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Spending Biased Legislators: Discipline Through Disagreement*

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Abstract. *This paper studies politicians who have a present-bias for spending: they want to increase current spending and procrastinate spending cuts. We argue that legislators' bias is more severe in economies with low institutional quality. We show that disagreement in legislatures leads to policy persistence and that this attenuates the temptation to overspend. Depending on the environment, legislators' decisions to be fiscally responsible may either complement or substitute other legislator's decisions. In economies with weak institutions, politicians' actions are strategic complements. Thus, institutional changes that induce fiscal responsibility are desirable, they generate a positive responsibility multiplier and reduce inefficient spending. However, in economies with better institutions, the same institutional change would induce some legislators to free ride on others' responsibility and may lead to more inefficient spending.*

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1. Introduction

The recent literature in public economics emphasizes that politicians may have preferences that are not perfectly aligned with those of their constituents, leading to inefficient outcomes. In particular, politicians may have incentives to shift spending toward the current period rather than taking a comprehensive intertemporal view. Political and economic institutions are key to dealing with this problem.[1]

A common belief is that disagreement among politicians is harmful since it delays policy changes. In this paper we show that disagreement is a key feature of the political process that provides an incentive to control legislators' temptation to overspend. For this reason, heterogeneity among politicians, which is necessary for disagreement, helps to reduce inefficiencies. Therefore, institutional changes that increase disagreement are generally beneficial while those changes that reduce it are detrimental.

We study politicians who are partially benevolent. They care about society's welfare but also derive utility from government spending. We show that this generates a present bias for spending. Legislators want high current spending and low spending in the future. Yet, when the future comes politicians have the incentive to be fiscally irresponsible; They are tempted to keep spending high and postpone spending cuts. We consider a model with a continuum of such politicians who differ with respect to the strength of their spending bias. Some gain more than others when spending increases. However, they all agree in one dimension: if there were a commitment technology, all legislators would agree on lower spending for the future.

Self-control problems have been analyzed in the literature mainly with models with a single decision-maker.[2] When the focus is on public policy decisions, the single decision-maker framework is less appealing. In this paper, spending decisions are negotiated by legislators. The model incorporates three wide spread institutional features. First, in each period spending is decided through legislative bargaining between a randomly recognized agenda setter (the executive) and the legislature: there is separation of power. Second, approval of proposals is probabilistic; when an executive makes a proposal, there is uncertainty about its acceptance. Finally, the status quo is the default option in case of disagreement. Legislators know that the implemented policy will become the default option for the next legislative

[1] This view is at the core of the field of public choice (Buchanan and Tullock, 1962). Persson and Tabellini (2000) and Besley (2006) cover the recent contributions of the political economy literature.

[2] See Akerlof (1991), Laibson (1997), and O'Donoghue and Rabin (1999), among others.

session. This feature introduces a dynamic linkage across periods.

Our first contribution is to provide a precise characterization of how legislative bargaining enhances efficiency. We find that the endogeneity of the status quo and separation of power play important roles reducing inefficient spending. We argue that when policies are chosen by a single decision-maker, the only equilibrium is one in which high spending is always chosen. When there is legislative bargaining, however, there are equilibria with no inefficient spending along the equilibrium path.

To understand this result, it is important to appreciate the role of the status quo. Separation of powers between the executive and the legislature leads (with some endogenous probability) to policy persistence. The status quo is maintained when the powers do not agree on a policy change. Forward looking legislators realize that current decisions may persist due to the possibility of political deadlock, which in turn provides legislators with the incentive to keep inefficient spending low. The expectation of future disagreement is the key to discipline current legislators. If all legislators are expected to favor the same policy, there is no status-quo bias and, hence, no incentive to forgo the temptation to spend. Thus, heterogeneity and disagreement in the legislature are necessary to sustain equilibria with low levels of inefficient spending.

The dynamic linkage created by the status quo leads to non-trivial interactions between current and future legislators. We emphasize that such interactions would not arise if policy persistence were exogenously assumed. The current level of legislator's fiscal responsibility depends on the expected responsibility of future ones. The two can either complement or substitute each other depending on a key parameter: the average degree of self-control problems in the legislature. This parameter can be thought as an indicator of the quality of institutions in the economy since strong political institutions place more constraints on politicians and thus reduce their temptation to raise current spending.

The second contribution is a clear understanding of the strategic interactions at play. They determine the direction and size of institutional changes' impact. We find that strategic substitutability is at work in economies where politicians have a relatively moderate temptation to spend (e.g., in economies with strong institutions). This implies that institutional changes that induce some legislators to be fiscally responsible would trigger irresponsibility in other legislators. To understand why, note that in economies with relatively strong institutions the majority of legislators are in favor of low spending. A further increase in fiscal reasonability would reinforce the majority view and thus reduce disagreement in the legislature, leading to weaker incentives to be fiscally responsible. Intuitively, politicians are tempted to free-ride and indulge themselves with current spending if they expect most future politicians to be responsible. Substitutability is the reason why in economies which are already characterized by relatively strong institutions, a further improvement of institutional quality reduces spending only by a small amount.

Conversely, strategic complementarity is at work in economies where on average politicians have severe self-control problems (e.g., in economies with weak institutions.) This explains why such economies may find themselves trapped in an equilibrium with high spending. To improve outcomes, it would be desirable to adopt institutions that reduce politicians' temptation to increase spending. Due to strategic complementarity, such changes could trigger even more responsibility in other legislators and generate a virtuous cycle leading to substantial cuts in inefficient spending. The reason for this responsibility multiplier is that in economies with weak institutions the majority of legislators support high spending. An increase of fiscal responsibility would then lead to a legislature more evenly divided between fiscally responsible and irresponsible. This raises the probability of political deadlock and thus strengthens the incentive to keep spending low.

Since economies with weak and strong institutions are not characterized by the same type of strategic interactions, similar institutional changes can have very different effects in economies with different institutional quality. To demonstrate this result, we analyze the consequence of a specific institutional change: an increase in the number of legislators who have a strong temptation to spend. Such a change might, for example, follows an extension of voting rights to allow poorer and more pro-spending constituencies to vote. First, increasing the number of legislators with severe self-control problems has a direct effect: taking as given equilibrium strategies, this change makes it more likely that spending increases are accepted and spending cuts rejected, which tends to increase spending. On other other hand, there is an effect on equilibrium strategies, whose sign is ambiguous and depends on the environment. In economies where the average spending bias is low, adding more fiscally irresponsible legislators has a disciplinary effect. Politicians realize that in the new legislature high spending will persist with higher probability, which changes equilibrium behavior and induces some legislators who were fiscally irresponsible to become responsible. Since the two effects go in opposite directions, the overall effect is ambiguous. Surprisingly, after adding a significant number of pro-spending legislators, expected spending could actually decrease. In Section 4 we argue that this may help explain why elites decided to grant voting rights to poor citizens (see Acemoglu and Robinson, 2000, and Lizzeri and Persico, 2004, for different explanations). Conversely, in economies where the average spending bias is severe, having more fiscally irresponsible legislators discourages even more legislators from choosing low spending. In such economies, both effects go in the same direction: spending unambiguously increases as a result.

A general lesson that we can draw from these results is that there are no institutions that work well in all environments. Institutions that increase inefficient spending in some economies, may reduce it in others. We reach similar conclusions in Section 5, where we consider other institutional changes.

The remainder of this paper is as follows. Section 2 reviews the literature. Section 3 presents our basic model with probabilistic acceptance and maximum executive turnover. In Section 4, we study the consequences of a distributional shift. Section 5 analyzes the role of executive turnover and modifies the rules necessary to pass a proposal. We conclude in Section 6.

2. Literature Review

This paper is related to a large literature that argues that separation of power is desirable since it prevents politicians from abusing their powers. Persson *et al.* (1997, 2000) study different noncooperative legislative bargaining games and formally demonstrate that separation of powers between the executive and legislative branches of government limits the scope of collusion among politicians at the voters' expense. Battaglini and Coate (2007, 2008) built dynamic models of legislative bargaining to analyze how policies respond to shocks in public spending needs and to characterize how public debt evolves over time. Battaglini *et al.* (2012) study dynamic provision of public good. Recently, Robinson and Torvik (2013) have argued that a shock that generates new economic opportunities (e.g., a discovery of natural resources) will raise output in economies where politicians face stronger constraints, but will decrease it in economies with weak institutions. Their conclusion is similar to ours in that institutional quality determines the comparative statics of the equilibrium.

As in this model, various papers have analyzed legislative bargaining with an endogenous default option for the bargaining process. Starting from the seminal contribution of Baron (1996), this literature has been rapidly growing.[3] All papers focus on standard time consistent preferences and consider bargaining protocols where the outcome of the bargaining process is deterministic. So, from this point of view our paper contributes methodologically to the dynamic bargaining literature. A common result of the endogenous status quo literature is that when legislators have concave preferences having an endogenous status quo improves welfare by reducing policy variability. In this paper, decision makers have linear utility and the endogenous status quo is beneficial because it serves a disciplinary role. Riboni (2010) and Piguillem and Riboni (2012) also argue that the endogenous status quo has a disciplinary role in the context of a Barro-Gordon economy and in a capital taxation model, respectively. Compared to them, we provide a tractable model with closed form solutions. This allows us a clear understanding of how public policies vary as we change the political and institutional environment.

The large literature on self-control problems has shown that time-inconsistent preferences, as in Phelps and Pollak, (1968) and Laibson (1997) may lead to procrastination and preproperation (doing things too early).[4] There are now a few papers which introduce self-control problems in political economy. In Bisin *et al.* (2011) and Lizzeri and Yariv (2012), voters are time inconsistent. In their model politicians may exploit voters' behavioral biases in order to win the election. They compare the outcome under government intervention with the laissez faire equilibrium, where consumption and savings decisions are decentralized.

Halac and Yared (2012) study the optimal debt policy of a benevolent government with self-control problems, i.e. a government which is present-biased towards public spending. The optimal fiscal rule solves the trade-off between the value of commitment and the need to respond to spending shocks. Interestingly, the economic mechanism behind their optimal contract is similar to ours. If a government claims to have high spending needs, it is "punished" by relaxing the borrowing limit of future governments. That is, today's fiscal irresponsibility is punished with potentially more irresponsibility in the future. This suggests

[3]Recent contributions include Kalandrakis (2004), Riboni and Ruge-Murcia (2008), Diermeier and Fong (2010), Duggan and Kalandrakis (2011), Zapal (2011), Nunnari (2012), Dziuda and Loeper (2012), Bowen and Zahran (2012), Bowen *et al.* (2012), Anesi and Seidmann (2013), and Baron and Bowen (2013).

[4]See O'Donoghue and Rabin (1999). Laibson *et al.* (2007) show that hyperbolic discounting may cause insufficient savings for retirement. Krusell and Smith (2003) study a consumption-saving decisions and find indeterminacy of Markov equilibrium savings rules.

that the main mechanism highlighted in our paper as welfare enhancing may extend to other settings.

Finally, this paper is also related to a large strand of literature analyzing political turnover. A common insight of this literature is that when the government is uncertain about its survival, it may engage in short-termism and choose suboptimal policies in order to "worsen" the state of the world inherited by its successor (see for instance, Alesina and Tabellini, 1990, Persson and Svensson, 1989, and Azzimonti, 2011).[5] While we assume separation of power, notice that these papers assume that the executive is a policy dictator. Second, in our model legislators discount future public policies in the same way when they have agenda setting power and when they don't. Alesina and Tabellini (1990) and Azzimonti (2011) assume instead that public goods chosen by the opponent are less valuable. Alesina *et al* (1996) argue that political instability and political uncertainty is detrimental to welfare because it discourages private investment and lowers productivity. We stress that all these papers treat turnover as exogenous.[6] Some papers have questioned the view that long-lived political regimes are welfare improving. For instance, Acemoglu and Robinson (2006) emphasize the possibility that such regimes may block beneficial technological or institutional changes in order to maintain their power.[7]

3. The Model

Time is infinite and indexed by t. Let τ_t and s_t denote, respectively, the income tax rate and the spending level in period t. Where $s_t \in \{\underline{s}, \overline{s}\}$, with $0 \leq \underline{s} < \overline{s}$.[8]

For simplicity, we assume that the government's budget is balanced: $\tau_t = s_t$. This implies that there is a simple mapping between taxation and spending: low s translates into low taxes, while high s translates into high taxes. We abstract from debt in order to isolate the

[5] The literature has also emphasized that political turnover leads to higher probability of sovereign default (see Amador, 2003, and Cuadra and Sapriza, 2008), higher seignorage (Cukierman *et al*, 1992) and smaller fiscal and legal capacity (Besley and Persson, 2009). Dal Bó and Rossi (2012) empirically analyze the effects of term length on legislative productivity.

[6] Turnover is treated as endogenous in the political agency models. See the seminal papers by Barro (1973) and Ferejohn (1986). Recent contributions include Acemoglu *et al.* (2008), Yared (2010), and Ales *et al.* (2012).

[7] The agency model by Acemoglu *et al.* (2011) also obtains that political turnover is desirable.

[8] The assumption that the policy space includes only two alternatives is without loss of generality. Results would not change if the policy space were the interval $[\underline{s}, \overline{s}]$. This is because equilibrium indirect utilities will be linear in the current policy. As a result, policymakers' choices will be at the corners.

direct effect of the endogenous status quo. Our model could be interpreted as the problem faced by legislators in several US states, where balanced budget requirements force them to finance current spending with tax revenue.[9]

3.1. Preferences

Throughout this paper, legislators have dynamically inconsistent preferences about spending. In words, if it were possible to commit to a sequence of spending, politicians would choose high spending in the current period (financed by high taxes) and relatively lower spending in the following periods (financed by low taxes). In the absence of commitment, however, they are tempted to ex-post renege on their promises, keep spending high and postpone spending cuts to future periods.

More formally, assume that there is a continuum of legislators, each indexed by the parameter a_i, where $a_i \in [0, 1]$. Life-time utility of legislator a_i at time t is

$$U_{i,t} = a_i s_t - \sum_{j=1}^{\infty} \beta^j s_{t+j}, \tag{1}$$

where $\beta \in (0, 1]$. It is immediate that the infinite sequence of spending that maximizes (1) is equal to $(\overline{s}, \underline{s}, \underline{s}, \underline{s}, ...)$.

At time $t + 1$ life-time utility becomes:

$$U_{i,t+1} = a_i s_{t+1} - \sum_{j=1}^{\infty} \beta^j s_{t+1+j}. \tag{2}$$

Note that the coefficient that multiplies s_{t+1} is equal to $-\beta$ when utility is evaluated at time t, but becomes a_i in expression (2), when utility is evaluated at time $t + 1$. This implies that in the absence of commitment, policy-makers would have an incentive to revise the spending plan chosen at t and select $\overline{s}$ at time $t + 1$. The higher a_i, the higher the marginal benefit of deviating ex-post by selecting $\overline{s}$. In a way, a_i measures the severity of the time consistency problem of legislator i.

The parameter β will be important in our analysis. Economies where legislators have a smaller β are countries where legislators are less forward looking. All things being equal,

[9]Adding debt would introduce an additional linkage across periods. See Persson and Svennson (1989), Alesina and Tabellini (1990), Battaglini and Coate (2008) for interesting implications.

this implies that on average legislators have a stronger spending-bias. As discussed in the next section, β also measures the politicians' degree of benevolence towards consumers. Up to some approximation we can interpret β more broadly as related to indicators of the rule of law, corruption and quality of institutions. In economies where such indicators are low, politicians can more easily appropriate part of the tax revenue. Consequently, we expect that on average politicians will be more tempted to raise spending.

Politicians' preferences, as described in (1) and (2), constitute a tractable way to model self-control problems in legislatures.[10] In the next subsection, we provide a setting that rationalizes such preferences.[11]

3.1.1. A rationalization of the preferences. Consider an economy populated by a continuum of consumers and by a continuum of politicians, both of measure 1. Consumers' income is exogenous and equal to 1 at all t.

We let $U_{c,t}$ denote the consumers' intertemporal utility at time t:

$$U_{c,t} = \sum_{j=0}^{\infty} F_c(j)(1 - s_{t+j}) \tag{3}$$

where $0 \leq F_c(j) \leq 1$ is the consumers' discount function, with $F_c(0) = 1$ and F_c decreasing in j. Note from (3) that for consumers public spending is assumed to be wasteful.

We suppose instead that politicians derive positive utility from spending.[12] This may occur because they capture part of the spending revenue or because they are able to use it for pet projects. Although to different degrees, politicians also care about consumers' well-being. The idiosyncratic parameter $\alpha_i \in [1, \overline{\alpha}]$, measures politicians' benevolence: the higher α_i, the lower the benevolence. We assume that politicians' intertemporal preferences at time t can be represented by the following utility function:

$$U'_{i,t} = U_{c,t} + \alpha_i \sum_{j=0}^{\infty} F_l(j) s_{t+j} \tag{4}$$

where $0 \leq F_l(j) \leq 1$ is the discount function used to evaluate future spending. The second term of (4) is the utility that politicians derive from current and future spending. They face

[10]Similar preferences have been assumed by Halac and Yared (2012).

[11]Uninterested readers may skip Section 3.1.1 and move to the discussion of the bargaining protocol.

[12]The assumption that all consumers (politicians) dislike (like) spending is made for tractability. It would be enough to assume that politicians like spending more than consumers.

a simple trade-off: increasing spending raises the second term of (4), but reduces consumers welfare.

We assume that

$$\overline{\alpha} F_l(j) < F_c(j) \tag{5}$$

for $j > 1$. That is, legislators are sufficiently more impatient than consumers. A possible reason for this is that politicians internalize the possibility of exiting the legislature.

After substituting (3) into (4) it is immediate to see that politicians' utility is linear in spending. Therefore, in order to find the spending sequence that maximizes (4), we need to determine the sign of the coefficients multiplying s_{t+j}, for all $j \geq 0$. Since α_i is assumed to be higher than 1, the coefficient attached to s_t is positive. Inequality (5) implies that the coefficient attached to future spending is negative. As a result, politicians would find it optimal to choose high spending in the current period, but low spending from tomorrow onwards. We obtain this result because consumers' welfare matters relatively more when choosing future spending, while the second term of (4) matters relatively more when choosing current spending.

After recalculating the utility at time $t+1$, note that if legislators had the possibility to re-optimize in the future, they would renege on their promises and choose high spending also at $t+1$.[13]

We now show that for specific values of $F_l(j)$ and $F_c(j)$ we obtain the reduced-form utility (1). Choose $F_l(j) = \delta\beta^j$ and $F_c(j) = \beta^j$. When $0 \leq \delta < 1/2$ and $\overline{\alpha} = 2$, inequality (5) holds. If we divide (4) by the positive term $(1 - \alpha_i \delta)$, (4) can be rewritten as (1), where

$$a_i \equiv \frac{(\alpha_i - 1)}{(1 - \alpha_i \delta)} \geq 0. \tag{6}$$

After evaluating (4) at $t+1$ and performing similar transformations, we obtain (2).

[13] It is interesting to note that such self-control problem arises even if $F_l(j)$ and $F_c(j)$ coincide with standard exponential discount functions. Along similar lines, Jackson and Yariv (2012) show that with heterogeneity in discounting, utilitarian aggregation generically results in time-inconsistent preferences.

3.2. Legislative Bargaining

Spending is decided sequentially by politicians through legislative bargaining. There is a continuum of legislators, each indexed by the parameter a_i, with preferences represented by (1) and (2). For tractability, we make the following assumption:

Assumption 1. *In the legislature, the distribution of a_i is uniform on* $[0, 1]$

At each t, legislative bargaining unfolds as follows:

(i) The agenda setter (or executive) at time t is chosen. With probability ρ she coincides with the agenda setter at $t-1$, with probability $1-\rho$ a new agenda setter is drawn from the legislature.

(ii) The executive currently in power makes a take-it-or-leave-it proposal to the floor. Subsequently, all legislators simultaneously cast a vote (either "accept" or "reject").

(iii) Proposals pass with probability equal to the measure of legislators who accept it.

(iv) If the proposal is rejected, the status quo policy q_t is implemented. If the proposal is accepted, it becomes the spending for the current period. Moreover it becomes the default option for next period: $q_{t+1} = s_t$.

Point (i) specifies that in each period one legislator has the right to propose the spending level for the current period. In this paper, such legislator is denoted as agenda setter or executive.[14] Executives are drawn from the legislature. When Assumption 1 holds this implies that the new executive is drawn from a Uniform distribution on [0,1].

The parameter ρ measures the durability of the executive. To grasp the main intuition of the economic mechanism involved we temporarily assume maximum turnover.

Assumption 2. *No incumbency advantage*: $\rho = 0$.

[14]In practice, legislatures often cede agenda-setting powers to executive offices, such as, the president or premier. This is why in this paper we use the words agenda setter and chief executive interchangeably.

Given that we have a continuum of legislators, when $\rho = 0$ the current executive is replaced with probability one in the following period. Later in Section 5.1, we solve the case of $\rho = 1$: the executive chosen at $t = 0$ is never replaced.

Point (iii) above states that the probability of acceptance increases linearly in the number of legislators who favor the proposal. More specifically, if we denote by $x \in [0, 1]$ the measure of legislators who favor the proposal, the proposal is assumed to pass with probability x. The proposal is accepted for sure only when all legislators prefer the proposal to the status quo, and it is rejected for sure when all legislators prefer the status quo. An implication of (iii) is that a rejection may occur even if the majority of legislators are in favor of it. In a typical legislature, this may happen when a minority of legislators have the ability to delay or veto the approval of the bill. On the other hand, (iii) also implies that a proposal may pass (although with smaller probability) when it is approved by a minority. We believe that in practice this might be the result of vote trading across issues or party discipline.[15] Probabilistic acceptance makes our setting analytically tractable. At the same time, it captures the inherent uncertainty in the actual legislative bargaining process. We emphasize that the thrust of our analysis would not change under simple majority rule: on this, see Section 5.3.

Finally, point (iv) states that the status quo, which coincides with the previous period's spending level, is the default option in case of disagreement. As argued by Tsebelis (2002, p. 8), this is a realistic institutional feature in actual budget negotiations.[16]

3.3. Markov-Perfect Equilibrium

We now compute the pure-strategy Markov Perfect Equilibrium (MPE) of the dynamic game among successive legislators. The status quo is the only payoff-relevant state variable. Since strategies are stationary, we remove the time index from the notation. A MPE of the game is (i) a *proposal rule* specifying the proposal made by an agenda setter of type a_i for all status quo policies and (ii) a *voting rule* specifying the vote of legislator a_i after any proposal

[15]To see this, suppose that the policy stance of the majority party is decided by the median legislator within the party. Under party discipline, a policy change may then pass with the support of only 25 percent of the legislature.

[16]For instance, the Treaty on the Functioning of the European Union states: "Where no Council regulation determining a new financial framework has been adopted by the end of the previous financial framework, the ceilings and other provisions corresponding to the last year of that framework shall be extended until such time as that act is adopted." (Para 4, Art 312, European Union 2010).

and starting from all status quo policies. Each legislator at any point in time is modeled as a "separate" agent who chooses her strategy in order to maximize her utility given the strategies of all other players (including her future selves). All politicians have sophisticated forecast of their own future time-inconsistent behavior. Moreover, legislators internalize that the current policy becomes the status quo in the next legislative session.

Voting strategy. As standard in the literature we assume that a legislator says "yes" to proposal s if she weakly prefers it over the default alternative in case of rejection. More formally, a legislator of type a_i votes in favor of the proposal if and only if

$$a_i s + \beta \mathrm{E}V(s) \geq a_i q + \beta \mathrm{E}V(q). \tag{7}$$

The left-hand side of (7) is the utility of implementing the proposal plus the expected continuation utility of going to the next period with s as new status quo. The right-hand side is the utility of maintaining the status quo policy q plus the continuation utility of going to the next period with the status quo. By (7) it is immediate that q is accepted by all legislators, if it is proposed.

Proposal strategy. The recognized agenda setter chooses the proposal that maximizes her intertemporal payoff given the strategies of all players. Since the policy space includes only two alternatives, one of the two alternatives necessarily coincides with the status quo. Then, the agenda setter's problem amounts to a simple comparison between the utility of proposing a policy change and the utility of proposing no change.

An agenda setter a_i prefers proposing s rather than keeping the status quo when

$$[1 - Prob(s \text{ passes})]\ [a_i q + \beta \mathrm{E}V(q)] + Prob(s \text{ passes})\ [a_i s + \beta \mathrm{E}V(s)] \geq a_i q + \beta\ \mathrm{E}V(q) \tag{8}$$

The left-hand side of (8) is the uncertain payoff of proposing a policy change; the right-hand side is the utility of proposing the status quo, which is accepted by all legislators and thus passes for sure. Inequality (8) is satisfied if

$$a_i s + \beta \mathrm{E}V(s) \geq a_i q + \beta \mathrm{E}V(q) \tag{9}$$

Note that condition (7) coincides with condition (9). Thus, the considerations affecting voting and proposal decisions are identical. This greatly simplifies our analysis.

Equilibrium Characterization. In any MPE legislators follow cutoff strategies.[17] Namely, there exist a voting cutoff (denoted by $\widehat{l} \in [0,1]$) and a proposal cutoff (denoted by $\widehat{e} \in [0,1]$) with the following properties. Legislators of type $a_i > \widehat{l}$ accept spending hikes (and refuse spending cuts), while those with $a_i \leq \widehat{l}$ accept spending cuts (and refuse spending hikes). Executives of type $a_i \leq \widehat{e}$ propose low spending and those of type $a_i > \widehat{e}$ propose high spending. Given Assumption 1 and recalling that executives are drawn from the legislature, proposal and acceptance probabilities are simple to compute. Specifically, $\widehat{l}$ is the probability that a spending cut is approved, while $1-\widehat{l}$ is the probability that a spending increase passes. Conversely, $\widehat{e}$ (1-$\widehat{e}$) is the probability that a spending cut (spending increase) is proposed.

A feature of our setting that keeps things tractable is that in equilibrium both cutoffs $\widehat{e}$ and $\widehat{l}$ will not depend on the status quo.[18]

Equilibrium spending levels follow a Markov chain. The probability that, given an initial status quo i, the legislature approves spending j is denoted by p_{ij}. In a cutoff MPE, the transition probability matrix is:

$$\mathbf{P} = \begin{bmatrix} p_{\underline{s}\underline{s}} & p_{\underline{s}\overline{s}} \\ p_{\overline{s}\underline{s}} & p_{\overline{s}\overline{s}} \end{bmatrix} = \begin{bmatrix} \widehat{e} + (1-\widehat{e})\widehat{l} & (1-\widehat{e})(1-\widehat{l}) \\ \widehat{l}\,\widehat{e} & \widehat{e}(1-\widehat{l}) + 1 - \widehat{e} \end{bmatrix} \tag{10}$$

It is instructive to compute, for instance, the probability that a low status quo is maintained. The first term of $p_{\underline{s}\underline{s}}$ is the probability that a fiscally responsible agenda setter is recognized and, consequently, proposes $\underline{s}$. Since the status quo is also $\underline{s}$, low spending is maintained for sure in this case. The second term is the probability that a fiscally irresponsible legislator becomes agenda setter multiplied by the probability that her proposal to increase spending is rejected.

A key feature of $\mathbf{P}$ is that $p_{\underline{s}\underline{s}} \geq p_{\overline{s}\underline{s}}$ and $p_{\overline{s}\overline{s}} \geq p_{\underline{s}\overline{s}}$: going to the next period with a low status quo increases the probability that $\underline{s}$ will be implemented and reduces the probability

[17]This is because continuation payoffs in (7) and (9) do not depend on the legislators' type and because the spending bias is increasing in a_i.

[18]To see that voting strategies do not depend on the status quo, note from (7) that legislators who accept a spending increase when the status quo is $\underline{s}$ are the same who also reject a spending cut when the status quo is $\overline{s}$. Since voting strategies do not depend on q, the executive also does not condition her proposal on q.

that $\overline{s}$ will be implemented, respectively. This is what gives legislators the incentive to keep spending low in the current period.

From (7) we obtain that legislator of type a_i accepts a spending cut (and rejects a spending increase) if

$$a_i\ (\overline{s} - \underline{s}) \leq \beta[\mathrm{E}V(\underline{s}) - \mathrm{E}V(\overline{s})]. \tag{11}$$

Expression (11) has a simple interpretation: legislator a_i is fiscally responsible if the current gain from spending is smaller than the net gain of going to the next period with a low status quo spending level.

The expected continuation utilities of going to the next period with status quos $\underline{s}$ and $\overline{s}$, respectively, are:

$$\mathrm{E}V(\underline{s}) = p_{\underline{s}\underline{s}}[-\underline{s} - \beta\mathrm{E}V(\underline{s})] + (1 - p_{\underline{s}\underline{s}})[-\overline{s} - \beta\mathrm{E}V(\overline{s})]. \tag{12}$$

$$\mathrm{E}V(\overline{s}) = p_{\overline{s}\underline{s}}[-\underline{s} - \beta\mathrm{E}V(\underline{s})] + (1 - p_{\overline{s}\underline{s}})[-\overline{s} - \beta\mathrm{E}V(\overline{s})]. \tag{13}$$

Using (12) and (13), condition (11) can be rewritten as

$$a_i\ (\overline{s} - \underline{s}) \leq \beta(p_{\underline{s}\underline{s}} - p_{\overline{s}\underline{s}})(\overline{s} - \underline{s}) + \beta^2(p_{\underline{s}\underline{s}} - p_{\overline{s}\underline{s}})[\mathrm{E}V(\underline{s}) - \mathrm{E}V(\overline{s})]. \tag{14}$$

After repeatedly substituting (12) and (13) into the above trade-off condition, we obtain

$$a_i\ (\overline{s} - \underline{s}) \leq (\overline{s} - \underline{s})\beta(p_{\underline{s}\underline{s}} - p_{\overline{s}\underline{s}}) \textstyle\sum_{t=0}^{\infty} \beta^t (p_{\underline{s}\underline{s}} - p_{\overline{s}\underline{s}})^t. \tag{15}$$

From (10) we obtain that

$$p_{\underline{s}\underline{s}} - p_{\overline{s}\underline{s}} = (1 - \widehat{l})\widehat{e} + \widehat{l}(1 - \widehat{e}), \tag{16}$$

where $\widehat{l}$ and $\widehat{e}$ denote the voting and proposal cutoffs that a_i expects future legislators will follow. The expression $(1 - \widehat{l})\widehat{e} + \widehat{l}(1 - \widehat{e})$ has an interesting interpretation: it relates to the probabilities of political deadlock due to disagreement between the legislature and the executive. In fact, $(1-\widehat{l})\widehat{e}$ is the probability that a spending increase is proposed and rejected, while $\widehat{l}(1 - \widehat{e})$ is the probability that a spending cut is proposed and rejected. Using (16) condition (15) can be rewritten as:

$$a_i \leq \beta \frac{(1-\widehat{l})\widehat{e} + \widehat{l}(1-\widehat{e})}{1-\beta[(1-\widehat{l})\widehat{e} + \widehat{l}(1-\widehat{e})]}. \tag{17}$$

Note that the right-hand side of (17) is strictly positive only if policymakers disagree and a status quo bias is expected. When there is disagreement, current spending is more likely to be maintained in the future. This makes condition (17) more likely to be satisfied. Conversely, the right-hand side of (17) is equal to zero when unanimous decisions are expected to occur. This occurs under two circumstances: when $\widehat{l}$ and $\widehat{e}$ are both equal to 0 (all future legislators are fiscally irresponsible) and when both are equal to 1 (all future legislators are fiscally responsible). In the former case, the net gain of choosing low spending is zero because approving $\underline{s}$ cannot prevent future politicians from unanimously choosing high spending. In the latter case, all future politicians are expected to accept and propose low spending. Since high spending will be cut for sure in the future, it is not costly to choose $\overline{s}$ in the current period. In other words, current legislators have an incentive to free-ride on future legislators' responsibility.

We emphasize that the endogeneity of the status quo is also key to provide incentives to be fiscally responsible. If the bargaining default option was exogenously fixed, there would be no dynamic link across periods and the right-hand side of (17) would be equal to zero.

Notice that (7) coincides with condition (9). Thus, the trade-off faced by the agenda setter is identical to the trade-off of a voting legislator: an agenda setter of type a_i proposes low spending if (17) holds. Consequently, in equilibrium the voting and proposal cutoffs coincide. Setting $\widehat{e} = \widehat{l}$ in (17), the equilibrium cutoff(s) can be found by solving

$$\widehat{l} = \beta \frac{2(1-\widehat{l})\widehat{l}}{1-\beta 2(1-\widehat{l})\widehat{l}}. \tag{18}$$

Figure 1

Equilibrium Cutoffs; $\beta \leq 1/2$

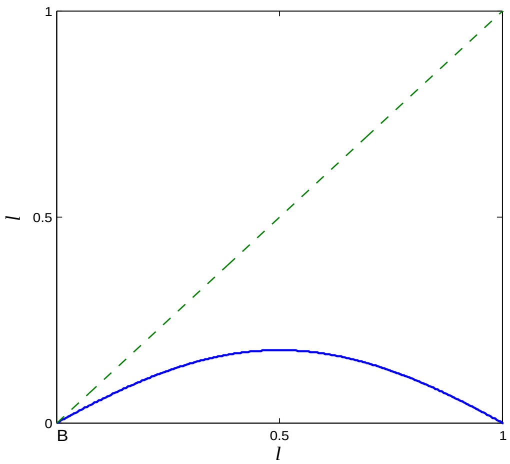
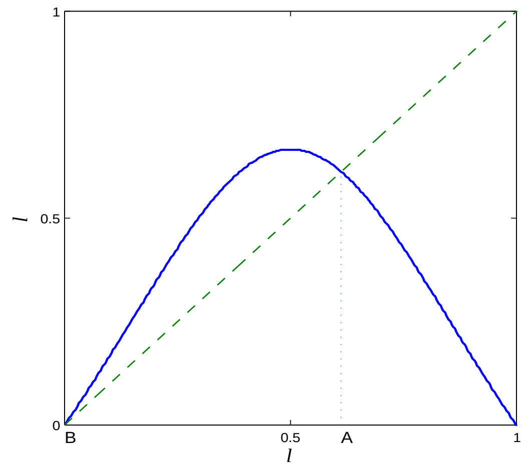


Figure 2

Equilibria Cutoffs; $\beta > 1/2$



Figures 1-2 illustrate the cutoff rule used by current policy makers (on the vertical axis) as a function of the expected cutoff used by future policy-makers (on the horizontal axis). Figure 1 and Figure 2 show the cases when $\beta \leq 1/2$ and $\beta > 1/2$, respectively. The plotted curve, which coincides with the right-hand side of (18), is hump-shaped. As previously discussed, it is zero when $\widehat{l} = 0$. When all future policy makers are expected to be fiscally irresponsible, there is no incentive to choose low spending in the current period. As more policy-makers are expected to be fiscally responsible, the gain from choosing low spending increases. That is, future and current fiscal responsibility are *strategic complements*. The curve reaches its maximum value at 1/2. This is because when $\widehat{l} = 1/2$ disagreement is at its peak in the legislature and, consequently, the status quo is most likely to persist. However, the curve's slope eventually becomes negative. When most future policy makers are expected to be responsible, it is less costly to go to the next period with a high status quo policy. Future and current fiscal responsibility eventually become *strategic substitutes*.

Since cutoffs do not depend on the state, current and future cutoffs must coincide in equilibrium. Thus, the equilibrium cutoff corresponds to the intersection with the 45 degree line. When β is low, strategic complementarities are weak, generating a unique equilibrium: $\widehat{l} = \widehat{e} = 0$. In this case, being irresponsible is a self-fulfilling equilibrium: all legislators, even those with an infinitesimally small spending bias, find it profitable to propose and accept high spending. When instead β is greater than 1/2 we obtain two equilibria, denoted by A and B in Figure 2. In equilibrium B no legislator is expected to vote or propose low spending.

In A low spending is proposed and accepted with positive probability.

The above results are summarized in the following proposition:

Proposition 1: *Suppose that Assumptions 1 and 2 hold.*

For any $\beta \in [0,1]$ there exists a MPE where all players use the cutoffs $\widehat{e}^* = \widehat{l}^* = 0$ and where $\overline{s}$ is implemented with probability one at all times.

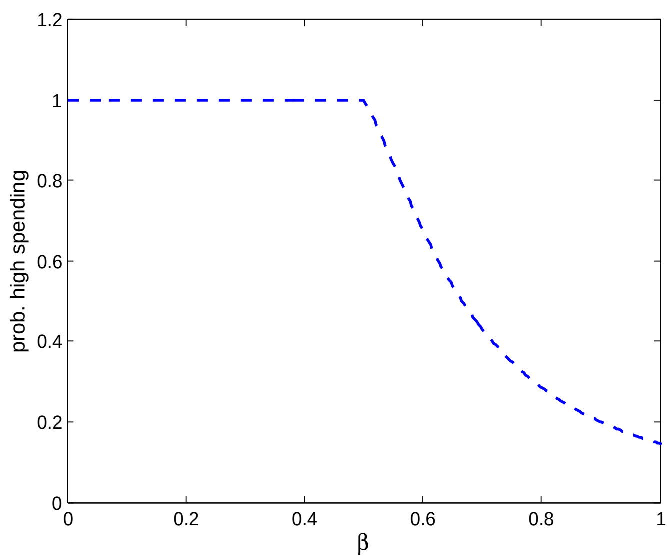
For any $\beta > (1/2, 1]$ there also exists an interior equilibrium, with cutoff

$$\widehat{e}^* = \widehat{l}^* = \frac{\sqrt{2\beta - 1}}{\sqrt{2\beta}} \tag{19}$$

where $\underline{s}$ is implemented with strictly positive probability.

Figure 3

Unconditional probability of $\overline{s}$



For any given MPE, we can compute the corresponding transition matrix and derive the stationary distribution π_i, $i \in \{\underline{s}, \overline{s}\}$, such that $\Sigma_{i \in \{\underline{s}, \overline{s}\}} \pi_i p_{ij} = \pi_j$ for all $j \in \{\underline{s}, \overline{s}\}$. The unconditional probability of observing high spending is

$$\pi_{\overline{s}} = \frac{p_{\underline{s}\overline{s}}}{p_{\overline{s}\underline{s}} + p_{\underline{s}\overline{s}}} \tag{20}$$

Using (10), (20) and the results of Proposition 1, in Figure 3 we show how $\pi_{\overline{s}}$ varies with β. In case of multiple equilibria, we pick the best-case scenario: that is, the lowest equilibrium probability corresponding to each β.[19] Thus,

$$\pi_{\overline{s}} = \begin{cases} \dfrac{\left(1-\frac{\sqrt{2\beta-1}}{\sqrt{2\beta}}\right)^2}{\left(1-\frac{\sqrt{2\beta-1}}{\sqrt{2\beta}}\right)^2+\frac{2\beta-1}{2\beta}} & \beta > 1/2 \\ 1 & \beta \leq 1/2 \end{cases} \tag{21}$$

Recalling that β can be thought as a proxy of institutional quality, Figure 3 indicates that improving institutions has no consequence on economic outcomes in economies where institutions are initially very weak, but it has a larger effect when the quality of institutions is above the 1/2 threshold. Moreover, the model exhibits a sort of "diminishing returns" property: the marginal effect of higher β gets small in absolute value as β increases.

An increase in β lowers $\pi_{\overline{s}}$ through two channels. First, it makes politicians more forward-looking: taking as given the strategies of all other players, this first effect increases the incentive to be fiscally responsible and reduces $\pi_{\overline{s}}$. Second, it changes other legislators' behavior which has an ambiguous effect on the incentives to spend. Figures 4 and 5 illustrate the effects on legislators' behavior. In Figure 4, we increase β from 0.55 to 0.65. Note that when taking the action of the other legislators as given, the first channel moves the cutoff from C to C'. However, the equilibrium response exceeds the partial response: C'' is greater than C'. To understand why the second channel amplifies the first one, note that in the interior cutoff when $\beta = 0.55$, the majority of legislators are in favor of high spending. Increasing β induces more fiscal responsibility, thus increasing disagreement among legislators. This leads to more status-quo bias and consequently stronger incentives to keep spending low, i.e., current and future fiscal responsibility are complements at low levels of β. The existence of a "responsibility multiplier" triggered by higher levels of β explains why the unconditional probability of $\overline{s}$ being accepted drops fast after 1/2.

In Figure 5, we show an increase in β from 0.8 to 0.9. At higher levels of β, the first and second channels go in opposite directions. To see this, notice that the partial response taking the action of others as given (from D to D') exceeds the equilibrium response. The reason is that in the interior cutoff when $\beta = 0.8$ the majority of legislators are in favor of low spending. When β increases, even more politicians become fiscal responsible: disagreement

[19] Analyzing the worst-case scenario (i.e., the equilibrium where all legislators are irresponsible) would not be interesting since it is not affected by changes of parameters and/or institutions.

among legislators is reduced as a result. This second channel weakens the incentives to keep spending low. At high levels of β, current and future fiscal responsibility are then strategic substitutes.[20] Figure 5 illustrates that the second channel is never strong enough to offset the first one. However, when β is large, the second channel partly attenuates the effect of higher β on $\pi_{\overline{s}}$.

Figure 4

Strategic Complementarity

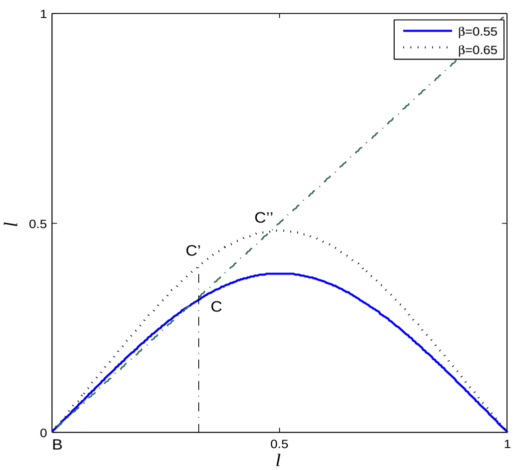
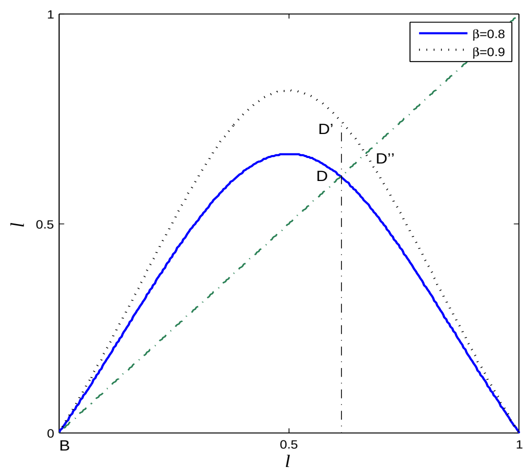


Figure 5

Strategic Substitutability



4. Distributional Shift: Extending the Voting Franchise

In this section we consider the following experiment: we change Assumption 1 and introduce a positive mass of legislators with a strong ($a_i = 1$) spending bias.[21]

It is often argued (see Rogoff, 1985 and Persson and Tabellini, 1994) that voters have an incentive to elect candidates with less credibility problems than themselves. Interestingly, our results indicate that under some circumstances, voters may instead find it profitable to elect legislators with a stronger spending bias. As shown below, inefficient spending may decrease as a result.

[20]It can be shown that the level at which substitutability starts to operate is 2/3.

[21]The alternative experiment (the introduction of a positive mass of legislators with no spending bias) would give symmetric results and is therefore omitted.

Formally, we let $G(a_i)$ denote the cdf representing the distribution in the legislature. We assume that

$$G(a_i) = \begin{cases} (1-\lambda)a_i \quad if \quad 0 \leq a_i < 1, \\ 1 \quad if \quad a_i = 1, \end{cases} \tag{22}$$

where $\lambda \in [0,1]$. Legislators are continuously distributed over [0,1) and there is a mass point at 1, with mass equal to λ. Note that when λ is zero, (22) corresponds to the previously analyzed case.

Similar to what happens when we lower β, increasing λ raises the average spending bias in the legislature. Notice, however, that while β moves the spending bias of all legislators in a symmetric fashion, increasing λ causes a distributional shift and introduces more heterogeneity of views in the legislature. As discussed below, this might help to reduce self-control problems.

We continue to assume that the recognition probability for selecting the executive is uniform on [0,1]; in spite of being more numerous, legislators with $a_i = 1$ are as likely as all others to be recognized agenda setter.[22] It can be shown that the equilibrium cutoff when λ is positive, denoted as usual by $\widehat{l}$, now solves the following equation:

$$\widehat{l} = \beta \frac{(1-\widehat{l})(1-\lambda)\widehat{l} + (1-(1-\lambda)\widehat{l})\widehat{l}}{1-\beta[(1-\widehat{l})(1-\lambda)\widehat{l} + (1-(1-\lambda)\widehat{l})\widehat{l}]}. \tag{23}$$

Since recognition probabilities are uniformly distributed on [0,1], the probability of observing a fiscally responsible executive is still $\widehat{l}$. Conversely, the measure of legislators accepting a spending cut is now $\widehat{l}(1-\lambda)$. In light of this, the transition matrix becomes:

$$\mathbf{P} = \begin{bmatrix} (1-\lambda)(1-\widehat{l})\widehat{l} + \widehat{l} & \left(\lambda + (1-\lambda)(1-\widehat{l})\right)(1-\widehat{l}) \\ (\widehat{l})^2(1-\lambda) & \left(\lambda + (1-\lambda)(1-\widehat{l})\right)\widehat{l} + (1-\widehat{l}) \end{bmatrix} \tag{24}$$

Note that increasing λ affects transition probabilities in (24) through two channels. First, there is a direct effect via λ. Since more legislators have a strong spending bias, spending cuts will be more likely to be rejected and spending increases will be more likely to be accepted. This undoubtedly increases the probability of observing high spending.

[22]For instance, in presidential systems the executive does not necessarily reflect the balance of power in the legislature.

Figure 6

$\lambda > 0$ triggers less discipline (β=0.6)

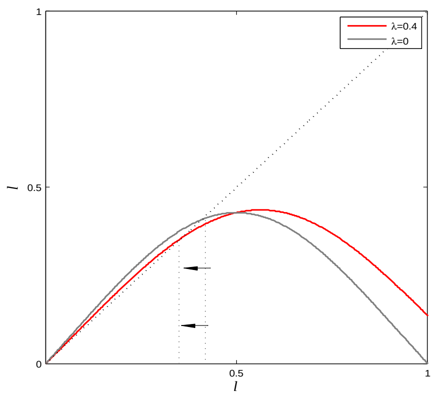
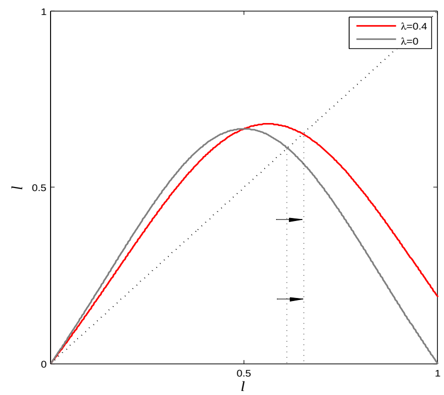


Figure 7

$\lambda > 0$ triggers more discipline (β=0.8)



Second, increasing λ affects the transition matrix by changing equilibrium behavior. In Figures 6 and 7 we increase λ from 0 to 0.4 and show that $\widehat{l}$ may move in both directions. Specifically, we obtain that when β is relatively high (see Figure 7, where we assume $\beta = 0.8$), the interior cutoff is higher. In this case, having more legislators who are fiscally irresponsible disciplines some of the legislators who were fiscally irresponsible when λ was zero. This disciplinary effect arises because strategic substitutability is at work. The intuition for this result is similar to the one discussed at the end of Section 3. When β is sufficiently high and $\lambda = 0$, the equilibrium cutoff is above 1/2 and thus the majority of legislators are fiscally responsible. After adding legislators with a strong bias, the legislature will be more evenly split between responsible and irresponsible. This increases future disagreement and $(p_{\underline{s}\underline{s}} - p_{\overline{s}\underline{s}})$, and thus provides stronger incentives to propose and accept low spending. Conversely, when β is relatively low (see Figure 6, where we assume $\beta = 0.6$), strategic complementarity operates. Adding more legislators who are fiscally irresponsible triggers even more irresponsibility: the interior cutoff moves down. The intuition for this result is that when β is sufficiently low, most legislators are fiscally irresponsible. Having more legislators with a strong bias further reduces the likelihood of disagreement since there is now quasi-unanimity in favor of high spending. This makes low spending levels less persistent and thus provides weaker incentives to propose and accept low spending.

Knowing (24), we can compute the stationary probability of observing high spending and analyze how it varies with λ. The total effect on $\pi_{\overline{s}}$ is given by the sum of the direct and equilibrium channels. When β is small both channels predict that a higher λ increases spending. As shown in Figure 8, in economies where β is small, it is not desirable to add legislators with a strong-spending bias since this aggravates self-control problems and considerably increases spending. However, when β is high the two channels have opposite implications on $\pi_{\overline{s}}$. Remarkably, this implies that in economies with high β, a significant increase of λ has little effect on $\pi_{\overline{s}}$. When β is close to 1, it may actually reduce spending. We obtain this surprising result when the disciplinary effect overcomes the direct effect.

As mentioned in the Introduction, an increase of λ could arise from an extension of the voting franchise which gives the right to vote to poor (hence, pro-spending) citizens. The recent literature has provided several theories to explain why a powerful elite is willing to dilute power. According to Acemoglu and Robinson (2000), the extension of the franchise and the associated increase in redistribution are the rational response by the elite to the threat of revolution.[23] Our model provides an additional explanation. Namely, we argue that extending the franchise serves a disciplinary role. In some cases, the elite attenuates self-control problems and achieves a spending reduction by adding pro-spending politicians to the legislature.[24] Figure 8 illustrates that this is more likely to occur when β is high. Recalling that β relates to the degree of foresightedness by legislators but also, more generally, to the overall quality of institutions, this suggests that a franchise extension is less detrimental to the elite when the economy has attained a sufficiently high level of institutional quality.

A prediction of the theory is that extending the voting franchise does not always lead to higher spending. Indeed, the empirical evidence relating size of government and expansion of voting rights does not reach clear-cut results. On the one hand, Husted and Kenny (1997) look at the US and they support the view that national franchise reforms help increase the size of government. On the other hand, Aidt *et al* (2008) look at municipal boroughs in England and Wales at the end of the 19th century and find that in some cases the voting franchise is a source of retrenchment rather than of expansion of public spending. Aidt et al (2006) consider Western European countries and find that the extension of the voting franchise to men increased spending mainly on defense, internal security, roads, and transportation. In

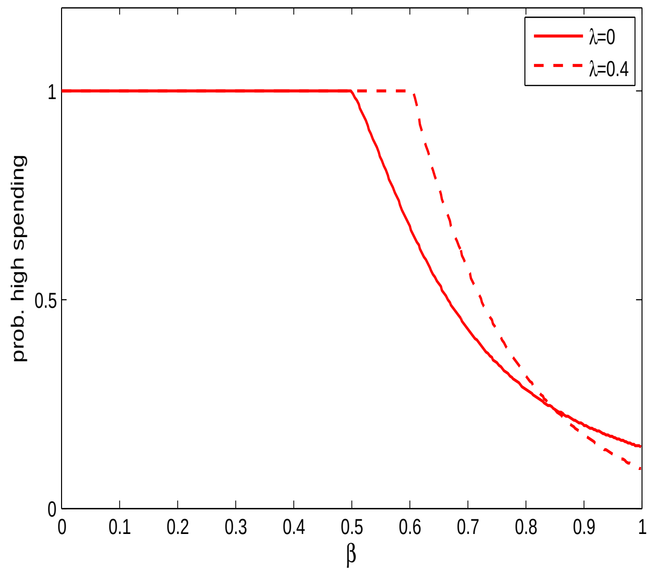
[23]For a different theory, see Lizzeri and Persico (2004).

[24]It bears mentioning that an extension of the franchise would not reduce spending if the elite transfers *all* power to legislators representing poor constituencies. This is rarely the case. In the UK, for instance, the House of Lords kept substantial veto power. The Parliamentary act 1911 was the first attempt to limit the legislation-blocking powers of the House of Lords (the suspensory veto).

some cases, they show that spending in collective goods and transfers actually went down.[25] Mulligan *et al.* (2003) and Profeta *et al.* (2012) also find that democracies do not necessarily spend more.

Figure 8

Unconditional probability of $\overline{s}$



5. Other Implications

In this section we modify the benchmark model of Section 3 along two dimensions. First, we drop the assumption that recognition probabilities are i.i.d. over time. Second, we change the rule specifying the number of votes necessary to pass a proposal. We consider whether the results are robust to these assumptions and study the consequences of such changes on spending.

[25] They also show that the female suffrage had little or, if anything, a negative impact on government spending.

5.1. Reducing Political Turnover: $\rho = 1$

In this section, we increase the durability of the executive by increasing ρ.[26] We modify Assumption 2 and consider the opposite benchmark: $\rho = 1$.[27] In this case, the agenda setter is never changed. However, there is still a separation of power: the fixed executive needs the approval of the legislature to change policy.

Proposition 2 below states that the type of the fixed agenda setter (her idiosyncratic parameter a_s) determines equilibrium long-run spending. If the fixed agenda setter's type is below threshold α, defined in (25), there exists a MPE in which the executive proposes $\underline{s}$ in all periods. As soon as this proposal is accepted, the economy reaches an absorbing state with low spending.[28] If instead the fixed agenda setter has a spending bias above threshold the economy ends up in an absorbing state with high spending, in all MPE of the political game.

Proposition 2: *Suppose that Assumptions 1 holds and that $\rho = 1$. Let a_s denote the type of the fixed agenda setter and $\beta \in (0, 1]$ be given.*

(i) If $a_s > \alpha$, where

$$\alpha \equiv \frac{1}{2\beta}(\sqrt{4\beta^2 + 1} - 1), \tag{25}$$

in all MPE we have that a_s proposes $\bar{s}$ in all periods. Regardless of the initial status quo, the economy reaches an absorbing state of high spending.

(ii) If $a_s \leq \alpha$, there exists a MPE in which a_s proposes $\underline{s}$ in all periods. In this equilibrium, regardless of the initial status quo, the economy reaches an absorbing state of low spending.

Proof: See Appendix A2.

When $\rho = 1$ we compute the unconditional probability of $\bar{s}$ as follows. In case of multiple equilibria, as before we pick the lowest equilibrium probability corresponding to each β. It

[26] In practice, ρ depends on various constitutional provisions (for instance, term length and limits) and other factors (e.g., fund-raising advantages and franking privilege) affecting the strength of the executive's incumbency advantage. ρ also depends on voters' electoral decisions, which are not modeled here. In future research, it would be desirable (but difficult) to model the electoral stage.

[27] Solving the intermediate cases $\rho \in (0, 1)$ is considerably more intricate. Details can be provided upon request.

[28] In this parameter range there is also a "bad" equilibrium where all legislators accept and propose high-spending. In Appendix A2 we give a detailed characterization of all MPE of the game with a fixed agenda setter.

is immediate that when $\rho = 1$, $\pi_{\overline{s}}$ is simply the probability that the fixed executive has type above the cutoff α. Knowing that the fixed agenda setter is drawn from a uniform distribution on $[0,1]$, $\pi_{\overline{s}}$ is equal to $1 - (\sqrt{4\beta^2+1}-1)/(2\beta)$, which is strictly decreasing in β. Depending on β, the executive may or may not choose more fiscally responsible decisions when she expects to remain in power in the next periods.

Figure 9

Political Turnover, Spending and β

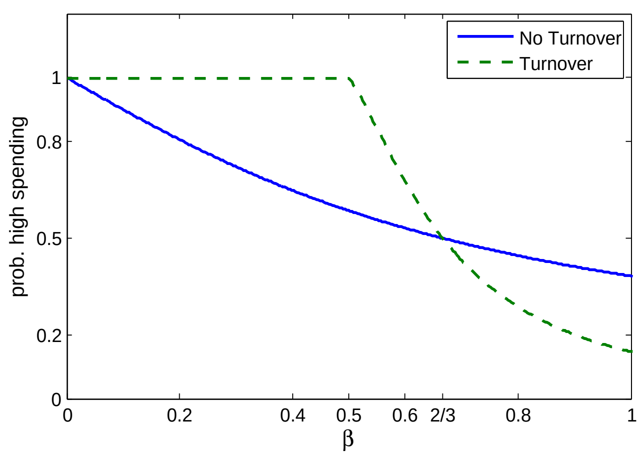


Figure 9 illustrates that increasing turnover is welfare improving (spending is lower) when β is sufficiently large, while if β is sufficiently small no turnover is instead preferable. To understand why, suppose that $\beta < 1/2$ and consider an agenda setter with a small preference parameter (below cutoff α). With no turnover we know from Proposition 2 that there exists a MPE in which this agenda setter makes fiscally responsible decisions. Conversely, given that $\beta < 1/2$, Proposition 1 establishes that in all MPE the *same* agenda setter would choose high spending when she expects to be replaced.

What is the intuition behind this result? It is key to understand that in this model varying ρ affects outcomes by changing expectations about the next executive's spending-bias. Due to strategic interdependence, this significantly alters current incentives. When recognition probabilities are *i.i.d.*, the current agenda setter expects to be followed by an agenda setter who is randomly drawn from the legislators' distribution (hence, a legislator with the mean parameter a_i, equal to 0.5). If β is low, this implies that future agenda setters are expected to have a strong incentive to propose high spending. The current agenda setter foresees future agreement in favor of high spending and, recalling that strategic complementarities operate when β is low, she is discouraged from being responsible. This occurs even if the current executive has an infinitesimally small spending-bias.

When instead $\rho = 1$, an agenda setter with a small spending bias expects to be "replaced" by an agenda setter with similarly low a_i. This, coupled with the threat of an irresponsible legislature, raises the extent of future disagreement and thus gives the current executive stronger incentives to keep spending low. To summarize, when $\beta < 1/2$ and there is maximum executive turnover, all agenda setters with $a_i \in [0, 1]$ are discouraged from choosing low spending. When $\beta < 1/2$ and executives are durable, there is at least a positive measure of executives, equal to α, who make fiscally responsible decisions. Since α is strictly positive for any β, this explains why no executive turnover is ex ante more desirable than maximum turnover for sufficiently small β.

When β is larger than 1/2, $\pi_{\overline{s}}$ with political turnover drops rapidly due to the responsibility multiplier discussed in the previous sections. With a fixed agenda setter such strategic complementarities do not arise and the probability of high spending decreases more slowly. After a certain threshold, which is equal to 2/3, we have that $\pi_{\overline{s}}$ with political turnover falls below the value of $\pi_{\overline{s}}$ that we obtain when the agenda setter is fixed over time.

A common view in the political economy literature (see Section 2) is that high political turnover leads to inefficient outcomes because it reduces the effective "discount factor" of the current government, leading to myopic behavior. In this section we have shown that in economies with sufficiently high institutional quality this prediction fails to hold, and therefore high political turnover actually improves efficiency.

5.2. Constraints on the Executive

Let $x \in [0, 1]$ be the measure of legislators in favor of the executive's proposal. So far we have assumed that the probability of acceptance was x. We now suppose that the probability of acceptance is $g(x)$, where

$$g(x) = \frac{(1-\epsilon)x}{(1-\epsilon x)}; \quad \epsilon < 1 \tag{26}$$

Figure 10

Acceptance probability

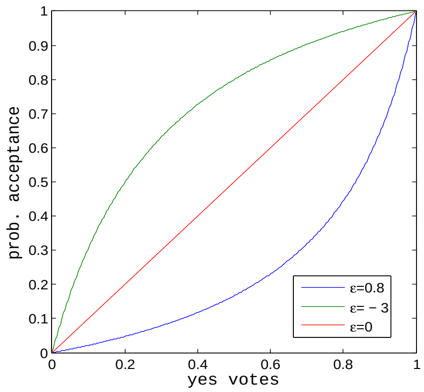
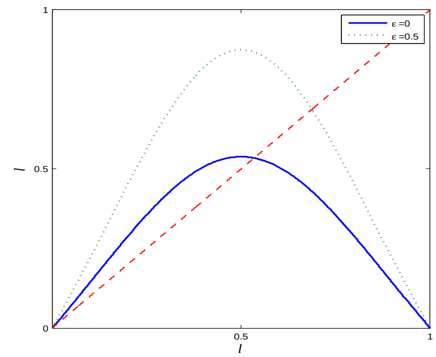


Figure 11

More Constraints on the Executive



Notice that $g([0,1]) \in [0,1]$, $g(0) = 0$, $g(1) = 1$ for all $\epsilon \in (-\infty, 1)$ and $g'(x) > 0$ for all x and all $\epsilon \in (-\infty, 1)$. Moreover, g is strictly convex when $0 < \epsilon < 1$ and it is strictly concave when $\epsilon < 0$ (see Figure 10). The case analyzed so far corresponds to $\epsilon = 0$. When $\epsilon > 0$ we have $g(x) < x$. Compared to the $\epsilon = 0$ case, the executive faces more constraints and finds it more difficult to pass a proposal. If $\epsilon < 0$ we have $g(x) > x$, it is easier for the executive to pass her proposal. In actual democracies, an increase of ϵ can be obtained by increasing the number of veto players and by tightening the majority requirement that is needed to pass legislation. Therefore, we can think of ϵ as a measure of the degree of separation of power between the executive and the legislative.

Given the equilibrium cutoffs $\widehat{l}$ and $\widehat{e}$, proposal and acceptance probabilities are simple to compute. For instance, $g(\widehat{l})$ is probability that a spending cut is accepted when it is proposed, while $1 - g(1 - \widehat{l})$ is the probability that a spending increase is rejected when it is proposed.

With the more general acceptance probability, after setting $\widehat{l} = \widehat{e}$, trade-off (17) now reads:

$$a_i \leq \beta \frac{(1-\widehat{l})(1-g(1-\widehat{l})) + \widehat{l}(1-g(\widehat{l}))}{1-\beta[(1-\widehat{l})(1-g(1-\widehat{l})) + \widehat{l}(1-g(\widehat{l}))]} \tag{27}$$

After substituting (26) into (27), it is straightforward to verify that the right hand side of (27) is increasing in ϵ. In other words, increasing ϵ raises the political cost of being irresponsible. The intuition is straightforward: higher ϵ induces a higher status quo bias, thereby giving more incentives to choose low spending in the current period to constrain future legislatures via the status quo. In Figure 11 we show that similarly to an increase of β, a higher ϵ moves the positive cutoff to the right.[29]

It is instructive to consider what happens as ϵ goes to $-\infty$. In the limit, the model approximates a setting in which policy dictators alternate in power. Absent separation of power, the status quo does influence policy decisions. This explains why the right hand side of (27) goes to zero as ϵ goes to $-\infty$. Low spending is never accepted or proposed since legislators cannot choose low spending in order to constrain future executives. This also explains why it is not possible to sustain equilibria with low spending when there is a single, omnipotent, decision-maker.

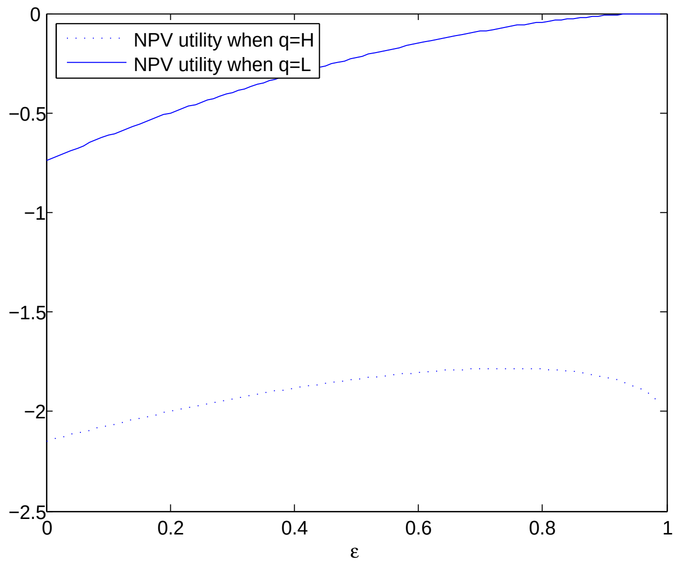
Consider a country where high spending is often chosen. Does our analysis imply that this country should adopt a constitution with a high number of constraints on the executive? The answer is not straightforward. On the one hand, we have shown in Figure 11 that a higher ϵ raises the measure of fiscally responsible legislators. On the other hand, since a higher ϵ implies that more affirmative votes are need to change the status quo, more constraints on the executive may make it more difficult to exit a bad status quo level. In Figure 12 we compute the continuation value function conditional on having a given status quo policy for given parameter values and show (see the dashed curve) that when the status quo is $\overline{s}$ the continuation utility reaches its maximum when ϵ is smaller than one.[30] In other terms, there is a trade-off between providing stronger incentives to be fiscally responsible and increasing the probability of exiting a status quo with high spending. Hence, the optimal ϵ is generally strictly below 1.

[29] In Figure 11 we set $\beta = 0.7$ and raise ϵ from 0 to 1/2.

[30] In drawing Figure 12 we set $\beta = 0.7$, $\overline{s} = 1$ and $\underline{s} = 0$.

Figure 12

Lifetime Utility for different status quos



5.3. Simple Majority

We now suppose that a proposal passes under simple majority rule: $g(x) = 1$ if $x \geq 1/2$ and zero otherwise. Under simple majority rule, the median is decisive: the executive's proposal passes if and only if the median legislator, denoted by a_m, accepts it. Since legislators are uniformly distributed over the unit interval, $a_m = 0.5$. We continue to assume that there is maximum turnover: in each period an executive is drawn from the uniform distribution and draws are i.d.d. over time.

Proposition 3*: Suppose that Assumptions 1 and 2 hold.*

(i) If $\beta \geq 2/3$ there exists a MPE in which the median always rejects spending increases and accepts spending cuts. In this equilibrium, regardless of the initial status quo the economy reaches an absorbing state of low spending.

(ii) If $\beta < 2/3$ in all MPE the median always accepts spending increases and rejects spending cuts. Regardless of the initial status quo the economy reaches an absorbing state of high spending.

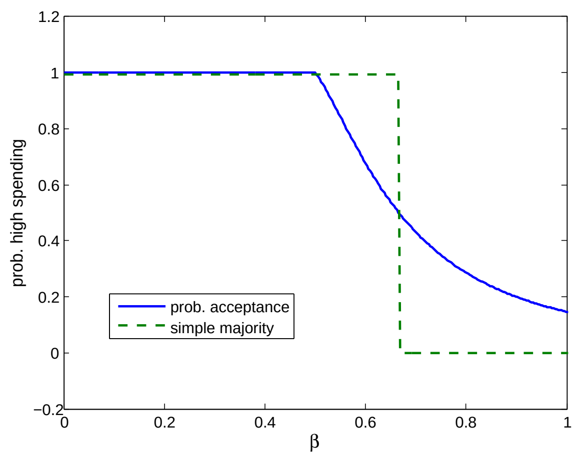
According to Proposition 3, under simple majority rule spending follows an absorbing Markov chain. Long-run outcomes are determined by β and are of the bang-bang type. When

β is sufficiently high, there exists an equilibrium in which the median is fiscally responsible. If the initial status quo is $\overline{s}$, as soon as low spending is proposed (an event occurring with positive probability), low spending is accepted by the median and becomes an absorbing state. When instead β is sufficiently low, the median is fiscally irresponsible and the economy eventually settles into a high spending equilibrium.

Figure 13 compares the long-run probabilities of high spending under simple majority rule and with probabilistic acceptance. We consider the best case scenario corresponding to each β. As discussed above, simple majority rule leads to low spending when β is above 2/3 and to high spending otherwise. Note that when β is between 1/2 and 2/3, probabilistic acceptance provides stronger incentives to keep spending low.[31]

Figure 13

Simple Majority vs Probabilistic Acceptance



Even under simple majority rule, legislative bargaining helps reduce self-controls problems. One difference with the benchmark model of Section 3 is that, similar to what happens when the executive is fixed, in all MPE under simple majority rule the economy settles into an absorbing state. The advantage of probabilistic acceptance is therefore to capture the uncertainty that is associated to the political process. Presumingly, such uncertainty is one of the reasons explaining why public policies fluctuate over time instead of settling in an absorbing state.

[31] Consistently, but in a very different setting, Nosal and Ordoñez (2013) show that uncertainty can improve efficiency by acting as a commitment device.

6. Conclusions

This paper contributes to the literature that studies the interaction between institutions and fiscal outcomes. We consider a legislature where politicians have self-control problems: they are tempted to increase spending and procrastinate spending cuts. We find that when policies are decided through legislative bargaining, disagreement among legislators induces policy persistence and that this reduces politicians' temptation to raise current spending.

A general lesson of this paper is that institutions matter, but that their effects are heterogenous and depend crucially on parameters. We find that economies where on average politicians have severe self-control problems (e.g., economies with weak institutions and few constraints on politicians) may find themselves trapped in an equilibrium with high spending. To improve outcomes, it would be desirable to introduce institutional changes that induce some degree of fiscal responsibility. Due to strategic complementarity, such changes would trigger even more responsibility in other legislators and generate a virtuous cycle, leading to substantial cuts in inefficient spending. Conversely, in economies with stronger institutions, strategic substitutability is at work: institutional changes that induce some legislators to be fiscally responsible would trigger irresponsibility in other legislators. Surprisingly, we find that in such economies institutions which give considerable power to legislators with a strong temptation to spend put more discipline in the remaining legislators and may reduce government's size.

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Appendix

A.1. Proof of Proposition 1

Proposition 1 follows in a straightforward manner from the discussion in the main text. To further help intuition, we provide below a different proof. First, we compute $\mathrm{E}V(s)$, the continuation value function. We use the index B (resp. A) to denote that the realized agenda setter is below (resp. above) the cutoff $\widehat{e}$. Further, we let $\widehat{V}^j(\tau)$ denote the *continuation-value function* (that is the value function from tomorrow onwards) when tomorrow's state is $j = A, B$ and the next period's status quo is s. In computing $\mathrm{E}V(s)$ we assume that future legislators are expected to use the cutoff voting strategies $\widehat{l}$ and $\widehat{e}$. Then,

$$\mathrm{E}V(\overline{s}) \;=\; \widehat{e}\,\widehat{V}^B(\overline{s}) + (1-\widehat{e})\widehat{V}^A(\overline{s}), \tag{A.1}$$

$$\mathrm{E}V(\underline{s}) \;=\; \widehat{e}\,\widehat{V}^B(\underline{s}) + (1-\widehat{e})\widehat{V}^A(\underline{s}), \tag{A.2}$$

where

$$\begin{aligned}\widehat{V}^B(\overline{s}) \;&=\; \widehat{l}\left\{-\underline{s} + \beta\left[\widehat{e}\,\widehat{V}^B(\underline{s}) + (1-\widehat{e})\widehat{V}^A(\underline{s})\right]\right\} + \\ &\qquad (1-\widehat{l})\left\{-\overline{s} + \beta\left[\widehat{e}\,\widehat{V}^B(\overline{s}) + (1-\widehat{e})\widehat{V}^A(\overline{s})\right]\right\},\end{aligned} \tag{A.3}$$

$$\widehat{V}^A(\overline{s}) = -\overline{s} + \beta\left[\widehat{e}\widehat{V}^B(\overline{s}) + (1-\widehat{e})\widehat{V}^A(\overline{s})\right], \tag{A.4}$$

$$\widehat{V}^B(\underline{s}) = -\underline{s} + \beta\left[\widehat{e}\widehat{V}^B(\underline{s}) + (1-\widehat{e})\widehat{V}^A(\underline{s})\right], \tag{A.5}$$

and

$$\begin{aligned}\widehat{V}^A(\underline{s}) \;&=\; \widehat{l}\left\{-\underline{s} + \beta\left[\widehat{e}\,\widehat{V}^B(\underline{s}) + (1-\widehat{e})\widehat{V}^A(\underline{s})\right]\right\} + \\ &\qquad (1-\widehat{l})\left\{-\overline{s} + \beta\left[\widehat{e}\,\widehat{V}^B(\overline{s}) + (1-\widehat{e})\widehat{V}^A(\overline{s})\right]\right\}.\end{aligned} \tag{A.6}$$

To understand expression (A.3) recall that when tomorrow's agenda setter is below the cutoff, $\underline{s}$ is proposed. In case of acceptance (an event occurring with probability $\widehat{l}$), tomorrow's payoff is given by $-\underline{s}$ and $\underline{s}$ becomes the default option in two periods from now. With probability $1-\widehat{l}$ the proposal $\underline{s}$ does not pass and the status quo $\overline{s}$ is kept. To understand (A.4), notice that when tomorrow's status quo is $\overline{s}$ and the realized agenda setter is above $\widehat{e}$, the agenda setter is expected to propose the status quo, which is implemented with probability one. Along similar lines, we obtained (A.5) and (A.6). After simple algebra, using expressions (A.1) to (A.6), it is easy to show that $a_i\ (\overline{s} - \underline{s}) \leq \beta[\mathrm{E}V(\underline{s}) - \mathrm{E}V(\overline{s})]$ coincides with (17).

Using $\widehat{e} = \widehat{l}$, we obtain (18). One easily obtains that the roots of (18) are given by zero and expression (19), as stated by Proposition 1.

A.2. Proof of Proposition 2

Proposition A1 below reformulates Proposition 2 by listing all Markov-perfect equilibria of the dynamic game with a fixed executive.

Proposition A.1: *Suppose that Assumptions 1 holds and that $\rho = 1$. We let a_s denote the type of the fixed agenda setter and let $\widehat{l}$ denote the voting cutoff.*

(i) For any β and $a_s \in [0, 1]$ there exists a MPE in which a_s proposes $\overline{s}$ at all t and $\widehat{l} = 0$.

(ii) If $a_s \leq \alpha$, where

$$\alpha \equiv \frac{1}{2\beta}(\sqrt{4\beta^2 + 1} - 1), \tag{A.7}$$

there exists a MPE in which a_s proposes $\underline{s}$ at all t and $\widehat{l} = \alpha$.

(iii) If $a_s > \alpha$ and $\beta \leq 2/3$ there exists a MPE in which a_s proposes $\overline{s}$ at all t and

$$\widehat{l} = \frac{1 - \beta}{\beta}. \tag{A.8}$$

We now prove each point of the previous proposition. Note that each legislator at any point in time is modeled as a separate agent who chooses her current strategy in order to maximize current preferences given the strategies of all other players (including her future selves). In order to check that a strategy profile is a Markov Perfect equilibrium, we verify that there are no profitable one-shot deviations for executives and for voting legislators.

Step 1: We prove statement (i) of Proposition A1. First, we verify that for all legislators voting for high spending is an equilibrium strategy. According to the MPE of point (i) the agenda setter is expected to propose high spending and all future legislators are expected to favor high spending. After setting $\widehat{e} = 0$ and $\widehat{l} = 0$ in (17), it is immediate that all legislators with $a_i \geq 0$ have no incentive to deviate and accept low spending. Second, it is possible to show that the fixed agenda setter does not have any incentive to propose low spending if she expects all future players to favor high spending. We have therefore shown that there are no profitable deviations from the strategy profile described in point (i).

Step 2: We prove statement (ii) of Proposition A1. First, we show that voting legislators have no profitable deviation. Since the agenda setter is expected to propose low spending at all t and $\widehat{l} = \alpha$, we set $\widehat{e} = 1$ and $\widehat{l} = \alpha$ in (17). Then, a legislator of type a_i strictly prefers voting for low spending if

$$\frac{a_i}{\beta} < \frac{1 - \alpha}{1 - \beta(1 - \alpha\ )} \tag{A.9}$$

and strictly prefers high spending if

$$\frac{a_i}{\beta} > \frac{1 - \alpha}{1 - \beta(1 - \alpha\ )}. \tag{A.10}$$

Note that α solves

$$\frac{x}{\beta} = \frac{1 - x}{1 - \beta(1 - x\ )}. \tag{A.11}$$

After noticing that the right hand side of (A.11) is decreasing, while the left hand side of (A.11) is increasing in x, we conclude that voting legislators with $a_i \leq \alpha$ have no incentive to deviate and vote for high spending and those with $a_i > \alpha$ also have no incentive to deviate and vote for low spending.

Finally, we need to show that when future legislators are expected to vote using a cutoff rule given by α, the fixed agenda setter has no incentive to deviate in the current period and propose high spending. It is immediate that if the fixed agenda setter has $a_s \leq \alpha$, (A.9) holds. Then, a one-shot deviation consisting in proposing high spending is not profitable. Finally, given the strategy profile of point (ii), it is immediate that low spending, once approved, it is an absorbing state.

Step 3: We prove statement (iii). First, we show that an agenda setter with $a_s > \alpha$ has no incentive to propose low spending if the measure of fiscally responsible legislators is $\epsilon = (1-\beta)/\beta$. That is, we need to check that

$$\frac{a_s}{\beta} > \frac{1-\epsilon}{1-\beta(1-\epsilon\ )}. \tag{A.12}$$

or, after substituting ϵ into (A.12),

$$a_s > \frac{2\beta-1}{2(1-\beta)}. \tag{A.13}$$

A sufficient condition for (A.13) to be satisfied when $a_s \geq \alpha$ is $\beta \leq 2/3$. To conclude the proof of point (ii) we need to show that voting legislators have no incentives to deviate. After setting $\widehat{e} = 0$ and $\widehat{l} = \epsilon$ in (17), first we need to check that a legislator of type $a_i \leq \epsilon$ has no incentive to vote for high spending:

$$\frac{a_i}{\beta} < \frac{\epsilon}{1-\beta\epsilon} \tag{A.14}$$

Second, we need to check that a legislator of type $a_i > \epsilon$ has no incentive to vote for low spending: that is,

$$\frac{a_i}{\beta} > \frac{\epsilon}{1-\beta\epsilon} \tag{A.15}$$

Equation

$$\frac{x}{\beta} = \frac{x}{1-\beta x} \tag{A.16}$$

has two roots: a strictly positive root,

$$x_1 = \frac{1-\beta}{\beta}, \tag{A.17}$$

and

$$x_2 = 0. \tag{A.18}$$

After substituting x_1 into (A.15) and (A.14), it is immediate to verify our two claims. Given the strategy profile of point (ii), it is immediate that high spending, once approved, it is an absorbing state.

A.3. Proof of Proposition 3

We reformulate Proposition 3 by listing all Markov-perfect equilibria of the dynamic game under simple majority rule.

Proposition A.2: *Suppose that Assumptions 1 and 2 hold. We let a_m denote the median in the legislature, let α be given by expression (A.7) and we let $\widehat{e}$ denote the measure of fiscally responsible executives.*

(i) For any $\beta \in [0,1]$ there exists a MPE in which a_m accepts $\overline{s}$ and rejects $\underline{s}$ at all t and $\widehat{e} = 0$.

(i) If $\beta \geq 2/3$ there exists a MPE in which the median always rejects $\overline{s}$ and accepts $\underline{s}$, and $\widehat{e} = \alpha$.

(i) If $\beta \geq 2/3$ there exists a MPE in which the median always accepts $\overline{s}$ and rejects $\underline{s}$, and $\widehat{e} = (1-\beta)/\beta$.

Step 1: We prove statement (i). Following Step 1 of the Proof of Proposition 2 it is obvious that none has incentive to deviate if all legislators are expected to be fiscally irresponsible in the future.

Step 2: We prove statement (ii).

Since the median is expected to be responsible at all t and $\widehat{e} = \alpha$, we set $\widehat{l} = 1$ and $\widehat{e} = \alpha$ in (17). If $\beta \geq 2/3$ it can be shown that the median (who has type 0.5) is below α. In this case, it follows that inequality

$$\frac{0.5}{\beta} < \frac{1-\alpha}{1-\beta(1-\alpha\ )} \tag{A.19}$$

is satisfied: the median has no incentive to deviate and be fiscally irresponsible.

It is also immediate that executives have no incentives to deviate. Executives with $a_i > \alpha$ satisfy

$$\frac{a_i}{\beta} > \frac{1-\alpha}{1-\beta(1-\alpha\ ),} \tag{A.20}$$

while executives with $a_i \leq \alpha$ satisfy

$$\frac{a_i}{\beta} \leq \frac{1-\alpha}{1-\beta(1-\alpha\ ),} \tag{A.21}$$

Finally, it is easy to show that once $\underline{s}$ is proposed the economy settles in a low-spending absorbing state.

Step 3: We prove statement (iii). First we show that there are no one-shot profitable deviations for the median. Before showing this, note that if $\beta \geq 2/3$ the median (who has type 0.5) is above ϵ where ϵ is equal to $(1-\beta)/\beta$. In this case, inequality

$$\frac{0.5}{\beta} > \frac{\epsilon}{1-\beta\epsilon} \tag{A.22}$$

is satisfied. This proves that the median has no incentive to deviate and be fiscally irresponsible. Second, it is immediate that executives have no incentives to deviate. Executives with $a_i > \epsilon$ satisfy

$$\frac{a_i}{\beta} > \frac{\epsilon}{1-\beta\epsilon,} \tag{A.23}$$

while executives with $a_i \leq \epsilon$ satisfy

$$\frac{a_i}{\beta} \leq \frac{\epsilon}{1-\beta\epsilon.} \tag{A.24}$$

It is immediate that given the strategy profile of point (iii), once $\overline{s}$ is proposed the economy settles in a high-spending absorbing state.