use multiple equilibria to explain different possible patterns of policy dynamics. Hassler et al. (2005) addressed the same issues with probabilistic model in the spirit of Lindbeck and Weibull (1987). All these studies deepen our understanding of policy dynamics, but institutional details are lacking in the respective models. The median-voter setup not only relies on a very restrictive policy space but also leaves no room for us to understand the different policy patterns resulting from different political institutions.

Another branch of this literature does provide theories about how different constitutions shape fiscal policies and government sizes. Persson and Tabellini (1998, 2000) theoretically investigated how different electoral rules (majoritarian vs. proportional representation) and political regimes (presidential system vs. parliamentary system) affect the sizes of total government expenditure, general public good provision and targeted transfers. They concluded that parliamentary systems and/or proportional electoral rules lead to a large government. These empirical implications were then tested and confirmed by Persson and Tabellini (2001, 2003, 2004). The theoretical approach of Persson and Tabellini was also applied by Lilesi-Ferretti et al. (2002) and Pagano and Volpin (2006) to study the composition of public expenditure and regulation over protection of employees and investors. All these models explicitly stress institutional details and compare different political institutions. However, most theories along this line are based on static models or focus on static policy issues like the sizes of total government spending, welfare expenditures, or the level of waste and corruption. Our model investigates how political institutions affect policy dynamics, for example, the *change* of government expenditure over time.

Battaglini and Coate (2007a, 2007b) provide dynamic model of public investment and public debt with a legislative bargaining institutions. They illustrate how inefficiency results from the institutions and present a rich dynamics of fiscal policies. However, their model does not apply to the ratchet effect investigated here.

In the next section we define both the policy environment and the legislative decision-making model. We then characterize the model's equilibrium and briefly discuss its implications. Then we expand the model to allow for an impulse response analysis and discuss the findings. This is followed by a brief conclusion.

2 The Model

2.1 The Policy Environment

Consider a policy environment with three distinct socioeconomic groups, indexed by $\ell = a, b, c$. Each group, formed by a continuum of identical individuals with a measure $\frac{1}{3}$, sends a representative to the legislature. Time is discrete with two periods. In every period the representatives collectively decide on the the size as well as the distribution of the government budget among the groups.

The government can implement three distinct public programs, each of which targets at a different socioeconomic group. As an example, imagine that the society is divided into retirees, the working poor and the working rich. The government may enforce a social security policy that redistributes resources to the retired elderly, provide public education and a medicare system that especially benefits the low income families, and engage in some other public programs that benefit the wealthy group. Let $x_{\ell,t} \geq 0$ be the size of the public program for group ℓ in period t . Note that the total government budget is endogenous but not fixed. Therefore, any feasible policy in period t is a triplet $\mathbf{x}_t = (x_{a,t}, x_{b,t}, x_{c,t}) \in \mathfrak{R}_+^3$. This feature distinguishes our model from that of Diermeier and Fong (2007).

All government expenditure is financed by a distortionary income tax. For any amount $\Pi_t > 0$ of tax revenue collected, the taxation system results in a deadweight loss of $C_S(\Pi_t) > 0$, where the cost function is continuous, differentiable, strictly increasing, and strictly convex. A balanced budget implies that the tax revenue exactly covers the total public expenditure: $\Pi_t = \sum_{\ell=a}^c x_{\ell,t}$. With symmetry, each group bears one-third of the deadweight loss, $\frac{1}{3}C_S(\Pi(\mathbf{x}_t))$.

The subscript S of the cost function refers to the state of the economy, which affects marginal deadweight loss of taxation. This parameter could reflect technological productivity of the economy, severity of fiscal deficits, efficiency of the government bureaucrats, and other economic or policy variables. We discuss various specifications of the economic state S variable below.

In addition to distributional concerns we are also interested in efficiency prop-

erties. The size of government budget may be too large or too small, compared to its social optimal level. If the public policy was chosen by a benevolent dictator, the total government budget would be G_S^* such that $C'_S(G_S^*) = 1$. At this efficient expenditure level, the social deadweight loss incurred by the last dollar spent is equal to the additional utility contributed by that dollar through government programs. In contrast, if the public policy was solely determined by a single socioeconomic group without any checks and balances by the others, the total government budget would be \bar{G}_S such that $\frac{1}{3}C'_S(\bar{G}_S) = 1$. A single group only internalizes its part (one-third) of the deadweight loss and therefore overspends ($\bar{G}_S > G_S^*$) leading to an inefficient allocation. Regardless of the legislative institution, \bar{G}_S is the upper bound of any politically feasible government size.

We do not assume electoral competition and assume that the representatives are perfect delegates. Given the constraints imposed by the balanced budget requirement and the political process they maximize the expected utilities of their respective groups. In any period t with economic state S_t , preferences of group ℓ are assumed to be quasi-linear and given by

$$u_\ell(\mathbf{x}_t; S_t) = x_{\ell,t} - \frac{1}{3}C_{S_t}(\sum_{\ell=a}^c x_{\ell,t}).$$

The total two-period utility is defined given by

$$(1 - \beta) u_\ell(\mathbf{x}_1; S_1) + \beta u_\ell(\mathbf{x}_2; S_2),$$

where $\beta \in [0, 1)$ represents a standard discount parameter.

2.2 The Political Process

The political process is modeled as legislative bargaining between the three representatives. We focus on a particular proposal protocol that is typical of parliamentary democracies where agenda setting is concentrated in the executive. Formally, we assume a single, persistent agenda setter during a legislative session. A legislative session refers to the lifetime of a government, i.e., the time period between two parliamentary elections. In our model, a session consists of 2 periods. We assume that

the government will last the entire session. In other words, we do not consider issues of cabinet stability. Therefore, the agenda setter is unchanged throughout the two periods. Without loss of generality, let the representative of group a be the sole agenda setter.

Legislative bargaining proceeds in potentially multiple rounds of proposal making and voting. The number of rounds depends on both exogenous factors that may randomly terminate the session and the decision by the agenda setter. Note that in a multiple period model each **period** may potentially have multiple **rounds** of proposing and voting.

At the beginning of period t , there is an initial default policy \mathbf{d}_t^0 . A "default" is the policy that will be implemented if no new policy proposal is passed subsequently in the same period. Consider an arbitrary round of negotiation and denote the prevailing default by \mathbf{d}_t^r . The agenda setter can choose to make a new policy proposal $\tilde{\mathbf{x}}_t^r \in \mathfrak{R}_+^3$ or to pass. To simplify the mathematical formulation, a "pass" is modeled as a proposal identical to the prevailing default; i.e., $\tilde{\mathbf{x}}_t^r = \mathbf{d}_t^r$. Once a proposal (different from the default) is made, it is voted on against the default. Voting is by simple majority rule. If a new proposal passes it becomes the default in the next round, i.e., $\mathbf{d}_t^{r+1} = \tilde{\mathbf{x}}_t^r$. Otherwise the original default remains, i.e., $\mathbf{d}_t^{r+1} = \mathbf{d}_t^r$. Collective decision-making then continues in the same fashion conditional on the continuation of the period. The default evolves as legislation in a period progresses. The default policy that survives till the end of the period is the final policy outcome for that period. We denote the policy outcome in period t by \mathbf{x}_t .

The assumption of an evolving default is similar to the approach proposed by Bernheim et al. (2006). Intuitively, the passage of a bill does not prevent the legislature from revisiting the issue at a later date; rather, it changes the default for subsequent deliberations. Bernheim et al. assumed an exogenously fixed, commonly known number of bargaining rounds. In our model, however, there is not a well-defined last round. Rather, the number of actual bargaining rounds is determined as follows.

There are two ways to terminate a legislative session. First, the period ends

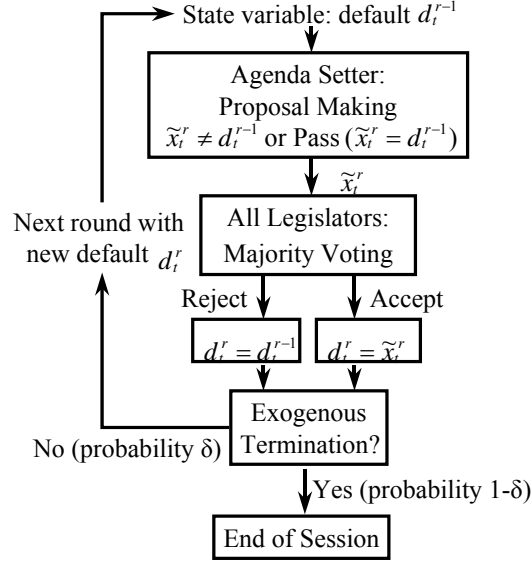


Figure 1: The Flow Chart: Sequence of events in round r of period t .

endogenously if the ongoing default is such that the agenda setter no longer wants to propose any new policy to defeat it. Second, at the end of each round of negotiation, the period may end *exogenously* with probability $(1 - \delta)$, where $\delta \in [0, 1)$. In other words, conditional on any round of negotiation, with probability δ a period continues and the agenda setter gets a chance to revisit the same policy and make a new proposal to replace the current policy. Following Diermeier and Fong (2007), we assume that the probability of reconsideration is sufficiently close to 1. Figure 1 summarizes the sequence of events in this game.

In any period t , we refer to a policy that has been enacted as a "status quo" and denote it by \mathbf{q}_t . Following this definition, the status quo in period two is the policy outcome in period two; i.e., $\mathbf{q}_2 = \mathbf{x}_1$. We assume that, once enacted, a policy is in effect until it is reformed. Such assumption captures the feature of a broad set of welfare programs and entitlement policies that compose a majority proportion of government expenditure in well-developed democracies, and especially in those multiparty parliamentary countries. Given this, it is natural to assume that, in any legislative session t , the initial default policy is simply the status quo alternative at that point; i.e., $\mathbf{d}_t^0 = \mathbf{q}_t$. In the beginning of the first period, we assume an exogenous

initial status quo \mathbf{q}_1 .

Note that in the existing dynamic bargaining literature *status quo* and *default* are the same thing (e.g. Baron 1996, Kalandrakis 2004, Fong 2006, Baron, Diermeier and Fong 2007, and Duggan and Kalandrakis 2007). However, this is not the case in our model. For example, suppose that in year 2007 the legislature passes a social security reform that will become effective in year 2009. The status quo is the ongoing policy that has been working, and default is the new bill, which may be reconsidered or even replaced before it is enacted. A separation of the concepts of status quo and default allows us to distinguish policy dynamics *within* and *across* periods.

As a final element, there is some proposal cost $\varepsilon > 0$ that the agenda setter has to pay when he makes a new proposal. The cost enters in a form as some loss of utility that the agenda setter would eventually receive. The cost may include the monetary value of effort the agenda setter puts to draft a new bill, or the opportunity cost of the time spent in legislative session when legislators deliberate a policy issue and vote. Compared to the size of total government budget, these costs are very small. Therefore, we will only consider the limiting equilibrium in which the proposal cost is positive but negligibly small. Diermeier and Fong (2007) show that the presence of a small cost together with a sufficiently large probability of reconsideration guarantees a unique and well-behaved equilibrium.

2.3 An Impulse Analysis Setup

The goal of this paper is to provide mechanisms, resulting from bargaining frictions, that could possibly account for the persistence of government size and inaction of government policy in response to change of economic environment in multi-party parliamentary countries. Therefore, instead of a full dynamic characterization of a model with changing economic state variables we only consider an impulse response analysis.

We assume that the economy could be in one of three states: H , N , and L . We assume that for any spending level Π , $C'_H(\Pi) < C'_N(\Pi) < C'_L(\Pi)$. Therefore, $G^*_H > G^*_N > G^*_L$ and $\bar{G}_H > \bar{G}_L > \bar{G}_L$. We refer to $S = H$ as a "good state" where it

is cheaper to provide government programs *ceteris paribus* and therefore the efficient government expenditure is at a higher level. We refer to $S = L$ as a "bad state" in which it is more costly to tax in order to finance the same amount of government expenditure and therefore the efficient government expenditure is at a lower level.

To conduct an impulse response experiment, we assume that before the first period the economy has been in a normal state $S_0 = N$, and the government size has been stabilized at G_N^* . In this way, the initial status quo \mathbf{q}_1 is a policy associated with a government size $\sum_{\ell=a}^c q_{\ell,1} = G_N^*$. In the first period, a temporary shock strikes and that affects the marginal social cost of public expenditure. The shock is temporary in the sense that it lasts for only one period. In the second period the economy revers back to its normal state. This means that we assume $S_2 = N$. We want to know how the government would respond to the change of economic environment by making a new policy in the first period. Given very few theories available in the literature, we believe this is a reasonable starting point to approach the key questions.

We characterize the equilibrium for three different possible states of the economy in the first period. The exact interpretation of this shock is not critical. What really matters is that the economy temporarily deviates from its long-run trend. We now want to investigate how this fluctuation results in fluctuation of government spending.

As a normative benchmark, in the first best solution, in every period with economic state S_t the total size of government expenditure should be equal to $G_{S_t}^*$ regardless of the specific allocation. Public spending should be fully responsive to the state of the economy. In our model, the policy is chosen by the political process of legislative bargaining. We want to show how the equilibrium policy deviates from the first best solution and identify possible sources of inefficiency and policy persistence resulting from the political institutions that characterize the legislative bargaining environment.

3 Equilibrium Concept

3.1 Equilibrium Definition

Consider any period t and an arbitrary round r of proposal making and voting with a prevailing default \mathbf{d}_t^r and economic state S_t . If no new bill is passed in the rest of this period, \mathbf{d}_t^r will be implemented and the utility of group ℓ is given by $d_{\ell,t}^r - \frac{1}{3}C_{S_t}(\sum_{\ell=a}^c d_{\ell,t}^r)$. Since the probability that this period may exogenously end is constant across time, the legislature faces an identical dynamic choice problem in legislative bargaining rounds r and $r' \neq r$, if the default policies in the two rounds are the same, i.e., $\mathbf{d}_t^r = \mathbf{d}_t^{r'}$. Therefore, we restrict analysis to cases in which the legislators condition their strategies only on the prevailing default as well as the economic state S_t . In other words, we assume stationarity *within* a legislative period. From now on, we drop the superscript for bargaining rounds.

The equilibrium we are going to define involves not only stationarity with period but also subgame perfection across periods. Subgame perfection implies that in any period the representatives maximize their discounted sum of expected utility and take into consideration their current policy choice on legislation in the subsequent period.

Moreover, following Diermeier and Fong (2007), we focus on the limiting legislative equilibrium as the proposal cost ε goes to 0 and the probability of reconsideration δ goes to 1. The reason for this assumption is mainly technical as the limiting equilibrium has various appealing properties. However, the substantive component of our assumption, i.e. that the costs for generating a proposal are arbitrarily small given what is at stake seem clearly satisfied in our context. For example, in the year 2007 social security expenditures approximate more than 500 billion dollars in the US budget and Medicare almost 500 billion dollars. Second, in the model δ captures the possibility of reconsidering a passed bill. Again for very significant legislation (as entitlement programs) a δ close to 1 provides a reasonable approximation.

For tractability, when formulating the equilibrium definition, we assume that in any period the representatives and socioeconomic groups they represent foresee a limiting equilibrium to follow in subsequent period but precisely perceive the negligibly

small proposal cost and a sufficiently high probability of reconsideration in the current period. This approximation makes the model very tractable. Note, however, that the equilibrium strategies and value functions are all continuous over the policy space and the parameters. This suggests that this assumption is not binding in a more general model.

Let $\mathbf{g}_t(\mathbf{d}_t; S_t)$ be the new bill passed in any round of negotiation in period t with a prevailing default \mathbf{d}_t . It will also be the new default in the subsequent rounds if the current legislative period continues. For any S_t , we refer to $\mathbf{g}_t : \mathfrak{R}_+^3 \times \{S_t\} \rightarrow \mathfrak{R}_+^3$ as the policy rule in period t . Let

$$\mathbf{g}_t^*(\mathbf{d}_t; S_t) \equiv \lim_{c \rightarrow 0} \lim_{\delta \rightarrow 1} \mathbf{g}_t(\mathbf{d}_t; S_t) \quad (1)$$

be the limiting policy rule in period t .

Let $U_{i,t}(\mathbf{x}_t; S_t)$ be the expected utility of group $i \in \{b, c\}$ if a policy \mathbf{x}_t is passed in any round of negotiation in period t , and

$$U_{i,t}^*(\mathbf{x}_t; S_t) \equiv \lim_{c \rightarrow 0} \lim_{\delta \rightarrow 1} U_{i,t}(\mathbf{x}_t; S_t) \quad (2)$$

be the limiting counterpart. In a two-period model, set $U_{i,3}^*(\mathbf{x}_{t+1}; S_{t+1}) \equiv 0$ for any \mathbf{x}_{t+1} , any S_{t+1} and any $i \in \{b, c\}$. With probability $(1 - \delta)$ the legislative session in period t exogenously ends and this group receives a utility of $x_i - \frac{1}{3}C_{S_t}(\sum_{\ell=a}^c d_{\ell,t})$ in the current period and an expected utility of $U_{i,t+1}^*(\mathbf{g}_{t+1}^*(\mathbf{x}_t; S_{t+1}); S_{t+1})$ in the subsequent period. With probability δ the agenda setter has a chance to revisit the policy issue and $\mathbf{g}_t(\mathbf{x}_t; S_t)$ will be passed in the next round of negotiation. In this case, group i will receive an expected utility of $U_{i,t}(\mathbf{g}_t(\mathbf{x}_t; S_t); S_t)$. Thus, for $i \in \{b, c\}$,

$$\begin{aligned} U_{i,t}(\mathbf{x}_t; S_t) &= (1 - \delta)(1 - \beta) \left(x_{i,t} - \frac{1}{3}C_{S_t}(\sum_{\ell=a}^c x_{\ell,t}) \right) \\ &\quad + (1 - \delta)\beta U_{i,t+1}^*(\mathbf{g}_{t+1}^*(\mathbf{x}_t; S_{t+1}); S_{t+1}) + \delta U_{i,t}(\mathbf{g}_t(\mathbf{x}_t; S_t); S_t). \end{aligned} \quad (3)$$

Note that, for any prevailing default \mathbf{d}_t , $U_i(\mathbf{d}_t; S_t)$ is the reservation value of group i in period t since this is the group's expected utility if the default remains.

Let $U_{a,t}(\mathbf{x}_t, \mathbf{d}_t; S_t)$ be the expected utility of the agenda setter's group in period t if the prevailing default is \mathbf{d}_t and a policy \mathbf{x}_t is passed, and

$$U_{a,t}^*(\mathbf{x}_t, \mathbf{d}_t; S_t) = \lim_{c \rightarrow 0} \lim_{\delta \rightarrow 1} U_{a,t}(\mathbf{x}_t, \mathbf{d}_t; S_t) \quad (4)$$

be its limiting counterpart. The expected utility is a function of both default \mathbf{d}_t and passed bill \mathbf{x}_t because the agenda setter has to pay a proposal cost c if $\mathbf{x}_t \neq \mathbf{d}_t$, no matter how the bargaining proceeds in subsequent rounds. With probability $(1 - \delta)$ the legislative session in period t exogenously ends and the agenda setter's group receives a utility of

$$\mathbf{x}_{a,t} - \frac{1}{3}C_{S_t} (\sum_{\ell=a}^c x_{\ell,t}) - \mathbf{I}(\mathbf{x}_t \neq \mathbf{d}_t) c$$

in the current period, where

$$\mathbf{I}(\mathbf{x}_t \neq \mathbf{d}_t) = \begin{cases} 1, & \text{if } \mathbf{x}_t \neq \mathbf{d}_t, \\ 0, & \text{if } \mathbf{x}_t = \mathbf{d}_t, \end{cases}$$

and an expected utility of $U_{a,t+1}^* (\mathbf{g}_{t+1}^* (\mathbf{x}_t; S_{t+1}), \mathbf{x}_t; S_{t+1})$ in the subsequent period. Again, let $U_{a,3}^* (\mathbf{x}_{t+1}, \mathbf{d}_{t+1}; S_{t+1}) \equiv 0$ for any \mathbf{x}_{t+1} , \mathbf{d}_{t+1} , and S_{t+1} . With probability δ the session continues. In this case, the default in the next round will be \mathbf{x}_t and a new bill $\mathbf{g}_t (\mathbf{x}_t; S_t)$ will be passed. The agenda setter will receive an expected utility of $U_{a,t} (\mathbf{g}_t (\mathbf{x}_t; S_t), \mathbf{x}_t; S_t)$. Thus,

$$\begin{aligned} U_{a,t} (\mathbf{x}_t, \mathbf{d}_t; S_t) &= (1 - \delta) (1 - \beta) (x_{a,t} - \frac{1}{3}C_{S_t} (\sum_{\ell=a}^c x_{\ell,t})) & (5) \\ &+ (1 - \delta) \beta U_{a,t+1}^* (\mathbf{g}_{t+1}^* (\mathbf{x}_t; S_{t+1}), \mathbf{x}_t; S_{t+1}) \\ &- \mathbf{I}(\mathbf{x}_t \neq \mathbf{d}_t) c + \delta U_{a,t} (\mathbf{g}_t (\mathbf{x}_t; S_t), \mathbf{x}_t; S_t). \end{aligned}$$

Note that, with a prevailing default \mathbf{d}_t , $U_{a,t} (\mathbf{d}_t, \mathbf{d}_t; S_t)$ is the reservation value of the agenda setter's group, since it is the group's expected utility if policy \mathbf{d}_t remains to be the default in the subsequent rounds.

We make two behavioral assumptions regarding proposal making and voting. First, a legislator votes against a policy proposal if and only if passage of the bill makes him strictly worse off. This is equivalent to a case in which a legislator has to overcome an infinitesimal cost in order to vote against the agenda setter. Second, when an agenda setter is indifferent between the prevailing default \mathbf{d}_t and proposing a new policy $\mathbf{x}_t \neq \mathbf{d}_t$, he chooses the latter. To justify why the agenda setter breaks a tie by not staying with the default, we can interpret the proposal cost ε as the amount of utility that is just enough for the agenda setter to be in favor of a policy change. It is as if the actual "proposal cost" is, for example, one penny less than ε .

Given any prevailing default \mathbf{d}_t , the agenda setter makes a policy proposal to maximize his expected utility $U_{a,t}(\mathbf{x}_t, \mathbf{d}_t; S_t)$. With a positive proposal cost, the agenda setter would never make any proposal that he expects to be rejected. Therefore, the maximization problem is subject to a constraint that the proposal be approved by majority voting. Given the assumption on voting behaviors, this is equivalent to a constraint that at least one other legislator is weakly better off with the proposed policy than with the default. In other words, majority voting can be modeled by an incentive compatibility constraint. To sum up, the policy rule $\mathbf{g}_t(\mathbf{d}_t; S_t)$ solves

$$\begin{aligned} \max_{\mathbf{x}'_t \in \mathfrak{R}_+^3} \quad & U_{a,t}(\mathbf{x}'_t, \mathbf{d}_t; S_t) \\ \text{s.t.} \quad & U_{i,t}(\mathbf{x}'_t; S_t) \geq U_{i,t}(\mathbf{d}_t; S_t) \text{ for some } i \in \{b, c\}. \end{aligned} \tag{6}$$

Note that the prevailing default \mathbf{d}_t always satisfies the incentive compatibility constraint. If the default policy is such that an agenda setter cannot pass any proposal that leaves him a (weakly) higher expected utility than his reservation value, he "proposes", and trivially, "passes" the default policy. In this case, the default policy solves the constrained maximization problem and $\mathbf{g}_t(\mathbf{d}_t; S_t) = \mathbf{d}_t$.

We are now ready to summarize the equilibrium definition.

Definition. A limiting legislative equilibrium is a pair of policy rules $\{\mathbf{g}_t^*\}_{t=1}^2$, and a set of expected utility functions $\{U_{a,t}^*, U_{b,t}^*, U_{c,t}^*\}_{t=1}^2$ such that these functions are the limit given by equations (1), (2), and (4), where $\{\mathbf{g}_t\}_{t=1}^2$ and $\{U_{a,t}, U_{b,t}, U_{c,t}\}_{t=1}^2$ satisfy the following conditions:

1. Given any $t \in \{1, 2\}$, \mathbf{g}_t and $\{U_{\ell,t+1}^*\}_{\ell=a}^c$, for any S_t and any $\mathbf{x}_t, \mathbf{d}_t \in \mathfrak{R}_+^3$, $U_{i,t}(\mathbf{x}_t; S_t)$ satisfies equation (3) for any $i \in \{1, 2\}$, and $U_{a,t}(\mathbf{x}_t, \mathbf{d}_t; S_t)$ satisfies equation (5).
2. Given any $t \in \{1, 2\}$ and $\{U_{\ell,t}\}_{\ell=a}^c$, for any $\mathbf{d}_t \in \mathfrak{R}_+^3$, $\mathbf{g}_t(\mathbf{d}_t)$ solves maximization problem (6).

3.2 An Equivalent Problem

A limiting legislative equilibrium exists and is unique. The proof is an extension of Diermeier and Fong (2007) and here omitted. In the rest of the paper, we only characterize necessary conditions for the unique limiting equilibrium. These necessary conditions demonstrate the mechanisms through that lead to the persistence of public expenditures.

In analogy with the analysis in Diermeier and Fong (2007) the following holds.

First, even though proposers have the ability to have current policies reconsidered in equilibrium, there exists at most one round of proposal making and voting in every period. In other words, if the agenda setter ever desires to change the status quo, he makes one proposal immediately without reconsidering in any further round.

Second, in any period the equilibrium spending levels for both of the two groups with no proposal power are identical. This is an important difference compared to the results in all models in the Baron-Ferejohn tradition, in which all legislators whose votes are not needed to pass a proposal are fully expropriated. The nature of legislative bargaining is different in our model, however. It is still true that the agenda setter has an incentive to expropriate as much as possible from any socioeconomic group, say k , whose votes he does not need to pass a new policy. However, the group, say j , from which the agenda setter seeks a voting support may not permit him to expropriate group k too much. This is explained in the following example based on Diermeier and Fong (2007).

Let's suppose that the three socioeconomic groups are dividing a fixed budget with size normalized to 1. Assume a single period with a status quo (the initial default) $\mathbf{d} = (\frac{1}{2}, \frac{1}{3}, \frac{1}{6})$. In a static Baron-Ferejohn model with closed rule the policy outcome would be $(\frac{5}{6}, 0, \frac{1}{6})$. Legislator c is most disadvantaged by the default policy, and therefore becomes the cheapest coalition partner for the agenda setter. Excluded from the coalition, legislator b is fully expropriated since her vote is not needed to pass the proposal. The agenda setter leaves legislator c just enough benefit to be indifferent between accepting and rejecting. In subgame-perfect equilibrium c accepts

with probability 1 and the proposer takes the rest of the pie.

In our limiting legislative equilibrium, however, the agenda setter could never pass the policy $(\frac{5}{6}, 0, \frac{1}{6})$. To see why, consider counter-factually, what would happen if legislator c approved the proposal. With probability $1 - \delta$ the proposer would not have been able to revisit the policy issue and therefore $(\frac{5}{6}, 0, \frac{1}{6})$ would be the final policy outcome. With probability δ , however, the agenda setter would be able to propose a new policy $(1, 0, 0)$, which would be accepted by the fully expropriated legislator b . This implies that by accepting the policy $(\frac{5}{6}, 0, \frac{1}{6})$, legislator c becomes vulnerable to further expropriation in the future. Foreseeing such an adverse consequence, legislator c will always vote against the proposal of $(\frac{5}{6}, 0, \frac{1}{6})$ even though according to this proposal he does not lose any benefit right away. By similar arguments, we can conclude that legislator c will not accept any new policy where legislator b receives strictly less benefit than legislator c , assuming that the proposal cost is negligibly small. Therefore, the agenda setter can guarantee himself at most $\frac{2}{3}$ and only pass the policy $(\frac{2}{3}, \frac{1}{6}, \frac{1}{6})$. Surprisingly, the possibility of reconsideration, in fact, constrains the agenda setter and leads to an equal distribution of public resources between the two groups with no proposal power.

Combining these observations, we can simplify the formulation of our model. It is as if the equilibrium policy outcome results from an equivalent problem, in which in every period the agenda setter makes a policy proposal once and for all with a "limited expropriation" constraint. This additional constraint should be specified that the agenda setter's policy proposal has to offer both of the other groups an equal expected utility and therefore targeted government programs with an equal size.

Therefore, in the second period and for status quo $\mathbf{q}_2 \in \mathfrak{R}_+^3$, the equilibrium policy rule $\mathbf{g}_2^*(\mathbf{q}_2; N)$ solves

$$\begin{aligned} \max_{\mathbf{x}'_2 \in \mathfrak{R}_+^3} \quad & x'_{a,2} - \frac{1}{3}C_N \left(\sum_{\ell=a}^c x'_{\ell,2} \right) \\ \text{s.t.} \quad & x'_{b,2} = x'_{c,2}, \\ & x'_{i,2} - \frac{1}{3}C_N \left(\sum_{\ell=a}^c x'_{\ell,2} \right) \geq q_{i,2} - \frac{1}{3}C_N \left(\sum_{\ell=a}^c q'_{\ell,2} \right) \text{ for some } i \in \{b, c\}. \end{aligned} \tag{7}$$

In a similar way, in the first period and for any status quo $\mathbf{q}_1 \in \mathfrak{R}_+^3$ and any economic

state S_1 , the equilibrium policy rule $\mathbf{g}_1^*(\mathbf{q}_1; S_1)$ solves

$$\begin{aligned} \max_{\mathbf{x}'_1 \in \mathfrak{R}_+^3} \quad & (1 - \beta) \left(x'_{a,1} - \frac{1}{3} C_{S_1} \left(\sum_{\ell=a}^c x'_{\ell,1} \right) \right) + \beta \left(g_{a,2}^*(\mathbf{x}'_1; N) - \frac{1}{3} C_N \left(\sum_{\ell=a}^c g_{\ell,2}^*(\mathbf{x}'_1; N) \right) \right) \\ \text{s.t.} \quad & x'_{b,1} = x'_{c,1}, \\ & W_i(\mathbf{x}'_1; S_1) \geq W_i(\mathbf{q}_1; S_1) \text{ for some } i \in \{b, c\}, \end{aligned} \tag{8}$$

where

$$W_i(\mathbf{q}_t; S_t) = (1 - \beta) \left(q'_{i,1} - \frac{1}{3} C_{S_1} \left(\sum_{\ell=a}^c q_{\ell,1} \right) \right) + \beta \left(g_{i,2}^*(\mathbf{q}_t; N) - \frac{1}{3} C_N \left(\sum_{\ell=a}^c g_{\ell,2}^*(\mathbf{q}_t; N) \right) \right)$$

is the equivalent reservation value of group $i \in \{b, c\}$,

$$W_i(\mathbf{x}'_t; S_t) = (1 - \beta) \left(x'_{i,1} - \frac{1}{3} C_{S_1} \left(\sum_{\ell=a}^c x'_{\ell,1} \right) \right) + \beta \left(g_{i,2}^*(\mathbf{x}'_t; N) - \frac{1}{3} C_N \left(\sum_{\ell=a}^c g_{\ell,2}^*(\mathbf{x}'_t; N) \right) \right)$$

is the expected utility of same group if a policy \mathbf{x}'_1 is chosen, and $\mathbf{g}_2^*(\mathbf{x}'_1; N)$ is the solution to (7), the agenda setter's equivalent maximization problem in the second period.

4 The Second Period

We characterize the equilibrium by backward induction and start the analysis from the second period. This case also provides us with a complete analysis of a legislative session with only one period.

4.1 General Intuition

In the period-two equilibrium, either the non-negativity constraint or the incentive compatibility constraint is binding. With a period-two status quo of \mathbf{q}_2 the agenda setter chooses a policy $\mathbf{x}'_2 \in \mathfrak{R}_2^3$ such that either $x'_{b,2} = x'_{c,2} = 0$, or

$$x'_{b,2} - \frac{1}{3} C_N \left(\sum_{\ell=a}^c x'_{\ell,2} \right) = x'_{c,2} - \frac{1}{3} C_N \left(\sum_{\ell=a}^c x'_{\ell,2} \right) = \min \{q_{b,2}, q_{c,2}\} - \frac{1}{3} C_N \left(\sum_{\ell=a}^c q_{\ell,2} \right).$$

If this was not true, the agenda setter could always reduce the provision of government programs to the other groups by a small amount and still obtain a voting support from the more disadvantaged group.

For any status quo \mathbf{q}_2 and any government size Π'_2 , let

$$\bar{x}(\mathbf{q}_2, \Pi'_2) \equiv \min \{q_{b,2}, q_{c,2}\} + \frac{1}{3}C_N(\Pi'_2) - \frac{1}{3}C_N(\sum_{\ell=a}^c q_{\ell,2}).$$

Then in equilibrium, the agenda setter must choose \mathbf{x}'_2 such that

$$x'_{b,2} = x'_{c,2} = \max \left\{ 0, \bar{x}(\mathbf{q}_2, \sum_{\ell=a}^c x'_{\ell,2}; N) \right\}, \quad (9)$$

and

$$x'_{a,2} = \sum_{\ell=a}^c x'_{\ell,2} - 2 \max \left\{ 0, \bar{x}(\mathbf{q}_2, \sum_{\ell=a}^c x'_{\ell,2}; N) \right\}. \quad (10)$$

We can now apply this approach and transform the original problem into a maximization problem in which the agenda setter directly chooses the size of total government budget $\Pi'_2 = \sum_{\ell=a}^c x'_{\ell,2}$. Once Π'_2 is chosen, the relative magnitudes of government programs for all socioeconomic groups are pinned down by (9) and (10).

For any government size Π'_2 to be feasible, it must be that

$$\Pi'_2 \in \mathcal{F}_1(\mathbf{q}_2; N) \equiv \{\Pi \in \mathfrak{R}_+ : 2\bar{x}(\mathbf{q}_2, \Pi; N) \leq \Pi\},$$

so that the spending level on the agenda setter's group is nonnegative. The transformed problem then can be stated as follows:

$$\begin{aligned} \max_{\Pi'_2 \leq \mathfrak{R}_+} \quad & \Pi'_2 - 2 \max \{0, \bar{x}(\mathbf{q}_2, \Pi'_2; N)\} - \frac{1}{3}C_N(\Pi'_2) \\ \text{s.t.} \quad & \Pi'_2 \in \mathcal{F}_1(\mathbf{q}_2; N). \end{aligned}$$

In the subsections that follow, we characterize the period-two equilibrium policy and relate it to the status quo government size. We divide the discussion into three parts according the status quo government size in relation to its social optimal level.

4.2 An Efficient Status Quo Government Size

Consider any status quo $\mathbf{q}_2 \in \mathfrak{R}_+^3$ for the second period such that $\sum_{\ell=a}^c q_{\ell,2} = G_N^*$. Here, the status quo government size is social optimal since $C'_N(G_N^*) = 1$, i.e., the social cost of the last dollar spent is equal to its social benefit. Would an efficient government budget persist through the political process? We answer this question in two steps.

First, suppose the agenda setter was restricted by the existing government size but that he could change the allocations of the budget among the socioeconomic groups. Note that $G_N^* \in \mathcal{F}_2(\mathbf{q}_2; N)$ so keeping the same size of government expenditure is always feasible, though not necessarily optimal for the agenda setter. With a fixed budget of G_N^* , the agenda setter's problem is identical to the one analyzed by Diermeier and Fong (2007). Their result shows that the agenda setter would spend

$$\widehat{x}_{i,2} = \bar{x}(\mathbf{q}_2, G_N^*; N) = \min\{q_{b,2}, q_{c,2}\}$$

for each of the other groups $i = 1, 2$, and leave his own group

$$\begin{aligned} \widehat{x}_{a,2} &= G_N^* - 2\bar{x}(\mathbf{q}_2, G_N^*; N) \\ &= q_{a,2} + \max\{q_{b,2}, q_{c,2}\} - \min\{q_{b,2}, q_{c,2}\}. \end{aligned}$$

With policy $\widehat{\mathbf{x}}_2$, the group more disadvantaged by the status quo would be indifferent, and the third group is expropriated up to the status quo allocation of the more disadvantaged group. This is the maximal amount of expropriation still acceptable to the more disadvantaged group. The fact that $\widehat{x}_{b,2} = \widehat{x}_{c,2}$ ensures that the agenda setter will not be able to pass any new policy in the remainder of the legislative session to expropriate any of the other groups (including the current coalition partner) further. The agenda setter can then allocate an amount equal to $\max\{q_{b,1}, q_{c,1}\} - \min\{q_{b,1}, q_{c,1}\}$ more on his own group compared to the status quo allocation. The larger is the difference between spending levels for the other two groups, the larger is the room for expropriation and the therefore the value of proposal power.

In the second step, we ask if the agenda setter ever has an incentive to deviate his proposal from $\widehat{\mathbf{x}}_2$ to some other policy that leads to a different government size from G_N^* . If the answer is yes, there must be some policy with which the agenda setter could derive a utility greater than

$$G_N^* - 2 \min\{q_{b,2}, q_{c,2}\} - \frac{1}{3}C_N(G_N^*).$$

We can show that this is not possible. To see that, suppose that, instead of choosing and dividing a government budget, the agenda setter chooses and divides a total

social surplus through policy making. Observe that policy $\widehat{\mathbf{x}}_2$ already maximizes the social surplus defined as the summation of the the three groups' period-two utilities, i.e., $\sum_{\ell=a}^c x_{\ell,2} - \frac{1}{3}C_N(\sum_{\ell=a}^c x_{\ell,2})$, and also that in order to pass any new policy the agenda setter has to offer each of the other groups at least a constant utility of $\min\{q_{b,2}, q_{c,2}\} - \frac{1}{3}C_N(G_N^*)$. By strict concavity of the social surplus, increasing or decreasing the size of government expenditure from its efficient level reduces the total surplus and therefore that must leave the agenda setter's group with a strictly smaller spending level if this policy is passed. Therefore, $\widehat{\mathbf{x}}_2$ is the best policy alternative the agenda setter can make for itself.

The following proposition summarizes the findings.

Proposition 1. For any status quo \mathbf{q}_2 in the second period such that $\sum_{\ell=a}^c q_{\ell,2} = G_N^*$:

1. The equilibrium government size is the same as its default, which is social optimal; Efficiency is sustainable.
2. Among the two groups with no proposal power, the one more disadvantaged by the status quo, say group j , is left the same as given by the status quo, and expenditure on the other group is cut down to match that on group j . In particular,

$$g_{b,2}^*(\mathbf{q}_2; N) = g_{c,2}^*(\mathbf{q}_2; N) = \min\{q_{b,2}, q_{c,2}\}.$$

3. The agenda setter's group gets $\max\{q_{b,1}, q_{c,1}\} - \min\{q_{b,1}, q_{c,1}\}$ more than given by the status quo. In particular,

$$g_{a,2}^*(\mathbf{q}_2; N) = G_N^* - 2 \min\{q_{b,2}, q_{c,2}\}.$$

5 The Second Period

5.1 An Inefficiently Small Status Quo Government Size

Now consider any status quo \mathbf{q}_2 in the second period such that $\sum_{\ell=a}^c q_{\ell,2} < G_N^*$. The status quo government size is inefficient since $C'_N(\sum_{\ell=a}^c q_{\ell,1}) < 1 = C'_N(G_N^*)$, i.e., the social cost of the last dollar spent is smaller than its social benefit. If the status quo remains, there is under-provision of government programs. Would bargaining in the legislature improve efficiency and lead to a large size of government expenditure? We answer this question by analysis in parallel with that of the previous subsection.

First, if the agenda setter was restricted to remaining the same government size as given by the status quo whenever he makes any proposal, the policy outcome would be

$$\widehat{x}_{i,2}^- = \bar{x}(\mathbf{q}_2, \sum_{\ell=a}^c q_{\ell,2}) = \min\{q_{b,2}, q_{c,2}\},$$

for each of the other groups $i = 1, 2$, and

$$\begin{aligned} \widehat{x}_{a,2}^- &= \sum_{\ell=a}^c q_{\ell,2} - 2\bar{x}(\mathbf{q}_2, \sum_{\ell=a}^c q_{\ell,2}) \\ &= q_{a,2} + \max\{q_{b,2}, q_{c,2}\} - \min\{q_{b,2}, q_{c,2}\}. \end{aligned}$$

This policy, $\widehat{\mathbf{x}}_2^-$, serves a reference point. If the agenda setter ever wants to choose a different government size from $\sum_{\ell=a}^c q_{\ell,2}$, his group must be able to derive at least a utility of

$$\sum_{\ell=a}^c q_{\ell,2} - 2\min\{q_{b,2}, q_{c,2}\} - \frac{1}{3}C_N(\sum_{\ell=a}^c q_{\ell,2})$$

from such a deviation.

We claim that the agenda setter is both willing and able to **increase** the size of government expenditure from its status quo value. As long as the government size is strictly smaller than the social optimal level G_N^* , a small increase in total government expenditure enlarges the total social surplus to be divided by the three groups. At the same time, the agenda setter can adjust the size of government programs for groups b and c so as to retain a constant utility of

$$\min\{q_{b,2}, q_{c,2}\} - \frac{1}{3}C_N(\sum_{\ell=a}^c q_{\ell,2}),$$

which is just enough for the disadvantaged group to break even. Therefore, it is to the agenda setter's interest to maximize social surplus by increasing government expenditure to G_N^* .

As total government expenditure rises, the more disadvantaged group has to bear more deadweight loss resulting from distortionary taxation. As a consequence, in order to obtain agreement from this group, the agenda setter has to offer

$$\bar{x}(\mathbf{q}_2, G_N^*) = \min\{q_{b,2}, q_{c,2}\} + \frac{1}{3}C_N(G_N^*) - \frac{1}{3}C_N(\sum_{\ell=a}^c q_{\ell,2})$$

to both groups b and c . Since $\sum_{\ell=a}^c q_{\ell,2} < G_N^*$ by supposition and the fact that the cost function is strictly increasing, the government program targeted at the more disadvantaged group is more generous than its status quo.

The agenda setter's group, a , then takes the residual of

$$G_N^* - 2\bar{x}(\mathbf{q}_2, \sum_{\ell=a}^c q_{\ell,2}).$$

Notice that group a also has to share the burden of a rising total expenditure. Given that it is better off with expansion, it must be that the government program for group a is more generous than its status quo as well. These findings are summarized in the following proposition.

Proposition 2. For any status quo \mathbf{q}_2 in the second period such that $\sum_{\ell=a}^c q_{\ell,2} < G_N^*$:

1. The period-two government size rises to its social optimal level G_N^* .
2. The spending level on each of the group with no proposal power, $i = 1, 2$, is given by

$$g_{i,2}(\mathbf{q}_2; N) = \bar{x}_2(\mathbf{q}_1, G_N^*) \equiv \min\{q_{b,2}, q_{c,2}\} + \frac{1}{3}C_N(G_N^*) - \frac{1}{3}C_N(\sum_{\ell=a}^c q_{\ell,2}).$$

The government program for the group disadvantaged by the status quo, say j , always becomes more generous than its status quo. On the other hand, the government program for the other group, k , may shrink. This happens under two conditions: (a) The status quo government size is not far below its social

optimal level so that there is not much room to expand total public spending; and (b) the disadvantaged group j is initially allocated very little by the status quo so that the agenda setter has sufficient ability to expropriate group k . In particular, group k is harmed if

$$C_N(\sum_{\ell=a}^c q_{\ell,2}) + 3(\max\{q_{b,2}, q_{c,2}\} - \min\{q_{b,2}, q_{c,2}\}) > \frac{1}{3}C_N(G_N^*).$$

3. The agenda setter's group is allocated strictly more compared to the status quo.

In particular,

$$g_{a,2}(\mathbf{q}_2; N) = G_N^* - 2\min\{q_{b,2}, q_{c,2}\} - \frac{2}{3}C_N(G_N^*) + \frac{2}{3}C_N(\sum_{\ell=a}^c q_{\ell,2}).$$

Proposition 2 implies that, if the status quo is associated with under-provision of public goods and government programs, through the legislative institution, it is easy for the government to expand. Whenever it is social welfare enhancing to tax more, the agenda setter raises distortionary taxes, spends part of the extra tax revenues to the other groups just enough to obtain a majority support, and leaves the rest of additional resources to his own group. Of course, such an adjustment while expanding the size of the government will be efficient. The key question is whether optimal contraction of the government size can also be a political economy equilibrium. If not, we have an explanation for the ratchet effect. We answer this question in the next subsection.

5.2 An Inefficiently Large Status Quo Government Size

Consider any status quo \mathbf{q}_2 in the second period such that $\sum_{\ell=a}^c q_{\ell,2} > G_N^*$. The status quo government size is inefficient since $C'_N(\sum_{\ell=a}^c q_{\ell,1}) > 1 = C'_N(G_N^*)$, i.e., the social cost of the last dollar spent is greater than its social benefit. If the status quo remains, there is over-provision of government programs.

Again, the reference point is a policy $\widehat{\mathbf{x}}_2^+$ such that

$$\widehat{x}_{i,2}^+ = \bar{x}(\mathbf{q}_2, \sum_{\ell=a}^c q_{\ell,2}; N) = \min\{q_{b,2}, q_{c,2}\},$$

for each of the other groups $i = 1, 2$, and

$$\begin{aligned}\widehat{x}_{a,2}^+ &= G_N^* - 2\bar{x}(\mathbf{q}_2, \sum_{\ell=a}^c q_{\ell,2}; N) \\ &= q_{a,2} + \max\{q_{b,2}, q_{c,2}\} - \min\{q_{b,2}, q_{c,2}\}.\end{aligned}$$

Intuitions developed in the previous subsections may suggest that the agenda would cut down total public spending to its social optimal level in order to "maximize the pie", offer the other groups just enough utilities in order to obtain a majority support, and then leave the rest of public resources to his own group. However, this intuition is incomplete as the agenda setter may be constrained from doing so. Notice that the argument above presupposes that the agenda setter is able to make the disadvantaged group, j indifferent. When the total government expenditure is decreased, group j (as well as the other groups) are released from a heavy tax burden. To make this group indifferent between the status quo policy and the new proposal, the agenda setter has to cut down the size of government program for j . But if the initial spending level on group j is sufficiently small, the agenda setter may not have room to substantially reduce it. In other words spending on j will be constrained at 0. At this corner solution, group j may be strictly better off with a smaller government size than with the status quo. Whenever such a corner solution occurs, the agenda setter must instead rely on cutting down his own group's expenditure to reduce the budget, but this may be too costly for him. Ironically, although the agenda setter **does increase** the total social surplus by adjusting total government expenditure downwards, the addition surplus created by a smaller government may in fact be all enjoyed by the groups with no proposal power. Such an outcome will not be the case in the legislative equilibrium.

The results are summarized in the following proposition.

Proposition 3. For any period-two status quo \mathbf{q}_2 such that $\sum_{\ell=a}^c q_{\ell,2} > G_N^*$ the following holds:

1. If $\sum_{\ell=a}^c q_{\ell,2} > \bar{G}_N$ and $\bar{x}(\mathbf{q}_2, \bar{G}_N) \leq 0$, then

$$\begin{aligned} g_{b,2}(\mathbf{q}_2; N) &= g_{c,2}(\mathbf{q}_2; N) = 0, \\ g_{a,2}(\mathbf{q}_2; N) &= \bar{G}_N, \text{ and} \\ \sum_{\ell=a}^c g_{\ell,2}(\mathbf{q}_2; N) &= \bar{G}_N. \end{aligned}$$

2. If $\bar{x}(\mathbf{q}_2, \bar{G}_N) > 0$ and $\bar{x}(\mathbf{q}_2, G_N^*) \leq 0$, then

$$\begin{aligned} g_{b,2}(\mathbf{q}_2; N) &= g_{c,2}(\mathbf{q}_2; N) = 0, \\ g_{a,2}(\mathbf{q}_2; N) &= \hat{G}(\mathbf{q}_2), \text{ and} \\ \sum_{\ell=a}^c g_{\ell,2}(\mathbf{q}_2; N) &= \hat{G}(\mathbf{q}_2), \end{aligned}$$

where

$$\bar{x}(\mathbf{q}_2, \hat{G}(\mathbf{q}_2)) = \min\{q_{b,2}, q_{c,2}\} - \left(\frac{1}{3}C_N(\sum_{\ell=a}^c q_{\ell,2}) - \frac{1}{3}C_N(\hat{G}(\mathbf{q}_2))\right) = 0. \quad (11)$$

3. If $\bar{x}(\mathbf{q}_2, G_N^*) > 0$, then

$$\begin{aligned} g_{b,2}(\mathbf{q}_2; N) &= g_{c,2}(\mathbf{q}_2; N) = \min\{q_{b,2}, q_{c,2}\} + \frac{1}{3}C_N(G_N^*) - \frac{1}{3}C_N(\sum_{\ell=a}^c q_{\ell,2}), \\ g_{a,2}(\mathbf{q}_2; N) &= G_N^* - 2\min\{q_{b,2}, q_{c,2}\} - \frac{2}{3}C_N(G_N^*) + \frac{2}{3}C_N(\sum_{\ell=a}^c q_{\ell,2}), \text{ and} \\ \sum_{\ell=a}^c g_{\ell,2}(\mathbf{q}_2; N) &= G_N^*. \end{aligned}$$

4. Starting with an efficiently large status quo government size, the equilibrium total spending level may end up being greater than its social optimal level. Everything else equal this will happen if the status quo government size is larger, if the more disadvantaged group is given a smaller government program by the status quo, and if the marginal social cost of government spending is greater.

5. If the equilibrium government size is strictly greater than its social optimal level, then nothing is spent on the two groups with no proposal power, and the whole budget is allocated to the agenda setter's group. If the equilibrium government size is socially optimal, then the sizes of the government program for both the two groups with no proposal power are cut, but are still positive to make the more disadvantaged group break even. The government program for the agenda setter's group may increase or decrease.

The intuition for the result can easily be grasped in the special case where $\sum_{\ell=a}^c q_{\ell,2} > \bar{G}_N$. Then even if the agenda setter was restricted to reducing expenditure on his own group, he would have an incentive to so. This follows because $\frac{1}{3}C'_N(\sum_{\ell=a}^c q_{\ell,2}) > 1$, i.e., even if the last dollar is solely spent on the agenda setter's group, the cost of the dollar incurred on the agenda setter is greater than the utility derived from the dollar. Therefore, the upper bound of equilibrium government size in the second period is always \bar{G}_N . The agenda setter always wants to reduce expenditures at least to this level.

We follow a marginal analysis and characterize the conditions under which the agenda setter is both willing and able to reduce government expenditure and, if so that what extent.

Consider two cases regarding the allocation of government budget with a fixed budget of \bar{G}_N .

Case A. If $\bar{x}(\mathbf{q}_2, \bar{G}_N) \leq 0$, the agenda setter would spend nothing on any of the other groups but spend all of \bar{G}_N on own his own group.

Case B. If $\bar{x}(\mathbf{q}_2, \bar{G}_N) > 0$, the agenda setter has to offer each of the other groups $\bar{x}(\mathbf{q}_2, \bar{G}_N)$ to make the disadvantaged group indifferent which leaves $\bar{G}_N - 2\bar{x}(\mathbf{q}_2, \bar{G}_N)$ to his own group.

We now need to investigate if the agenda setter ever wants to cut down total expenditure further. In Case A, he is not willing to do so since the expenditure on the other groups is already zero. If the agenda setter continued cutting down spending to reach some government size $\Pi < \bar{G}_N$, then he would only be able to reduce the government program for his own group, a , in order to achieve that goal. Group a would lose a utility of 1 from the last dollar cut down but only saved a cost of $\frac{1}{3}C'_N(\Pi)$, which is strictly smaller than $\frac{1}{3}C'_N(\bar{G}_N) = 1$ which is not optimal.

In Case B, the agenda setter is both willing and able to continue reducing government expenditure as long as the final total spending level $\Pi < \bar{G}_N$ is such that $\bar{x}(\mathbf{q}_2, \Pi) > 0$. It is to the agenda setter's interest to do that because by reducing the government size by a small amount, the total social surplus increases, and at the same time the other groups have an incentive to agree to a tighter budget.

Let $\widehat{G}(\mathbf{q}_2)$ be such that $\bar{x}(\mathbf{q}_2, \widehat{G}(\mathbf{q}_2)) = 0$, as defined in equation (??).

Case Ba. If $\widehat{G}(\mathbf{q}_2) \leq G_N^*$, then $\bar{x}(\mathbf{q}_2, G_N^*) \geq 0$ and therefore the agenda setter can successfully propose a policy that leads to an efficient government size by spending $\bar{x}(\mathbf{q}_2, G_N^*)$ on each of the other groups and $G_N^* - 2\bar{x}(\mathbf{q}_2, G_N^*)$ on his own group.

Case Bb. If $\widehat{G}(\mathbf{q}_2) > G_N^*$, then $\bar{x}(\mathbf{q}_2, G_N^*) < 0$. Before the agenda setter reduces total government expenditure down to its efficient level, he hits the corner. But in this case he has no incentive to propose a policy that leads to a government smaller than $\widehat{G}(\mathbf{q}_2)$, since otherwise the lost utility due to the last dollar cut is 1, but the cost savings are strictly smaller than $\frac{1}{3}C_N(\overline{G}_N) = 1$.

This established the result for a status quo government size of $\sum_{\ell=a}^c q_{\ell,2} > \overline{G}_N$. An analogous argument holds for the case of $G_N^* < \sum_{\ell=a}^c q_{\ell,2} < \overline{G}_N$.

6 The First Period

Throughout this section, consider an initial status quo $\mathbf{q}_1 \in \mathfrak{R}_+^3$ such that $\sum_{\ell=a}^c q_{\ell,1} = G_N^*$. That is, assume that the economy has been in a normal state, and the government size has reached its social optimal level. We now conduct an impulse response analysis by assuming the the economy is hit by some temporary random shock S_1 in the first period, but reverts back to its normal state at $S_2 = N$ in the second period.

6.1 General Intuition

As in the previous section, it is useful to transform the agenda setter's maximization problem.

First, note that if the initial status quo \mathbf{q}_1 remains in the first period, according to subsection 4.2, the second period equilibrium policy will be $g_{i,2}(\mathbf{q}_1; N) = \min\{q_{b,1}, q_{c,1}\}$ for each of the other groups $i = a, b$, and $g_{a,2}(\mathbf{q}_1; N) = G_N^* - 2 \min\{q_{b,1}, q_{c,1}\}$. Therefore, the discounted sum of utility of group $i \in \{b, c\}$ will be

$$W_i(\mathbf{q}_1; S_1) = (1 - \beta) \left(q_{i,1} - \frac{1}{3}C_{S_1}(G_N^*) \right) + \beta \left(\min\{q_{b,1}, q_{c,1}\} - \frac{1}{3}C_N(G_N^*) \right).$$

In the period-one equilibrium, either the non-negativity constraint or the incentive

compatibility constraint is binding. In other words, the agenda setter must choose a policy $\mathbf{x}'_1 \in \mathfrak{R}_+^3$ with $\Pi'_1 = \sum_{\ell=a}^c x'_{\ell,1}$ such that for any $i \in \{b, c\}$, either $x'_{i,1} = 0$, or

$$\begin{aligned} W_i(\mathbf{x}'_1; S_1) &= (1 - \beta) \left(x'_{i,1} - \frac{1}{3} C_{S_1}(\Pi'_1) \right) + \beta \left(g_{i,2}^*(\mathbf{x}'_1; N) - \frac{1}{3} C_N \left(\sum_{\ell=a}^c g_{\ell,2}^*(\mathbf{x}'_1; N) \right) \right) \\ &= \min \{ W_{b,1}(\mathbf{q}_1; S_1), W_{c,1}(\mathbf{q}_1; S_1) \}. \end{aligned}$$

To see that this claim holds suppose otherwise. In that case the agenda setter could always reduce the provision of government programs to the other groups by a small amount and still obtain support from the more disadvantaged group, which would be a contradiction. For the moment, ignore the non-negativity constraint and let $\tilde{x}(\mathbf{q}_1, \Pi'_1; S_1)$ be such that, for any initial status quo \mathbf{q}_1 , period-one economic state, and chosen government size Π'_1 ,

$$\begin{aligned} &(1 - \beta) \left(\tilde{x}(\mathbf{q}_1, \Pi'_1; S_1) - \frac{1}{3} C_{S_1}(\Pi'_1) \right) + \beta \left(g_{i,2}^*(\tilde{\mathbf{x}}'_1; N) - \frac{1}{3} C_N \left(\sum_{\ell=a}^c g_{\ell,2}^*(\tilde{\mathbf{x}}'_1; N) \right) \right) \\ &= \min \{ W_{b,1}(\mathbf{q}_1; S_1), W_{c,1}(\mathbf{q}_1; S_1) \}, \end{aligned}$$

where

$$\begin{aligned} \tilde{x}'_{b,1} &= \tilde{x}'_{c,1} = \tilde{x}(\mathbf{q}_1, \Pi'_1; S_1), \text{ and} \\ \tilde{x}'_{a,1} &= \sum_{\ell=a}^c \tilde{x}'_{\ell,1} - 2\tilde{x}(\mathbf{q}_1, \Pi'_1; S_1). \end{aligned}$$

Then, in equilibrium

$$x'_{b,1} = x'_{c,1} = \max \left\{ 0, \tilde{x}(\mathbf{q}_1, \sum_{\ell=a}^c \tilde{x}'_{\ell,1}; S_1) \right\}, \quad (12)$$

$$\tilde{x}'_{a,1} = \sum_{\ell=a}^c \tilde{x}'_{\ell,1} - 2 \max \left\{ 0, \tilde{x}(\mathbf{q}_1, \sum_{\ell=a}^c \tilde{x}'_{\ell,1}; S_1) \right\}. \quad (13)$$

We can now apply this argument and transform the original problem into a maximization problem in which the agenda setter directly chooses the size of the total government budget $\Pi'_1 = \sum_{\ell=a}^c x'_{\ell,1}$. Once Π'_1 is chosen, the respective sizes of government programs for all socioeconomic groups are now determined by (??) and (12).

For any government size Π'_1 to be feasible, it must be that $2\tilde{x}(\mathbf{q}_1, \Pi'_1; S_1) \leq \Pi'_1$, so that the spending level on the agenda setter's group is nonnegative. Let

$$\mathcal{F}_1(\mathbf{q}_1; S_1) = \{ \Pi \in \mathfrak{R}_+ : 2\tilde{x}(\mathbf{q}_1, \Pi; S_1) \leq \Pi \}.$$

The transformed problem is then as simple as follows:

$$\begin{aligned}
& \max_{\Pi'_1 \leq \mathfrak{R}_+} (1 - \beta) (x'_{a,1} - \frac{1}{3}C_N (\Pi'_1)) + \beta (g_{c,1}^* (\mathbf{x}'_1; N) - \frac{1}{3}C_N (\sum_{\ell=a}^c g_{\ell,1}^* (\mathbf{x}'_1; N))) \\
& s.t. \quad \Pi'_2 \in \mathcal{F}_1 (\mathbf{q}_1; S_1). \\
& \quad x'_{a,1} = \Pi'_1 - 2 \max \{0, \tilde{x} (\mathbf{q}_1, \Pi'_1; S_1)\}, \\
& \quad x'_{b,1} = x'_{c,1} = \max \{0, \tilde{x} (\mathbf{q}_1, \Pi'_1; S_1)\}.
\end{aligned}$$

In the subsections that follow, we characterize the period-two equilibrium policy and relate it to the status quo government size. Again we the discussion into three parts according the whether the status quo government budget is efficient, too low or too high.

6.2 Stable Economy Benchmark

Suppose $S_1 = N$, i.e. there is no shock and the economy is stable in the normal state. By an analogous argument as above (Section 5.2), we can show that in equilibrium the efficient status quo government size is retained in both periods.

Proposition 4. Suppose $S_1 = N$. For any $\mathbf{q}_1 \in \mathfrak{R}_+^3$ such that $\sum_{\ell=a}^c q_{\ell,1} = G_N^*$:

1. In equilibrium, the status quo government size remains and the social optimal government size is attained in both periods. That is,

$$\sum_{\ell=a}^c g_{\ell,1} (\mathbf{q}_1; N) = \sum_{\ell=a}^c q_{\ell,1} (\mathbf{q}_1; N) = G_N^*.$$

2. The period-one equilibrium policy is

$$\begin{aligned}
g_{b,1} (\mathbf{q}_1; N) &= g_{c,1} (\mathbf{q}_1; N) = \min \{q_{b,1}, q_{c,1}\}, \text{ and} \\
g_{a,1} (\mathbf{q}_1; N) &= q_{a,1} + \max \{q_{b,1}, q_{c,1}\} - \min \{q_{b,1}, q_{c,1}\}.
\end{aligned}$$

If the agenda setter ever deviated from the efficient status quo government size, he would actually make the total social surplus smaller. Note that the agenda setter has to satisfy each of the other groups by $\min \{W_{b,1} (\mathbf{q}_1; N), W_{c,1} (\mathbf{q}_1; N)\}$, which is a constant, in order to pass any new policy. If the total social surplus was smaller, the agenda setter's group would have to take a smaller residual. This shows why

the agenda setter would like to maintain the status quo government size. Given this, the remaining open issue pertains only to the distribution of the budget among the socioeconomic groups. The agenda setter simply satisfies the more disadvantaged group and expropriates the other group as much as possible.

Proposition 4 implies that, with a persistent agenda setter, if the state of the economy does not change, the policy remains the same over time. If the agenda setter ever adopts a new policy, this is done at the very beginning of the legislative session.

6.3 A Temporary Positive Shock

Suppose $S_1 = H$, i.e. a temporary positive shock in the first period. This means that the status quo government size $\sum_{\ell=a}^c q_{\ell,1} = G_N^* < G_H^*$ is too small compared to the efficient solution. We now need to derive the equilibrium response to this temporary shock. Will the total government budget rise in the first period and then drop in the second? The next proposition answers this question.

Proposition 5. Suppose $S_1 = H$. For any $\mathbf{q}_1 \in \mathfrak{R}_+^3$ such that $\sum_{\ell=a}^c q_{\ell,1} = G_N^*$:

1. In equilibrium, the government size rises to $\sum_{\ell=a}^c x_{\ell,1} = G_H^*$ in the first period and drops to $\sum_{\ell=a}^c x_{\ell,2} = G_N^*$ in the second period. In both periods, the government size is socially optimal and fully responsive to the change of economic environment.
2. The period-one equilibrium policy is

$$\begin{aligned}
g_{b,1}(\mathbf{q}_1; N) &= g_{c,1}(\mathbf{q}_1; N) \\
&= \min\{q_{b,1}, q_{c,1}\} + \frac{1}{3}((1 - \beta)(C_H(G_H^*) - C_H(G_N^*)) + \beta(C_N(G_H^*) - C_N(G_N^*))) \\
&> \min\{q_{b,1}, q_{c,1}\},
\end{aligned}$$

and

$$g_{a,1}(\mathbf{q}_1; N) = G_H^* - g_{b,1}(\mathbf{q}_1; N) - g_{c,1}(\mathbf{q}_1; N) > q_{a,1}.$$

Both the agenda setter's group and the more disadvantaged group receive more than their status quo allocations.

3. The period-two equilibrium policy is

$$\begin{aligned}
g_{b,1}(\mathbf{q}_1; N) &= g_{c,1}(\mathbf{q}_1; N) \\
&= \min\{q_{b,1}, q_{c,1}\} - \frac{1}{3}(1 - \beta)((C_N(G_H^*) - C_N(G_N^*)) - (C_H(G_H^*) - C_H(G_N^*))) \\
&< \min\{q_{b,1}, q_{c,1}\},
\end{aligned}$$

and

$$g_{a,1}(\mathbf{q}_1; N) = G_H^* - g_{b,1}(\mathbf{q}_1; N) - g_{c,1}(\mathbf{q}_1; N) > q_{a,1}.$$

In the second period, the agenda setter's group receives more than its status quo allocations, while both of the other groups receive strictly less.

With a temporary positive shock, total expenditure expands accordingly. With a larger total spending level, all groups have to bear a larger cost than with the status quo. Therefore, the agenda setter has to increase spending on the other groups just enough to obtain majority support. He can then spend the remaining additional tax revenues on his own group. After the shock ceases to have an effect, total spending is back to its normal level. However, the spending levels on the other groups *do not* return to their original status quo level. Instead, they drop to some level below the initial status quo. In other words from an efficiency point of view government spending is fully elastic, but from a distributional point of view the agenda's setter's party benefits.

6.4 A Temporary Negative Shock

Suppose $S_1 = L$, a temporary negative shock in the first period. That is, the status quo government size $\sum_{\ell=a}^c q_{\ell,1} = G_N^* > G_L^*$ is too large compared to the efficient case. We want to know how the government responds to this temporary shock. Will it also be fully elastic, i.e. will the total government budget drop in the first period to the efficient level and then rebound in the second?

Suppose that the agenda setter chooses a policy $\mathbf{x}'_1 \in \mathfrak{R}_+^3$ such that $\sum_{\ell=a}^c x'_{\ell,1} = \Pi'_1$. First, it is straightforward to show that $\Pi'_1 \leq G_N^*$. Suppose otherwise. Then the agenda setter reduces the total social surplus while he still has to offer the other

groups a constant value of $\min \{W_{b,1}(\mathbf{q}_1; L), W_{c,1}(\mathbf{q}_1; L)\}$ in order to pass any new policy. This is not beneficial to the agenda setter. Since $\Pi'_1 \leq G_N^*$, by Propositions 1 and 2, we know that in the second period the agenda setter is able to implement a policy with a total government budget G_N^* . Therefore, the government size will drop in the first period and then rebound when the negative shock goes away. The remaining question is: to what extent?

The analysis in subsection 5.1 showed that the agenda setter will expropriate as much as possible by setting

$$\begin{aligned} x'_{b,1} &= x'_{c,1} = \tilde{x}(\mathbf{q}_1, \Pi'_1; L) \\ &\equiv \min \{q_{b,1}, q_{c,1}\} - \frac{1}{3}(1 - \beta)(C_L(G_N^*) - C_L(\Pi'_1)) - \frac{1}{3}\beta(C_N(G_N^*) - C_N(\Pi'_1)) \end{aligned}$$

to each of the other groups. Note that for \mathbf{x}'_1 to be feasible, it must be that $\tilde{x}(\mathbf{q}_1, \Pi'_1; L) \geq 0$ and $x'_{a,1} = \Pi'_1 - 2\tilde{x}(\mathbf{q}_1, \Pi'_1; L) \geq 0$, so that all non-negativity constraints are satisfied. This imposes constraints on the feasible set of government sizes. Let $\underline{G}^+(\mathbf{q}_1; L)$ be such that $\tilde{x}(\mathbf{q}_1, \underline{G}^+(\mathbf{q}_1; L); L) = 0$. Then $\tilde{x}(\mathbf{q}_1, \Pi'_1; L) \geq 0$ if and only if $\Pi'_1 \geq \underline{G}^+(\mathbf{q}_1; L)$. Also let $\underline{G}^-(\mathbf{q}_1; L)$ be such that $\tilde{x}(\mathbf{q}_1, \underline{G}^-(\mathbf{q}_1; L); L) = \frac{1}{2}\underline{G}^-(\mathbf{q}_1; L)$. Then $\Pi'_1 - 2\tilde{x}(\mathbf{q}_1, \Pi'_1; L) \geq 0$ if and only if $\Pi'_1 \geq \underline{G}^-(\mathbf{q}_1; L)$. The equilibrium government size then solves the following problem:

$$\begin{aligned} \max_{\Pi'_1 \geq 0} \quad & (1 - \beta)(\Pi'_1 - x'_{b,1} - x'_{c,1} - \frac{1}{3}C_L(\sum_{\ell=a}^c x'_{\ell,1})) + \beta(G - \frac{1}{3}C_N(G_N^*)) \\ \text{s.t.} \quad & \max \{ \underline{G}^-(\mathbf{q}_1; L), \underline{G}^+(\mathbf{q}_1; L) \} \leq \Pi'_1 \leq G_N^*, \\ & x'_{b,1} = x'_{c,1} = \tilde{x}(\mathbf{q}_1, \Pi'_1; L). \end{aligned}$$

As long as the period-one government expenditure is above its social optimal level, the agenda setter can gain additional utility by reducing the government size. With a smaller government budget, all groups are released from a heavy tax burden. In order to fully take advantage of this, the agenda setter would like to reduce government programs for the other groups at the same time. However, the agenda setter would face strong resistance from the other groups. The reason lies the dynamic nature of bargaining, i.e. the fact that equilibrium distributions in future periods depend on the status quo allocation, which determined in the current period. In other words

a "temporary" cut in government expenditures has a "permanent" effect in political equilibrium. If the government program on group b is reduced, in the subsequent period group b would be faced with a lower reservation value. This would reduce the bargaining power of group b which implies that the spending level of group b would be permanently low. Foreseeing this, group b will not allow the agenda setter to substantially cut down its allocation and neither will group c . Given this, when decreasing the total government budget, the agenda setter can only slightly reduce allocations to the other groups which means he has to substantially reduce his own allocation. Eventually, a corner solution is reached, i.e., the spending level on the agenda setter's group is 0, and the agenda setter will have no room to cut expenditures any further. This happens when β is sufficiently large, and the agenda setter's initial government program is sufficiently small.

It is also possible that the spending levels on the other groups have reached 0, so that in order to reduce total government budget the agenda setter has to solely rely on cutting down allocations his own group. As long as the government size is smaller than \overline{G}_L , it is not beneficial for him to do that. This is another possible corner solution. This case happens when β and the initial program for one of the other groups are sufficiently small.

These results are summarized in Proposition 6.

Proposition 6. Suppose $S_1 = L$. For any $\mathbf{q}_1 \in \mathfrak{R}_+^3$ such that $\sum_{\ell=a}^c q_{\ell,1} = G_N^*$:

1. In equilibrium, the government size is $\max \{ \max \{ \underline{G}^-(\mathbf{q}_1; L), \underline{G}^+(\mathbf{q}_1; L) \}, G_L^* \}$ in the first period, and G_N^* in the second period. The government size in the second period is always social optimal. In the first period, the government size is insufficiently adjusted downward if $\underline{G}^-(\mathbf{q}_1; L) > G_L^*$ or $\underline{G}^+(\mathbf{q}_1; L) > G_L^*$. That, is policy persistence is more likely to happen if the initial status quo leads to an unequal distribution of public resources in the sense that the spending level on the most disadvantaged socioeconomic group is sufficiently small.

2. The period-one equilibrium policy is

$$\begin{aligned}
g_{b,1}(\mathbf{q}_1; N) &= g_{c,1}(\mathbf{q}_1; N) \\
&= \min\{q_{b,1}, q_{c,1}\} - \frac{1}{3}(1 - \beta)(C_L(G_N^*) - C_L(\Pi_1^*)) - \frac{1}{3}\beta(C_N(G_N^*) - C_N(\Pi_1^*)), \\
g_{a,1}(\mathbf{q}_1; N) &= G_H^* - g_{b,1}(\mathbf{q}_1; N) - g_{c,1}(\mathbf{q}_1; N) > q_{a,1},
\end{aligned}$$

where Π_1^* refers to the equilibrium government size in the first period. Both of the groups without proposal power get less in the first period than their status quo allocation.

7 Discussion

Our theory has two separate components. First, notice that the period-two equilibrium can be interpreted as the equilibrium in a one-period model. Even in that case we were able to provide an explanation for the ratchet effect. The key insight is that the equilibrium government size depends on the status quo allocation, but in an asymmetric manner: It is easy for government spending to rise but difficult to fall. If the status quo spending level is too low, i.e., smaller than the efficient level, then through the legislative bargaining the government programs will expand in equilibrium. The agenda setter can always seek support by spending part of the additional tax revenues on the other socioeconomic groups. However, the situation is different when the status quo spending level is too high. In order for the agenda setter to enjoy the benefits of budget contraction, he has to be able to cut down the government programs targeted at some other socioeconomic group. If the status quo policy already gives the other groups very few public resources, there will not be sufficient room for the agenda setter to do so. In an extreme case the agenda setter can reduce total government expenditure down to the point that nothing is spent on the other groups and the agenda setter has to bear any additional cuts solely by himself. However, because the agenda is only able to partially capture the net benefits from such a contraction, he does not reduce the government size to the efficient level.

The key mechanism in this single-period model may be further developed and

integrated into a fully specified macroeconomics or public finance model. Suppose that for a certain periods there is an extraordinary need for a certain public good x_i so that the spending level on this good rises substantially and the spending levels of the other goods are cut down. Consider, for example, national security crises or wars, which will lead to a dramatic increase in defense spending including significant long-term health-care and pension benefits for veterans. Unless the increase in spending has a pre-defined termination clause (a so-called "sunset provision") this policy will be in effect until a new law is passed. However, now the increased budget has become the status quo, with a high total spending level, and there is an unequal allocation of the total budget on different spending items. Our model shows how this status quo not only will get locked in, but how it may lead to further increases. This provides an explanation for the ratchet effect.

The one-period model is a good approximation for the case where a policy takes effect after the legislative session ends. For example, a parliament that is in session for two years may make a change to the social security system that takes places three years from now. However, in many cases a sitting parliament will have to revisit a policy within its current session. This includes, of course, the annual budget. In this case a one-period model may not capture all the relevant dynamics. The key point is that by adopting a policy for the current period, parliament is endogenously determining the status quo for the next period when it is still in session. This may lead to additional strategic effects.as a change in the status affects each representatives' future bargaining position. This is leads to a second explanation for the ratchet effect and provides insights for the persistence of high levels of government spending in multi-party parliamentary democracies.

In the multi-period case non-proposing parties need to take into account that any reduction now, even if it is efficient for the whole society in the current period, will permanently lock them into a lower level of allocated spending. This follows because the current sizes of continuing public programs will be the status quo in future periods. As the economy rebounds from a recession, which makes it easier to raise taxes, the agenda setter will exploit the lower reservation values of the other

socioeconomic groups so that public programs for those groups will never rebound accordingly. But with every group foreseeing this effect, downward adjustment of public expenditures has to be achieved by disproportionately cutting down the public program for the agenda setter's group. At most, the agenda setter can reduce total government expenditure down to the point where nothing is spent on his own group. Beyond this point, any fiscal adjustment faces a strong resistance from the groups without agenda control. Policy persistence thus results.

In our model, policy persistence occurs in a corner solution where some of the non-negativity constraints are binding. Either nothing is spent on the groups without proposal power or nothing is spent on the agenda setter's group. Of course this finding should not be interpreted literally. The agenda setter may have to provide some minimum allocation to the other groups or his own group for other (unmodeled) reasons. For example, with a large senior population with little personal savings it may be difficult or constitutionally prohibited to literally reduce benefits to zero. In other words our model only captures that part of the budget that realistically and legally can be cut. Another important point is that our model does not capture positive externalities of government programs across different socioeconomic groups. If the agenda setter's group partially benefits from spending on other groups, e.g. by providing education benefits, he may not want to fully eliminate those programs. Finally, the quasi-linear assumption may be too much of a simplification. If the utilities derived from public programs behave diminishing marginal returns, when the expenditure on some group ℓ is sufficiently small, the marginal utility of group ℓ on its public program may be sufficiently high. In this case, a corner solution will never be reached, yet we will still observe the ratchet effect as an interior solution.

Even our simple model yields various testable empirical implications. First and importantly, it generates a version of the ratchet effect of total spending. As the economy is hit by an unexpected temporary positive shock, the total spending expands and all extra spending benefits the agenda setter. As the economy is hit by an unexpected temporary negative shock, the total spending may not be fully adjusted downward.

Second, in empirical studies Persson and Tabellini identify the ratchet effect in parliamentary democracies with proportional representation. Our intuition suggests that what matters strictly speaking is the form of government that makes fiscal policy decisions. In other words, what is important is proportional representation *per se* but multi-party legislative bargaining. Proportional representation is only important as it usually leads to multi-party parliaments without a majority party. In other words the ratchet effect should also be observed in the case of a hung parliament in the majoritarian-parliamentary case and *should not be* observed in the rare cases where elections under proportional representation yield a majority party. To test this intuition, we could possibly look at fiscal policy dynamics in those countries during different regimes: regimes with a majority party, and regimes with a minority parliament and coalition governments. We conjecture that the ratchet effect is more prevalent when fiscal policy is determined by a coalition government.

Third, ratchet effects are particularly pronounced for large negative shocks. If we relate the larger marginal cost of public expenditure to a negative income shock, the model predicts that government expenditure is inertial if the income level of the economy substantially deviates from and gets below to its long-run trend. The intuition is that the agenda setter has difficulty cutting spending on the other legislators; he can mainly cut down his own benefit. If the negative shock is small, the agenda setter is able to do so and adjust total spending to its new socially optimal value. However, if the negative shock is sufficiently large, the agenda setter leaves zero benefit to himself and at this corner solution, he is not able to further reduce public spending. As a consequence, there is overspending compared to the first best solution.

Fourth, our model also implies that, whenever the government size is not fully downward elastic, the allocation of public resources on various socioeconomic groups will be highly unequal. Therefore, there is a positive relationship between policy persistence and inequality of public budget allocation.

It should be noted that as long as the status quo government size is not too big compared to its efficient level, the equilibrium policy attains socially optimal public fiscal policies. This is due to the possibility of reconsideration by the agenda setter.

In order to obtain voting support from group j , the agenda setter is forced not to expropriate group k . As a consequence, the agenda setter faces equilibrium spending constraints on both of the other groups. These constraints make the agenda setter fully internalize all costs and benefits of public expenditure, whenever the expenditure on any group is strictly positive. It is easy to verify that, without possibility of reconsideration, the equilibrium government size is always larger than its social optimal level regardless of the status quo, leading to inefficiency in all cases. Paradoxically granting some political actors more power may be social welfare enhancing.

Note also that the agenda setter would be better off if he was able to commit to a certain allocation (this is what happens in models without reconsideration). However, this is ruled out by the ongoing possibility of reconsideration. While it is commonly accepted that lack of commitment by the policy maker is a source of inefficiency⁵, our model shows that lack of commitment by the agenda-setter with persistent proposal power in fact may lead to more egalitarian divisions and more efficient government size.

Finally, our analysis also demonstrates the general point that in order to understand the size of government expenditures in a political economy framework it is important to look at its composition as well. The issues of efficiency and distribution cannot be separated.

8 Concluding Remarks

In this chapter we provide an institutional explanation for the so-called "ratchet effect": the observation that in proportional-parliamentary democracies, economic downturns lead to a lasting expansion of outlays and welfare spending in proportion to GDP that is not reversed during upturns. We model proportional-parliamentary

⁵See Alesina and Tabellini (1990) and Persson and Svensson (1989) on public debt manipulation, Besley and Coate (1998) for commitment problems in a citizen candidate modeling framework, Acemoglu (2001) for an example about the emergence of inefficient redistribution, and Fong (2006) and Baron et al. (2007) for the commitment problem in legislative bargaining institutions. For a comprehensive literature survey see Acemoglu (2003).

democracies as a multi-party legislative bargaining game with reconsideration and a single agenda setter. The political economy model is then applied to the case of public good provision with distortionary taxes. We show that in contrast to other bargaining models in equilibrium proposers are less able to expropriate other members of the legislature. This makes it more difficult for proposers to secure approval for a contraction of government spending in cyclical upturns. On the other hand spending increases in down-turns can always be supported in equilibrium. We then extend our analysis to a multi-period model where the government needs to respond to random temporary income shocks. We show that these dynamic considerations create additional incentives for strategic behavior consistent with the ratchet effect.

An immediate next step of this research agenda is to investigate how the bargaining frictions identified in this paper can *quantitatively* account for policy persistence in multi-party parliamentary countries. Such a numerical project requires a more specific macroeconomic or public finance setup than the reduced forms assumed in this paper. It would also require an infinite-horizon model so that we can look at an equilibrium that is stationary not only within periods (as in the current model) but also across periods.

Second, our current model implicitly assumes balanced budgets in every period. How the ability to use public debt as an additional fiscal instrument would change the analysis is an open question.

Third, since economic policy is made through the political process, a complete understanding of policy dynamics in democracies also requires an understanding of how political power transits from one group to another. What policy is chosen in one period may affect not only the status quo in the next period but also which group captures agenda control in the future. In other words, the identity of the agenda setter would be endogenous. If the incumbent can manipulate fiscal policies so that he is more likely to obtain or retain power in the future we may expect more inertia in fiscal policies. To answer this question, two approaches can be followed. First, we can explicitly model parliamentary elections with sophisticated voters like in the model of Baron et al. (2007). Second, different socioeconomic groups may directly

spend resources or exert efforts to compete for political power (Yildirim 2007).

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