Separation of Powers and Political Budget Cycles*

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Abstract

¿From a theoretical viewpoint, political budget cycles (PBC) arise in equilibrium when rational voters are imperfectly informed about the incumbent's competency and the incumbent enjoys discretionary power over the budget. This paper focuses on the second condition, specifically examining how PBC in the composition of government spending are affected by separation of powers. With an exogenous status quo, the details of the budgetary process, namely, the status quo location, the agenda-setting authority and the degree of compliance with the budgetary law, play critical roles for the existence and the size of PBC. With an endogenous status quo given by the previous period's budget, PBC only arise when there is low compliance with the budgetary law. What drives these results are effective checks and balances, that provide a commitment device to solve the credibility problem behind PBC.

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1 Introduction

The literature on political budget cycles (PBC) studies cycles in fiscal policies generated by the electoral process. These cycles may be in the composition of public spending, in the size of the total budget, and in the choice of taxes or debt to finance the budget.

At a theoretical level, the literature on rational PBC has made significant progress analyzing informational issues.[1] However, a formal analysis of PBC under separation of powers is still lacking. In effect, in this literature it is implicitly assumed that fiscal decisions are taken unilaterally by the executive, without any kind of institutional constraints. None of the existing models of rational PBC has incorporated the legislature as a second player in the policy-making process followed to set fiscal policy.

The standard assumption of concentration of powers in the hands of the executive is not innocuous. As Lohmann (1998b) shows, the credibility problem this produces is at the heart of electoral cycles in monetary (and, we may add, fiscal) policy. This paper shows that under separation of powers, the design of appropriate checks and balances may provide the kind of commitment device that allows the executive to credibly compromise to optimal policies, by requiring joint agreement in the policy-making process.

This paper formally tackles the impact of separation of powers on PBC in the composition of government spending, though the model can also be applied to other aspects of fiscal policy. To the best of our knowledge of the field, this is the first time such goal is carried out.[2] As in Rogoff and Sibert (1988), Rogoff (1990) and others, under asymmetric information the political incumbent faces, before elections, an incentive to boost the supply of more visible (consumption) public goods, in the hope that voters will attribute the boost to its competence and will reelect it for another term. However, instead of assuming an all-powerful executive, our model introduces a legislature into the policy-making process, reflecting the existence of separation of powers.

Separation of powers brings into play a system of checks and balances. In this regard, in all constitutional democracies a relatively fixed procedure is followed every year to draft, approve and implement the annual budget of expenditures and the public resources to finance it.[3] In this paper this pro-

[1] See Shi and Svensson (2003) for a recent review.

[2] The interplay of various policy-makers has been considered in the analysis of the electoral cycle in monetary policy. In Lohmann (1998a), several regional central bankers interact, while in Drazen (2001) there is both a fiscal authority and a monetary authority.

[3] Alesina and Perotti (1995) review the literature on budget processes and institutions. Empirically, Alesina et al. (1999) point out that budget institutions have a significant role for explaining the cross-country variance of fiscal experiences in Latin America. However,

cedure is depicted through a simple bargaining game between the executive and the legislature, which relies ultimately on the agenda-setter model of Romer and Rosenthal (1978, 1979).[4] Persson, Roland and Tabellini (1997) use a similar framework to analyze separation of powers, but as a mechanism to control the rents politicians appropriate from being in office.

Our main result is that effective checks and balances in the budgetary process curb PBC. With an exogenous status quo, the institutional features of the executive-legislative bargaining game, namely, the exact status quo location, the actual agenda-setting authority and the degree of compliance with the budgetary law, play critical roles for the existence and magnitude of electoral cycles in fiscal policy. When the status quo is given by the previous period's budget, an arrangement typical of many countries, the results are much crisper: PBC only arise under separation of powers if there is low compliance with the budget law, i.e., if the legislature cannot oversee and enforce the effective implementation of the authorized budget. Conceptually, the role of effective checks and balances is to solve the time consistency problem, providing the executive a way to credibly commit to not manipulate fiscal policy in electoral years.

The paper is organized as follows. Section 2 presents the model. The equilibrium analysis is carried out in Sections 3, 4, and 5. Finally, Section 6 briefly summarizes the main results and outlines directions for future research.

2 The model

Consider an infinite-horizon society composed by a large but finite number of identical individuals, labeled $i = 1, 2, \ldots, n$. Let t denote time, $t \in T \equiv T_1 \cup T_2$, where T_1 is the set of all odd positive integers (electoral periods) and T_2 is the set of all even positive integers (non-electoral periods).

In every period $t \in T$, individual i plays roles both as a consumer and as a citizen. The representative consumer derives utility from two types of public goods, which differ in the timing of their production: a visible (consumption) good $g_t \in \Re_+$, instantaneously supplied, and a less visible (capital) good $k_{t+1} \in \Re_+$, provided at the end of period t. The capital good cannot be observed until it is in place.

To simplify the equilibrium characterization, it is assumed that the representative consumer's per-period payoff is given by a Cobb-Douglas utility

this literature does not relate budget institutions to rational PBC.

[4]See Rosenthal (1990) for a survey on this literature.

function $u : \Re_+ \times \Re_+ \rightarrow \Re$,

$$u(g_t,\, k_{t+1}) = (g_t)^{\alpha}\ (k_{t+1})^{1-\alpha}, \tag{1}$$

where $0 < \alpha < 1$.

In each period $t \in T$, the economy is subject to the budget constraint

$$\gamma_t + \kappa_t = \tau, \tag{2}$$

where $\gamma_t,\, \kappa_t \in \Re_+$ denote actual budget expenditures on consumption and capital goods, respectively, and $\tau \in \Re_{++}$ is a fixed sum of tax revenues (the size of the public sector).

The production of public goods is such that the same amount of per-period public resources can be transformed into either one unit of g_t or one unit of k_{t+1}. Their effective provision is affected by a random variable θ_t that represents the competence of the executive, the agent in charge of this task. Public goods are thus given by

$$g_t = \theta_t\, \gamma_t, \tag{3}$$

$$k_{t+1} = \theta_t\, \kappa_t. \tag{4}$$

As in Rogoff and Sibert (1988), Rogoff (1990) and others, actual competence is assumed to be partially lasting, following a first-order moving average process (MA(1)),

$$\theta_t = \bar{\theta} + \varepsilon_t + \varepsilon_{t-1}, \tag{5}$$

where ε is a random iid variable and ε_t denotes the period t realization of ε. The interpretation of these competence shocks is that, although competence is in principle persistent, it comprises multiple dimensions that are not necessarily correlated. The specific challenges a government faces change exogenously over time, making actual competence contingent to these changes.

The variable ε is uniformly distributed over the interval $\left[-\frac{1}{2\xi},\, \frac{1}{2\xi}\right]$, with expected value $E(\varepsilon) = 0$ and density function $\xi > 0$. A higher value of ε corresponds to a more competent politician, since the same per-period tax revenues can be used to provide more of both public goods. The marginal (conditional on ε_{t-1}) probability distribution of θ_t, $\tilde{F}(\theta_t) = F(\theta_t|\varepsilon_{t-1})$, is also uniform, with support $\Theta_t = \left[\bar{\theta} + \varepsilon_{t-1} - \frac{1}{2\xi},\, \bar{\theta} + \varepsilon_{t-1} + \frac{1}{2\xi}\right]$, $\tilde{F}' > 0$ for all $\theta_t \in \Theta_t$, $\tilde{F}'' = 0$, and $E(\theta_t \big| \varepsilon_{t-1}) = \bar{\theta} + \varepsilon_{t-1}$. Henceforth, it is assumed that $\bar{\theta} > 1/\xi$, so $\theta_t > 0$ and (3) and (4) are well-defined.

2.1 Separation of powers

In contrast to much of the theoretical literature on PBC, in this paper the policy-making process carried out to set the mix of public expenditures involves the interaction of two political agents, labeled E and L. These agents are the current leaders, or incumbents, of the two branches of government, the executive and the legislature.

In each branch, a leader's term lasts two periods. Every other period, a random iid recognition rule $\hat{L} : T_1 \rightarrow \{1, 2 \ldots, n\}$ selects a new leader for the legislature from the set of all possible political candidates, which coincides here with the set of citizens.[5] On the other hand, the electorate removes or confirms the executive leader in an explicit electoral contest. If the executive incumbent is confirmed, it controls this branch for another term. Otherwise, a new policy-maker is randomly recognized according to the rule $\hat{E} : T_1 \rightarrow \{1, 2, \ldots, n\}$. No limit is set on the number of times incumbents can run for reelection.

Incumbents' payoffs are as follows. They receive, like other citizens, utility from the consumption of public goods. They also receive an exogenous rent $\chi > 0$ at the beginning of each term in office (i.e., in post-electoral periods), reflecting the satisfaction from being in power. These rents will be the source of conflict between the incumbents and the electorate. In Lohmann's (1998b) words, this variable reflects the strength of the electoral goal.

2.2 Checks and balances

The process for setting the budgetary mix under separation of powers involves a specific system of checks and balances. At the stage of budget formulation and approval, the institutional arrangement gives E the right to make a budget allocation proposal, but it requires the motion to be accepted by L. If no amendment rights exist, L faces a take-it-or-leave-it proposal, where the reversion outcome $\bar{\gamma}$ (the status quo) in case of rejection is exogenously specified. The legislature might be allowed to amend the executive's proposal, but then the amended proposal can be vetoed by E.[6]

At the implementation stage, the executive supplies the public goods, but it is monitored by the legislature. An exogenous proportion $\delta \in [0, 1]$ of $\widetilde{\kappa}_t$, the expenditures approved for the provision of the public capital good,

[5] To simplify the analysis, neither the legislative electoral process nor the citizens' individual decision of entering into the political arena are modeled.

[6] The possibility that L overrides E's veto, not considered here, is trivial to analyze. However, this is an unlikely case, since it usually requires that the majority leader L in the legislature have a qualified majority to impose its criterion when E vetoes an amendment.

cannot be reassigned. The interpretation is that these resources represent public funds affected to specific ends, whose realizations are subject to the revision and control of the legislature. Thus, the executive leader can at most reassign an amount $(1-\delta)\widetilde{\kappa}_t$ of resources to the provision of g_t. The measure δ, which can be interpreted as the degree of compliance with the authorized budget, determines the effective limits the legislature imposes on the executive office.[7]

2.3 Asymmetric information

As in Lohmann (1998b), in each period $t \in T$, incumbents do not observe the value of ε_t before making budget allocation decisions. This assumption simply implies that, ex-ante, they are uncertain about how well they will be able to transform government revenues into public output.

As to the electorate V, it does not observe neither the executive leader's most recent competence shock, ε_t, nor the allocation (γ_t, κ_t) before voting. The only information it receives is the amount of the consumption good g_t that is provided.[8] Thus, incumbents have a temporary information advantage over the actual budget allocation implemented. All past competence shocks, as well as the amount of tax revenues, are common knowledge. Finally, even though voters do not observe the particular circumstances incumbents confront at a given date, they know the incentives they face and the objectives they try to achieve.

2.4 The game

Given the MA(1) process for competence, the infinite-horizon model described above can be broken down into a sequence of two-period sequential games, in which each election is independently analyzed. Consider one of these games, which will be referred to as G. Call t and $t+1$ its two peri-

[7]Notice that the legislature is endowed with the power to guarantee some specific items will be supplied, but not to prevent the over-provision of other public goods. Incumbents confronted with electoral contests refrain from transferring resources from g_t to k_{t+1}. The reason is only the provision of the more visible (consumption) goods will be effective for the incumbent's purpose of appearing talented to voters before elections.

[8]It is assumed that V knows two parameters of the budget process, $\bar{\gamma}$ and δ. Below, we discuss qualitatively how the baseline results change if these variables of the budget process are not observed by V. In that case, the estimated value of γ_t will be a function of the estimated values of $\bar{\gamma}$ and δ.

ods, such that $t \in T_1$ and $t+1 \in T_2$. The set of players of G are the two incumbents, E and L, the representative voter, V, and Nature.[9]

Let $\Gamma = [0, \tau] \subset \Re_+$ be the set of feasible expenditures on the public consumption good. A pure strategy for E in G is a pair $\lambda^E = (\lambda^E_t, \lambda^E_{t+1})$ such that, for each $s \in \{t, t+1\}$, $\lambda^E_s = (\tilde{\gamma}^E_s, d^E_s, \gamma_s)$, where [10]

- $\tilde{\gamma}^E_s : \Gamma \to \Gamma$ is E's budget allocation proposal, which is a function of the status quo $\bar{\gamma} \in \Gamma$;
- $d^E_s : \{0, 1\} \times \Gamma \times \Gamma \to \{0, 1\}$ is E's veto decision rule, which depends on L's approval or rejection of $\tilde{\gamma}^E_s$, L's amended proposal $\tilde{\gamma}^L_s$ in case of rejection (to be specified below) and $\bar{\gamma}$; and,
- $\gamma_s : \Gamma \times [0, 1] \to \Gamma$ denotes actual expenditures on g_s, which depends on degree of compliance $\delta \in [0, 1]$ and authorized expenditures $\tilde{\gamma}_s \in \Gamma$ (yet to be defined).

In the same way, a pure strategy for L in G is a pair $\lambda^L = (\lambda^L_t, \lambda^L_{t+1})$ such that, for each $s \in \{t, t+1\}$, $\lambda^L_s = (d^L_s, \tilde{\gamma}^L_s)$, where

- $d^L_s : \Gamma \times \Gamma \to \{0, 1\}$ is L's veto decision rule, given $\tilde{\gamma}^E_s$ and $\bar{\gamma}$; and,
- $\tilde{\gamma}^L_s : \Gamma \times [0, 1] \to \Gamma(\tilde{\gamma}^E)$ is an amendment rule, as a function of $\bar{\gamma}$ and δ, where $\Gamma(\tilde{\gamma}^E) \subseteq \Gamma \cup \{\emptyset\}$ represents the set of feasible amendments to $\tilde{\gamma}^E_s$. For simplicity, the analysis will focus on two extreme cases where $\Gamma(\tilde{\gamma}^E)$ does not depend on $\tilde{\gamma}^E_s$: (i) Closed rule: $\Gamma(\tilde{\gamma}^E) = \emptyset$ and (ii) Open rule: $\Gamma(\tilde{\gamma}^E) = \Gamma$.

Finally, in order to decide its vote, V compares the flow of payoffs expected under each of the potential executive incumbents using observable information on expenditure g_t. That is, in electoral period t it behaves according to the forward-looking voting rule $\lambda^V : \Re \to \{0, 1\}$

[9] Two comments are in order. First, since individuals are identical, there is no loss of generality in using a single representative voter. Second, the two potential incumbents $\hat{E}(t)$ and $\hat{L}(t)$ should formally be included in the set of players. However, since these players (potentially) participate only in the last period of the game, and the optimal strategies of all incumbents at this post-electoral period are the same, the distinction between them and the original incumbents will be omitted. This simplifies the notation considerably.

[10] In an slight abuse of notation, λ^E_{t+1} is used to denote both a (conditional on being reelected) strategy for E at $t+1$ and a possible plan of action for the (potential) executive incumbent $\hat{E}(t)$. This simplification is also adopted below for L's strategies. It entails no loss of generality, because all incumbents choose the same optimal strategy in the last period of the game.

$$\lambda^V = \begin{cases} 1 & \text{if } E\{v(\gamma_{t+1},\, \theta_{t+1}) \,|\, \lambda^V = 1,\, g_t\} \geq E\{v(\gamma_{t+1},\, \theta_{t+1}) \,|\, \lambda^V = 0,\, g_t\}, \\ 0 & \text{otherwise.} \end{cases} \tag{6}$$

where $\lambda^V = 1$ represents V's decision to keep the current executive incumbent in office, while $\lambda^V = 0$ is vote to replace it, and $v(\gamma_s,\, \theta_s) \equiv u[\theta_s \gamma_s,\, \theta_s(\tau - \gamma_s)]$ is the indirect utility function, for $s \in \{t,\, t+1\}$.

For each $j \in \{E,\, L,\, V\}$, let Λ^j denote player j's set of pure strategies. A pure strategy profile in G is a vector $\lambda = (\lambda^E,\, \lambda^L,\, \lambda^V) \in \Lambda$, where $\Lambda \equiv \prod_j \Lambda^j$. Then, player j's expected payoffs in G are given by a mapping $\pi^j : \Lambda \to \Re$, such that:

$$\pi^E(\lambda) = E\left\{ \sum_{s=t}^{t+1} \left[\beta^{s-t}\, v(\gamma_s,\, \theta_s)\right] + \mu^E_{t+1}\, \beta\chi \middle|\, \varepsilon_{t-1} \right\}, \tag{7}$$

$$\pi^L(\lambda) = E\left\{ \sum_{s=t}^{t+1} \left[\beta^{s-t}\, v(\gamma_s,\, \theta_s)\right] + \mu^L_{t+1}\, \beta\chi \middle|\, \varepsilon_{t-1} \right\}, \tag{8}$$

$$\pi^V(\lambda) = E\left\{ \sum_{s=t}^{t+1} \left[\beta^{s-t}\, v(\gamma_s,\, \theta_s)\right] \middle|\, \varepsilon_{t-1},\, g_t \right\}, \tag{9}$$

where $\beta \in (0, 1)$ is a common discount factor and μ^j_s is the probability incumbent j attaches to being in office in period s,

$$\mu^E_s = \begin{cases} 1 & \text{if } s = t, \\ \text{prob}(\lambda^V = 1) & \text{if } s = t+1, \end{cases} \tag{10}$$

and

$$\mu^L_s = \begin{cases} 1 & \text{if } s = t, \\ \text{prob}(\hat{L}(s-1) = L) & \text{if } s = t+1. \end{cases} \tag{11}$$

In each period $s \in \{t,\, t+1\}$, the timing of events is as follows:

1. E proposes $\tilde{\gamma}^E_s$ to L.
2. L observes $\tilde{\gamma}^E_s$ and

   (i) If $\Gamma(\tilde{\gamma}^E) = \emptyset$, L chooses whether to accept $\tilde{\gamma}^E_s$ or not, and

$$\tilde{\gamma}_s = \begin{cases} \tilde{\gamma}^E_s & \text{if } d^L_s = 1, \\ \bar{\gamma} & \text{if } d^L_s = 0; \end{cases} \tag{12}$$

(ii) If $\Gamma(\tilde{\gamma}^E) = \Gamma$, L decides whether to amend $\tilde{\gamma}_s^E$ or not. If it is modified, E chooses whether to veto $\tilde{\gamma}_s^L$ or not, and

$$\tilde{\gamma}_s = \begin{cases} \tilde{\gamma}_s^E & \text{if } d_s^L = 1, \\ \tilde{\gamma}_s^L & \text{if } d_s^L = 0 \text{ and } d_s^E = 1, \\ \bar{\gamma} & \text{if } d_s^L = 0 \text{ and } d_s^E = 0; \end{cases} \tag{13}$$

3. E implements γ_s, which may differ from plan $\tilde{\gamma}_s$ if $\delta < 1$, and κ_s is determined residually.

4. ε_s is realized and g_s and k_{s+1} are determined according to (3) and (4);

5. V observes g_s, but not k_{s+1}, ε_s and (γ_s, κ_s), forming a belief θ_t^e about the incumbent's competency.

6. If $s = t$, $\hat{L}$ chooses a new legislative leader for the next political term. Simultaneously, V decides whether to vote for E or not. If E is re-elected, it stays in office for two more periods. If not, $\hat{E}$ chooses a new executive leader, whose competence at $t+1$ is determined by Nature from the probability distribution of ε;

7. Individuals observe k_{s+1} and period s ends.

Since this game is not of complete information, the equilibrium concept used to solve it is (weak) perfect Bayesian equilibrium in pure strategies. This equilibrium concept involves an explicit description of players' beliefs, which must be statistically consistent with the strategy profile, as well as the optimality requirement that, given these beliefs, agents must choose a best response to the other players' strategies. More precisely,

Definition: *A pure strategy equilibrium for G is a profile of strategies $\hat{\lambda} = (\hat{\lambda}^E, \hat{\lambda}^L, \hat{\lambda}^V)$, which are common knowledge, and a belief θ_t^e about the incumbent's competency such that, in G or any continuation game of G,*

- *Given $\hat{\lambda}^{-j}$, each player $j \in \{E, L, V\}$ weakly prefers $\hat{\lambda}^j$ to λ^j, for all $\lambda^j \in \Lambda^j$.*

- *Belief θ_t^e is determined by V using Bayes rule and $\hat{\lambda}$ on the equilibrium path; off the equilibrium path, it is determined by the condition that unexpectedly low values of g_t correspond to minimum competence, while unexpectedly high values of g_t correspond to maximum competence.*

3 One policy-maker

We carry out the equilibrium analysis in three steps. To analyze the effects of different institutional arrangements over the size of the electoral cycle in the composition of public expenditures, this Section starts by considering the case of a single policy-maker. The next two Sections considers the case of two policy-makers.

3.1 Benchmark

Suppose no electoral contest is held. That is, assume a unique individual is randomly selected at the beginning of period t, after which it controls both the executive and the legislature. Let $\Delta = |\gamma_{t+1} - \gamma_t|$ denote the size of the electoral cycle on budget expenditures γ.

Remark 1 *If there are no elections, then every period equilibrium expenditures are given by $\gamma^* = \alpha\ \tau$ and $\kappa^* = (1-\alpha)\ \tau$. Hence, electoral cycle $\Delta^* = 0$.*

This is the social planner's solution, which is obtained in the usual way. There are no cycles, but there is no possibility either to remove an incompetent incumbent from office.

3.2 Executive elections

Assume now an electoral contest takes place at date t. One can assume that only one policy-maker I $(= E = L)$ exists, or that the result of the legislative electoral process, represented by $\hat{L}(t)$, is perfectly correlated with the outcome of the presidential election. This situation corresponds to the usual situation analyzed in the literature on rational PBC, which we denote "unification of powers". Then, we have the following result:[11]

Proposition 1 *Suppose there is unification of powers. There is a unique pure strategy equilibrium $\hat{\lambda}^u$ in G such that $\gamma^u_{t+1} = \gamma^*$, $\gamma^u_t > \gamma^*$ is implicitly defined by the condition*

$$\left(\frac{\gamma^u_t}{\tau - \gamma^u_t}\right)^\alpha (\gamma^u_t - \alpha\tau) = \beta\,\chi\,\tilde{F}',$$

and $\lambda^V = 1$ if and only if $\theta^e_t = g_t/\gamma^e_t \geq \bar{\theta} + \varepsilon_{t-1}$.

[11] The superscript u stands for equilibrium values under "unification of powers".

Corollary 1 *There is an electoral cycle, $\Delta^u > 0$; and Δ^u is strictly increasing in both χ and β.*

The proofs of Proposition 1 and Corollary 1 are as follows. First of all, notice that our treatment of the infinite-horizon game as a sequence of two-period games is well-defined, since each individual game is uncorrelated with any other member of the sequence. To illustrate this, consider for example the expected utility of V at the post-electoral period $t+3$. By voting rule (6), this determines V's vote at $t+2$. However, since competence follows a MA(1) process, V's expected utility at $t+3$ is not affected by E's competence at $t+1$: $E[\theta_{t+3} | \, \theta_{t+1}] = E[\theta_{t+3}] = \bar{\theta}$. Therefore, period $t+1$ in G is independent of the continuation game. This implies I has no incentives to manipulate V's perception of its competence at $t+1$ and, consequently, that actual expenditures on g_{t+1} are $\gamma^u_{t+1} = \gamma^*_{t+1}$.

Consider now electoral period t. From voter preferences (1) and γ^u_{t+1}, maximization of expected utility in (6) implies that V votes for I if and only if the expected competency of I is larger than the opposition's. Given that the only information on potential replacement is average competency, while voters' expectations about I's competency are given by θ^e_t, V votes for I if and only if $\theta^e_t - \varepsilon_{t-1} \geq \bar{\theta}$.

Since at election time V knows g_t, but it does not observe ε_t, it has to estimate θ^e_t. Let γ^e_t be the solution, expected by V, of the incumbent's optimization problem at date t.[12] Using equation (3), V estimates I's competence by

$$\theta^e_t = E[\theta_t \mid g_t, \ \gamma^e_t] = \frac{g_t}{\gamma^e_t}. \tag{14}$$

By (3) and (14), $\theta^e_t \geq \bar{\theta} + \varepsilon_{t-1}$ if and only if $\theta_t \geq \frac{(\bar{\theta}+\varepsilon_{t-1})\,\gamma^e_t}{\gamma_t}$. Hence, the probability μ^I_{t+1} that I attaches to being in office in period $t+1$ in (10) can be expressed as

$$\mu^I_{t+1}(\gamma_t) = 1 - \tilde{F}\left(\frac{(\bar{\theta}+\varepsilon_{t-1})\,\gamma^e_t}{\gamma_t}\right). \tag{15}$$

Thus, I's maximization problem at period t can be written as

$$\max_{\gamma_t} \quad E_t \left\{ \theta_t(\gamma_t)^{\alpha} \, (\tau - \gamma_t)^{1-\alpha} + \beta \, \mu^I_{t+1} \, \chi \mid \varepsilon_{t-1}, \ \gamma^e_t \right\}, \tag{16}$$

subject to (15). Taking the first order condition with respect to γ_t, we have

$$\left(\frac{\gamma_t}{\tau - \gamma_t}\right)^{\alpha} \left[1 - \alpha\left(\frac{\tau - \gamma_t}{\gamma_t} + 1\right)\right] = \frac{\beta \, \chi \, \tilde{F}' \gamma^e_t}{(\gamma_t)^2}. \tag{17}$$

[12]Since I does not observe its competence before choosing the expenditure composition, γ^e_t cannot depend on θ_t.

In equilibrium, $\gamma_t = \gamma_t^e$, since actual and expected decisions coincide. Denote equilibrium $\gamma_t \equiv \gamma_t^u$. Therefore, (17) can be re-written as

$$\left(\frac{\gamma_t^u}{\kappa_t^u}\right)^{\alpha} (\gamma_t^u - \alpha\tau) = \beta\,\chi\,\tilde{F}^{\,\prime}. \tag{18}$$

Notice that the right hand side in (18) is positive. Thus, $(\gamma_t^u - \alpha\tau) > 0$, which means $\gamma_t^u > \alpha\tau = \gamma_t^*$ and $\kappa_t^u < (1-\alpha)\tau = \kappa_t^*$. Further, in equilibrium, $\mu_{t+1}^I = 1 - \tilde{F}\left(\bar{\theta}\right) = \frac{1}{2}$. Finally, uniqueness of γ_t^u follows from the strict concavity of both (15) and (16).[13]

As to the proof of Corollary 1, the first part is immediately derived from Proposition 1. With respect to the second part, to see that Δ^u is strictly increasing in χ, notice first that $\partial\Delta^u/\partial\chi = \partial\gamma_t^u/\partial\chi$. Therefore, totally differentiating the first order condition (18) with respect to χ, it follows that

$$\frac{\partial\gamma_t^u}{\partial\chi} = \frac{\beta\tilde{F}^{\,\prime}}{\left(\frac{\gamma_t^u}{\tau-\gamma_t^u}\right)^{\alpha}\left[\frac{\alpha\tau(\gamma_t^u-\alpha\tau)}{\gamma_t^u(\tau-\gamma_t^u)}+1\right]},$$

which is strictly greater than zero. Following the same reasoning, it can be shown that

$$\frac{\partial\gamma_t^u}{\partial\beta} = \frac{\chi\tilde{F}^{\,\prime}}{\left(\frac{\gamma_t^u}{\tau-\gamma_t^u}\right)^{\alpha}\left[\frac{\alpha\tau(\gamma_t^u-\alpha\tau)}{\gamma_t^u(\tau-\gamma_t^u)}+1\right]},$$

is also positive. This complete the proof.

Thus, under the assumption of unification of powers (only one policy-maker), our model predicts optimal equilibrium policy during off-electoral periods, and public consumption expenditures above the optimal level during electoral periods. These results are pretty standard, having to do with the MA(1) nature of competency shocks.

The intuition for the result in the post-electoral period is clear. Since reputation of competence lasts only one period, there is no incentive to distort fiscal policy at $t+1$. But, why is it that the optimal allocation at date t cannot

[13] The text analyzes pure strategies. The restriction of λ^V to pure strategies (to a *yes* or *no* vote) makes sense in large populations, since it may be unrealistic to assume that voters coordinate on implementing a strategy that makes reelection random from the point of view of the executive incumbent. Besides, voters are only willing to adopt mixed strategies when they are indifferent between the incumbent and the opposition. This happens with probability zero, in non-generic case where expected competency of incumbent is equal to that of opposition. As to I, it would not want to play mixed strategies because voters would still reelect the incumbent for sure beyond a certain threshold g_t, making the probability of reelection monotonically increasing in γ_t. Thus, as in (16), I would want to play a pure strategy.

be sustained in equilibrium? Ultimately, both V and I would be better off with budget allocation γ^* instead of γ^u. The crucial point to understand this is to see that I cannot credible compromise to follow γ^* during electoral periods. If such policy were expected by V, then I would have an incentive to exploit its discretionary power to deviate to γ^u, since such deviation would increase its probability of being reelected. Hence, this cannot be part of an equilibrium. In each electoral period the incumbent trades-off the efficiency cost of distorting the composition of public expenditures against a higher probability of winning the contest. Its incentive to appear competent before elections induces overspending on the more visible (consumption) good, at the expense of the less visible (investment) good.[14]

In models of PBC à la Lohmann like this, where policy choices are made before the competence shock is realized, the credibility problem depicted above is at the heart of the electoral distortion of fiscal policy. This policy bias is similar to the bias generated by credibility problems in the time consistency literature, such as the inflation bias in the Barro-Gordon model.[15]

Following the institutional solutions suggested by this literature, like the delegation of monetary policy to a conservative central banker, the next section will examine whether the credibility problem of our model can be alleviated by restricting the executive's capacity of unilateral moves. The reason to do this is that the lack of credibility and the electoral bias are in fact produced by concentration of powers, which allows the all-powerful executive to choose any policy it desires. Instead, when there exists separation of powers, we will show that appropriate checks and balances, by requiring joint agreement in the policy-making process, provide the kind of commitment device that allows E to credible compromise to optimal policies. Therefore, it could be that, under this institutional arrangement, all players are made better off, including the executive incumbent.

[14]Notice that, even though the policy bias in electoral periods reduces voters' welfare, there is a positive selection effect after elections, because elections help to select candidates with above-average competency for office. Hence the net effect may be positive or negative (Lohmann 1998b).

[15]The Barro-Gordon model assumes that commitment is achieved if policy is decided before expectations, instead of being set simultaneously or afterwards. In our model, this is not enough to achieve commitment because of asymmetric information on the actual budget allocation: in electoral period t, high g_t may be due either to high competency, or to an electoral manipulation of budget allocation that implies low k_{t+1} in the future.

4 Two policy-makers

This Section incorporates a second policy-maker, the legislature, into the model, as well as the institutional structure of checks and balances discussed in Section 2. The main purpose is to analyze how the results under one policy-maker change after these modifications are introduced. Here the status quo is exogenously given. In the next Section, we consider the effect of a budget rule that takes the previous period's budget as default outcome, which in fact makes the status quo endogenous.

We first consider the case of perfect compliance with the budget law, before introducing the consequences of imperfect compliance. The point of this distinction is that what matters for PBC are not nominal checks and balances, but rather effective checks and balances. Two variants of the system of checks and balances are considered in each case, depending on whether $\Gamma(\tilde{\gamma}^E) = \emptyset$ or $\Gamma(\tilde{\gamma}^E) = \Gamma$.

4.1 Perfect compliance

This case corresponds to $\delta = 1$, and represents a situation where there is perfect legislative oversight and no enforcement problems. In other words, it is the case in which the budget law approved through the budgetary process is the policy implemented by the executive.

Closed rule: Assume no amendments can be made to the executive's proposal. That is, following the jargon of the legislative bargaining literature, suppose there exists a closed rule, so that the legislature faces each period a take-it-or-leave-it allocation proposal, with the rejection followed by the exogenous reversion point $(\bar{\gamma}, \bar{\kappa})$.

For $j \in \{E, L\}$, let $\tilde{\pi}^j(\cdot)$ denote player j's policy preferences over Γ, with ideal policy $\gamma^j = \arg\max_{\gamma} \ \tilde{\pi}^j(\gamma)$.[16] Define the mirror function $r^j : \Gamma \to \Gamma$ as follows: $\forall \ \gamma' \in [0, \gamma^j]$, set $r^j(\gamma') = \gamma''$ if there exists $\gamma'' \in [\gamma^j, \tau]$ such that $\tilde{\pi}^j(\gamma') = \tilde{\pi}^j(\gamma'')$, and $r^j(\gamma') = \tau$ otherwise. Similarly, $\forall \ \gamma' \in [\gamma^j, \tau]$, fix $r^j(\gamma') = \gamma''$ if there exists $\gamma'' \in [0, \gamma^j]$ such that $\tilde{\pi}^j(\gamma') = \tilde{\pi}^j(\gamma'')$, and $r^j(\gamma') = 0$ otherwise. Then, we have the following result:[17]

Proposition 2 *Suppose there is separation of powers and closed rule. With perfect compliance, there exists a unique pure strategy equilibrium $\hat{\lambda}^s$ in G*

[16]The ideal policy of each incumbent is the policy it would choose if it were not constrained by the requirement that its proposal has to be approved by the other policy-maker.

[17]The superscript s stands for equilibrium values under "separation of powers".

such that $d_{t+1}^{L,s} = d_t^{L,s} = 1$, $\gamma_{t+1}^s = \tilde{\gamma}_{t+1}^{E,s} = \gamma^*$,

$$\gamma_t^s = \tilde{\gamma}_t^{E,s} = \begin{cases} \max\left\{\bar{\gamma},\ r^L(\bar{\gamma})\right\} & \text{if } \bar{\gamma} \in \left(r^L(\gamma^u),\, \gamma^u\right), \\ \gamma^u & \text{otherwise,} \end{cases} \tag{19}$$

and $\lambda^V = 1$ *if and only if* $\theta_t^e = g_t/\gamma_t^e \geq \bar{\theta} + \varepsilon_{t-1}$.

Corollary 2 *Except for* $\bar{\gamma} = \gamma^*$, *there is an electoral cycle with the following properties:*

1. *If* $\bar{\gamma} \in \left(r^L(\gamma^u),\, \gamma^u\right)$, *then* $\Delta^* \leq \Delta^s < \Delta^u$;[18]
2. *If* $\bar{\gamma} \in \left[0,\, r^L(\gamma^u)\right] \cup [\gamma^u,\, \tau]$, *then* $\Delta^s = \Delta^u$.

To prove Proposition 2, consider first the post-electoral period $t+1$. Following the argument applied in Proposition 1, it is immediate to note that the incumbents implement their common most-preferred policy γ^*. No agent can be made better off by unilateral deviations.

Going back to the electoral period t, the problem for V is still to estimate the competence of E, $E[\theta_t |\, g_t]$, after having observed g_t. As in the previous section, for the expected equilibrium policy γ_t^e, $\theta_t^e = g_t/\gamma_t^e$. Therefore, μ_{t+1}^E has the same form as (15).

However, γ_t is now determined in a non-trivial bargaining process between the executive and the legislature, instead of being unilaterally set by E. Under the closed rule, E has maximum power in the bargaining game. Therefore, it can be conjectured that L will be nailed to its status quo payoff. Based on this conjecture, the process is solved in the following way. Consider first incumbents' preferences over γ_t. For each $j \in \{E,\, L\}$, let $\tilde{\pi}^j : \Gamma \rightarrow \Re$ denote player j's payoff as a function of γ_t:

$$\tilde{\pi}^j(\gamma_t) = E\left\{v(\gamma_t,\, \theta_t) + \beta\, \left[v(\gamma^*,\, \theta_{t+1}) + \mu_{t+1}^j\, \chi\right] \mid \varepsilon_{t-1}\right\}. \tag{20}$$

It is immediate to see that $\tilde{\pi}^j$ is single-peaked on Γ, with ideal policies $\gamma^L = \gamma^*$ and $\gamma^E = \gamma^u$.[19]

[Insert Figure 1 about here]

[18] $\Delta^s = \Delta^*$ if and only if $\bar{\gamma} = \gamma^*$.

[19] Single-peakedness follows from the strict concavity of $E[v(\gamma_t,\, \theta_t) \mid \varepsilon_{t-1}]$ and $\mu_{t+1}^E(\gamma_t)$. We are considering policy actions that are not constrained by the requirement that they be accepted by the other policy-maker. While L cannot affect its probability of reelection, E takes into account the trade-off between the probability of reelection and the current cyclical distortion.

In order to pass a proposal $\tilde{\gamma}_t^E$, E has to guarantee L at least its reservation payoff $\tilde{\pi}^L(\bar{\gamma})$, to persuade it not to reject $\tilde{\gamma}_t^E$. That is, the executive's proposal has to satisfy the incentive constraint

$$\tilde{\pi}^L(\tilde{\gamma}_t^E) \geq \tilde{\pi}^L(\bar{\gamma}). \tag{21}$$

Therefore, the problem of E at date t is to choose $\tilde{\gamma}_t^E$ in order to maximize $\tilde{\pi}^E(\gamma_t)$ subject to (21) and (15). Looking at Figure 1, it is clear that only two cases are possible. If $\bar{\gamma} \in [0,\, r^L(\gamma^u)] \cup [\gamma^u,\, \tau]$, then (21) is not binding, since $\tilde{\pi}^L(\gamma^u) > \tilde{\pi}^L(\bar{\gamma})$ for all $\bar{\gamma} \neq \gamma^u$. That is, the reversion outcome is too low or too high, so that L is unable to affect the equilibrium budgetary policy $\tilde{\gamma}_t^s$, by triggering E to refuse its proposal. V anticipates this and expects E will obtain in equilibrium authorized expenditures $\tilde{\gamma}_t^s = \gamma^u$. Therefore, the same reasoning of Section 3.2 applies.

On the other hand, if $\bar{\gamma} \in (r^L(\gamma^u),\, \gamma^u)$, then $\tilde{\gamma}_t^s$ will be above γ^*, but below γ^u (except, of course, in case when $\bar{\gamma} = \gamma^*$). Concretely, since L would reject any other proposal that violates (21), E ties L to its status quo payoff by proposing $\tilde{\gamma}_t^E = \max\{\bar{\gamma},\, r^L(\bar{\gamma})\}$. It will never offer more than that, since this proposal makes L indifferent between either accepting it or rejecting it and getting the default payoff. That is, L could not be strictly better off by rejection. Hence, $d_t^L = 1$.

In both cases, a Nash equilibrium implies the optimal solution of E coincides with V's expected equilibrium policy (expectations are rational). Finally, notice that $\tilde{\gamma}_t^E$ will be lower, the closer $\bar{\gamma}$ is to γ^*. In effect, $\frac{\partial \tilde{\gamma}_t^E}{\partial \bar{\gamma}} \geq 0$ for all $\bar{\gamma} \geq \gamma^*$ and $\frac{\partial \tilde{\gamma}_t^E}{\partial \bar{\gamma}} < 0$ for $\bar{\gamma} < \gamma^*$.

In words, Proposition 2 says that separation of powers moderates electoral cycles for intermediate reversion levels (i.e., for $\bar{\gamma} \in (r^L(\gamma^u),\, \gamma^u)$), but not for extreme levels, where cycles are just like under unification of powers.

Open rule: Suppose now the legislature can introduce any amendment into the executive's proposal, but the executive has veto power over it. Under this institutional structure, the role of each incumbent is in fact reversed. That is, L becomes the actual agenda-setter, while E reduces to a veto player. The main result is the following:

Proposition 3 *Suppose there is separation of powers and open rule. With perfect compliance, there exists a unique pure strategy equilibrium $\hat{\lambda}^s$ in G such that $d_{t+1}^{L,s} = d_t^{L,s} = 1$, $\gamma_{t+1}^s = \tilde{\gamma}_{t+1}^{E,s} = \gamma^*$,*

$$\gamma_t^s = \tilde{\gamma}_t^{E,s} = \begin{cases} \min\left\{\bar{\gamma},\ r^E(\bar{\gamma})\right\} & \textit{if } \bar{\gamma} \in (\,\gamma^*,\, r^E(\gamma^*)\,), \\ \gamma^* & \textit{otherwise,} \end{cases} \tag{22}$$

and $\lambda^V = 1$ *if and only if* $\theta_t^e = g_t/\gamma_t^u \geq \bar{\theta}$.

Corollary 3 *Except for* $\bar{\gamma} = \gamma_t^u$*, the electoral cycle is dampened or eliminated by separation of powers:*

1. *If* $\bar{\gamma} \in \Big[0,\, \gamma^*\Big] \cup \Big[r^E(\gamma^*),\, \tau\Big]$*, then* $\Delta^s = \Delta^*$*;*

2. *If* $\bar{\gamma} \in (\gamma^*,\, r^E(\gamma^*))$*, then* $\Delta^* < \Delta^s \leq \Delta^u$*.*[20]

To derive Proposition 3, the analysis is similar to Proposition 2. The equilibrium at the post-electoral period $t+1$ and the optimal response of V to the observation of g_t are exactly the same.

With respect to the bargaining process carried out in period t, the only difference is who has the effective power to make final offers. Here the actual agenda-setter is the legislative leader, instead of the executive incumbent. It will be clear below that this reduces considerably the electoral distortion on γ_t, compared with a closed rule, since it curtails E's power over the budget composition.

For $\bar{\gamma} \in [0,\, \gamma^*] \cup [r^E(\gamma^*),\, \tau]$, the legislature's leader would amend any executive proposal $\tilde{\gamma}_t^E \neq \gamma^*$ by setting $\tilde{\gamma}_t^L = \gamma^*$. This amendment satisfies the incentive constraint $\tilde{\pi}^E(\tilde{\gamma}_t^L) \geq \tilde{\pi}^E(\bar{\gamma})$ (see Figure 1). Therefore, it cannot be vetoed by E. Understanding this, E weakly prefers to make such an offer rather than to propose a different spending level and lose approval in the legislature.

A similar reasoning can be made if $\bar{\gamma} \in (\gamma^*,\, r^E(\gamma^*))$. However, in this case γ^* does not satisfy the incentive constraint of E. That is, $\tilde{\pi}^E(\gamma^*) < \tilde{\pi}^E(\bar{\gamma})$. Therefore, L cannot achieve its ideal policy γ^*. Nevertheless, following the logic of the agenda setter, L restricts player E to its reservation utility, by amending any proposal $\tilde{\gamma}_t^E \neq \min \left\{\bar{\gamma},\ r^E(\bar{\gamma})\right\}$. Hence, this policy is proposed in equilibrium and $\Delta^* < \Delta^s \leq \Delta^u$, being $\Delta^s = \Delta^u$ only if $\bar{\gamma} = \gamma^u$.

In words, Proposition 3 says that, when there exists open rule, separation of powers completely eliminates the electoral cycles on γ_t for low and high reversion levels. On the contrary, for intermediate values of $\bar{\gamma}$, the electoral cycle in public consumption expenditures cannot be eliminated, but its magnitude is reduced.

Notice that for low and high values of $\bar{\gamma}$, the results with and without amendments are exactly the opposite. While the former provides the first best allocation, the second supplies the same predictions as unification of powers. The explanation for this is based on who is the actual veto player

[20] $\Delta^s = \Delta^u$ if and only if $\bar{\gamma} = \gamma_t^u$.

in each case, and by the fact that the veto player has greatest power when the reversion policy is very near its most-preferred policy.

Figure 2 illustrates Proposition 2 and 3 for different status quo. In the case of closed rule, $\tilde{\gamma}_t^s$ starts at γ^u, for $\bar{\gamma} = 0$, then it eventually starts falling, reaching γ^* as $\bar{\gamma}$ approaches γ^*, and then it starts rising again to γ^u. The graph has the inverse shape in the case of open rule, starting at γ^*, then rising towards γ^u, and reaching it when $\bar{\gamma} = \gamma^u$, before starting to fall again. This behavior of $\tilde{\gamma}_t^s$ explains the opposite results obtained under closed and open rule.

[Insert Figure 2 about here]

Propositions 2 and 3 imply that, regardless of the initial status quo $\bar{\gamma}$, policy in electoral periods $\tilde{\gamma}_t \in [\gamma^*, \gamma^u]$, the Pareto set, while in non-electoral periods $\tilde{\gamma}_t = \gamma^*$.[21] The only difference in the density functions during electoral periods is at the boundaries: in Proposition 2, γ^u will be a mass point because E is the agenda setter, while in Proposition 3 γ^* will be a mass point because L is the agenda setter.

4.2 Imperfect compliance

We analyze in this Subsection the general case $\delta \in [0, 1]$, allowing for the existence of either imperfect oversight, or enforcement of the budget law, or both. This captures the situation where the policy approved through the budgetary process is not necessarily the policy implemented by the executive.

Closed rule: Imperfect compliance at the implementation stage makes actual electoral expenditures γ_t^s greater than approved ones $\tilde{\gamma}_t^s$. The legislature takes this into account in the budget process, so this breaks the indifference of L in Proposition 2 between $r^L(\bar{\gamma})$ and $\bar{\gamma}$.

Proposition 4 *Suppose there is separation of powers and closed rule. There exists a unique pure strategy equilibrium $\hat{\lambda}^s$ in G such that $d_{t+1}^{L,s} = d_t^{L,s} = 1$, $\gamma_{t+1}^s = \tilde{\gamma}_{t+1}^{E,s} = \gamma^*$,*

$$\tilde{\gamma}_t^{E,s} = \begin{cases} \bar{\gamma} & \text{if } \bar{\gamma} \in \left(r^L(\gamma^u),\, \gamma^u\right), \\ \gamma^u & \text{otherwise,} \end{cases} \tag{23}$$

$$\gamma_t^s = \min\left\{\gamma^u,\ \tau - \delta[\tau - \tilde{\gamma}_t^s]\right\}, \tag{24}$$

[21] The Pareto set or bargaining set consists of those policies that cannot be altered without making at least one of the players worse off.

and $\lambda^V = 1$ *if and only if* $\theta_t^e = g_t/\gamma_t^e \geq \bar{\theta}$.[22]

Let $\delta^{crit}(\bar{\gamma}) \equiv \frac{\tau-\gamma^u}{\tau-\tilde{\gamma}^s(\bar{\gamma})}$ be the critical level of compliance that makes the first term of the right hand side of (24) equal to the second.

Corollary 4 *Electoral cycles depend on the status quo and the degree of compliance:*

1. *If* $\delta > \delta^{crit}(\bar{\gamma})$ *and* $\bar{\gamma} \in \left(r^L(\gamma^u),\, \gamma^u\right)$, *then* $\Delta^s(\bar{\gamma},\, \delta) < \Delta^u$;
2. *If either* $\delta \leq \delta^{crit}(\bar{\gamma})$ *or* $\bar{\gamma} \in \left[0,\, r^L(\gamma^u)\right] \cup [\gamma^u,\, \tau]$, *then* $\Delta^s(\bar{\gamma},\, \delta) = \Delta^u$;
3. *Given* $\bar{\gamma} \in [0,\, \tau]$, $\Delta^s(\bar{\gamma},\, \delta)$ *is non-increasing in* $\delta \in [0,\, 1)$.

Looking at (24), if $\delta = 1$, then $\gamma_t^s = \tilde{\gamma}_t^s$. As δ falls, it is clear that γ_t^s approaches γ_t^u, reaching γ_t^u at the critical value $\delta^{crit}(\bar{\gamma})$, and staying there for lower values of δ.

The legislature foresees that the executive will try to divert budgetary resources at the implementation stage. If $\delta > \delta^{crit}(\bar{\gamma})$ and $\bar{\gamma} < r^L(\bar{\gamma})$, for $\bar{\gamma} \in \left(r^L(\gamma^u),\, \gamma^u\right)$, L will no longer be indifferent between $\bar{\gamma}$ and $r^L(\bar{\gamma})$, since it knows that at the implementation stage E will reallocate a part $1-\delta$ of any approved budget to visible expenditure. L will prefer to restrict E to the lower level $\bar{\gamma}$ of spending on visible goods. Note that spending will always be below the case of unification of powers, i.e., $\gamma_t^s < \gamma_t^u$.

Figure 3 below shows the shape of γ_t^s as a function of δ:

[Insert Figure 3 about here]

For a status quo $\bar{\gamma} \in (r^L(\gamma^u),\, \gamma^u)$, Figures 3a and 3b show that γ_t^s coincides with E's ideal policy for $\delta \leq \delta^{crit}(\bar{\gamma})$. For $\delta > \delta^{crit}(\bar{\gamma})$, γ_t^s decreases monotonically as δ rises, reaching $\tilde{\gamma}_t^s$ when $\delta = 1$.[23] It is important to stress that within this range, for $\bar{\gamma} \in (r^L(\gamma^u),\, \gamma^*)$, there can be underspending on visible public goods in election years (Figure 3a). On the other hand, for $\bar{\gamma} \in [0,\, r^L(\gamma^u)] \cup [\gamma^u,\, \tau]$, Figure 3c shows that γ_t^s is completely insensitive to the value of δ.

[22] The proof of Proposition 4 is similar to Proposition 2. The only difference is that in this case V also anticipates the use of discretion at the implementation stage. Therefore, the actual spending on g_t moves closer to γ^u.

[23] Like Proposition 2, for $\delta = 1$, $\Delta^s(\bar{\gamma},\, \delta) = \Delta^*$ only for the non-generic case $\bar{\gamma} = \gamma^*$. For $1 > \delta > \delta^{crit}(\bar{\gamma})$, there is $\bar{\gamma} \in (r^L(\gamma^u),\, \gamma^*)$ such that the effects of both parameters just cancel out, so $\Delta^s(\bar{\gamma},\, \delta) = \Delta^*$ too. This is again non-generic case.

This discussion is formally summarized in Corollary 4. Note that point 3 of Corollary 4 means that, for a given $\bar{\gamma}$, the existence of discretion at the implementation stage reduces the moderating influence of the legislature in electoral periods. This does not mean that imperfect compliance always leads to a larger cyclical distortion than perfect compliance, because at $\delta = 1$ there is a discontinuity in the approved budgets. As compliance falls infinitesimally, for $\bar{\gamma} \in (r^L(\gamma^u), \gamma^*)$, L strictly prefers the status quo $\bar{\gamma}$. The end-result may be a smaller cycle (even optimal policy) compared to perfect compliance.

Open rule: As to the case of open rule, we have the following:

Proposition 5 *Suppose there is separation of powers and open rule. There exists a unique pure strategy equilibrium $\hat{\lambda}^s$ in G such that $d_{t+1}^{L,s} = d_t^{L,s} = 1$, $\gamma_{t+1}^s = \tilde{\gamma}_{t+1}^{E,s} = \gamma^*$,*

$$\tilde{\gamma}_t^{E,s} = \begin{cases} \min\left\{\bar{\gamma},\ r^E(\bar{\gamma})\right\} & \text{if } \bar{\gamma} \in (\,\widehat{\gamma},\, r^E(\widehat{\gamma})\,), \\ \widehat{\gamma} & \text{otherwise,} \end{cases} \tag{25}$$

$$\text{where } \widehat{\gamma} = \max\left\{0,\ \frac{\gamma^* - (1-\delta)\tau}{\delta}\right\}, \tag{26}$$

$$\gamma_t^s = \min\left\{\gamma_t^u,\ \tau - \delta[\tau - \tilde{\gamma}_t^s]\right\}, \tag{27}$$

and $\lambda^V = 1$ if and only if $\theta_t^e = g_t/\gamma_t^u \geq \bar{\theta}$.

Corollary 5 *Electoral cycles depend on the status quo and the degree of compliance:*

1. *If either $\delta > 1-\alpha$ and $\bar{\gamma} \in \left[0,\, \widehat{\gamma}\right] \cup \left[r^E(\widehat{\gamma}),\, \tau\right]$, or $\delta = 1-\alpha$ and $\bar{\gamma} \in \{0,\, \tau\}$, then $\Delta^s(\bar{\gamma},\, \delta) = \Delta^*$;*
2. *If either $\delta < 1-\alpha$ or $\bar{\gamma} \in (\widehat{\gamma},\, r^E(\widehat{\gamma}))$, then $\Delta^* < \Delta^s(\bar{\gamma},\, \delta) \leq \Delta^u$;*
3. *Given $\bar{\gamma} \in [0,\, \tau]$, $\Delta^s(\bar{\gamma},\, \delta)$ is non-increasing in δ.*

To derive Proposition 5, we must take into account that the legislature foresees that the executive will try to divert budgetary resources at the implementation stage. For any level of authorized expenditures $\tilde{\gamma}_t$, the policy implemented will be $\gamma_t = \min\left\{\gamma_t^u,\ \tau - \delta[\tau - \tilde{\gamma}_t^s]\right\}$. That is, E will set γ_t at its most-preferred policy or, if this were not possible, it will use at the implementation the maximum degree of discretion to achieve an alternative as close as possible to γ^u.

For a given value of δ, let $\widehat{\gamma}$ be implicitly defined by the following condition: $\tau - \delta[\tau - \widehat{\gamma}] = \gamma^*$; or set it equal to zero if $\gamma^* < (1-\delta)\,\tau$. That is, let $\widehat{\gamma} = \max\left\{0,\ \frac{\gamma^* - (1-\delta)\tau}{\delta}\right\}$. It is clear that $\widehat{\gamma} > 0$ if and only if $\delta > 1-\alpha$, and $\widehat{\gamma} = 0$ when $\delta \leq 1-\alpha$.

For $\delta > 1-\alpha$ and $\bar{\gamma} \in [0,\ \widehat{\gamma}] \cup [r^E(\widehat{\gamma}),\ \tau]$, the legislative leader would amend any executive proposal $\tilde{\gamma}^E_t \neq \widehat{\gamma}$ by setting $\tilde{\gamma}^L_t = \widehat{\gamma}$. As in Proposition 3, this amendment satisfies the incentive constraint $\tilde{\pi}^E(\tilde{\gamma}^L_t) \geq \tilde{\pi}^E(\bar{\gamma})$ (see Figure 1). By definition, $\widehat{\gamma}$ ensures the legislature its ideal policy γ^* is realized. The same happens if $\delta = 1-\alpha$ and $\bar{\gamma} \in \{0,\ \tau\}$.

On the other hand, if either $\delta < 1-\alpha$, or $\delta = 1-\alpha$ and $\bar{\gamma} \in (0,\ \tau)$, there is a corner solution with $\widehat{\gamma} = 0$. In this case, $\widehat{\gamma}$ does not satisfy the incentive constraint of E. That is, $\tilde{\pi}^E(\widehat{\gamma}) < \tilde{\pi}^E(\bar{\gamma})$. L can amend any proposal $\tilde{\gamma}^E_t \neq \min\left\{\bar{\gamma},\ r^E(\bar{\gamma})\right\}$; since in the implementation stage E can spend more than what was authorized, L will strictly prefer to propose the minimum (E will accept minimum, since it ends up closer to its own ideal point). Therefore, for any level of authorized expenditures $\tilde{\gamma}^s_t$, it follows that $\gamma^s_t > \gamma^*$. Furthermore, there is critical value of compliance $\delta^{crit} = (\tau - \gamma^u_t)/\tau$ that makes the first term of the right hand side of (27) equal to the second. If $\delta \leq \delta^{crit}$, $\gamma^s_t = \gamma^u$ so $\Delta^s(\bar{\gamma},\ \delta) = \Delta^u$. Therefore, $\Delta^* < \Delta^s(\bar{\gamma},\ \delta) \leq \Delta^u$.

Finally, for $\bar{\gamma} \in (\widehat{\gamma},\ r^E(\widehat{\gamma}))$, $\tilde{\gamma}^E_t = \min\left\{\bar{\gamma},\ r^E(\bar{\gamma})\right\}$ by arguments in previous paragraph. Furthermore, $\gamma^s_t = \gamma^u_t$ only if either $\delta \leq (\tau - \gamma^u_t)/\tau$ or $\bar{\gamma} = \gamma^u$. By analysis above, in the generic case γ^s_t increases as δ falls.

By the results in Proposition 5, one can depict the shape of γ^s_t as a function of δ, for three different subsets of domain of $\bar{\gamma}$:[24]

[Insert Figure 4 about here]

Figure 4.a shows that in interval $[0, \gamma^*]$, there is no distortion in optimal policy once $\delta \geq \frac{\tau - \gamma^*}{\tau - \bar{\gamma}}$. This requires $\delta \geq 1-\alpha$ for $\bar{\gamma} = 0$, and $\delta = 1$ for $\bar{\gamma} = \gamma^*$. Similar arguments apply to $\bar{\gamma}$ in interval $[r^E(\gamma^*), \tau]$, replacing $\bar{\gamma}$ by inverse of $r^E(\bar{\gamma})$: need $\delta \geq \frac{\tau - \gamma^*}{\tau - {r^E}^{-1}(\bar{\gamma})}$ (Figure 4.b). Finally, for $\bar{\gamma} \in (\gamma^*, r^E(\gamma^*))$, spending is always above optimal value (Figure 4.c). Comparing Propositions 3 and 5, one can see that the moderating force of separation of powers, when there exists agenda-setting authority and open rule, decreases if the executive enjoys more lee-way at the implementation stage (cf. Corollaries 3.1 and 5.1).

[24] To derive these three different subsets, for a given value $\bar{\gamma}$ one can plot in the space $\Gamma \times [0, 1]$ the minimum value of δ such that $\widehat{\gamma}$ allows to attain γ^*, and the minimum value of δ such that $r^E(\widehat{\gamma})$ allows to attain γ^*.

4.3 Rationally uninformed voters

In the model, voters are treated symmetrically in relation to institutional players E and L. They solve the game using information on the rules of the game, as well as the motivations of the institutional players. Though there is asymmetric information on actual budget expenditure, voters can infer this perfectly in equilibrium since the solution concept is a (refinement of a) Nash equilibrium. To this setup, voters add their own observation of the actual realization g_t, which allows them to perfectly infer competency (there is no noise in the model).

Our setup implies that voters know the two parameters of the budget process, $\bar{\gamma}$ and δ. What happens if, initially, voters do not know these parameters, starting out with a randomly given prior? In non-electoral periods, this does not matter because policy is always optimal. In electoral periods, the realization of g_t will allow voters to infer the budget outcome γ_t. Hence, in the game analyzed above, voters will be able to correctly predict expenditure in electoral periods, after guessing (and possibly making a mistake) in the first try.

Alternatively, one can think of games where voters are treated as amateurs, in contrast to E and L who are pros whose livelihood depends on politics. Indeed, since Downs (1957) it is clear that for rational voters it does not make sense to solve a complicated game to decide their vote if it is costly to decide how to vote optimally, because the change in an individual vote does not affect electoral outcomes. What happens instead if, for example, voters only use past fiscal history in electoral periods to predict competency? Well, in our stationary environment, given any randomly chosen initial γ_1^e, after the first electoral period they will be able to predict γ_t correctly using the simple adaptive rule $\gamma_t^e = \gamma_{t-2}$ (i.e., adaptive expectations are rational in this environment). Hence, the assumption that voters solve a complicated game is not required for them not to be surprised by electoral cycles. In a stationary environment, voters will converge to the same outcome as when they behave as sophisticated game players who take into account the whole budget process to reach their decisions.

5 Endogenous status quo

This Section analyzes what happens when the assumption of an exogenous reversion policy is replaced by the previous period's budget. We choose this particular budget rule because it is used in many countries, perhaps because it acts as a focal point in case of disagreement. We will show, in our stationary environment, that when there is perfect compliance this rule is also optimal. Then we will present the general case with imperfect compliance.

5.0.1 Perfect compliance

Suppose that the status quo is now given by authorized expenditures on public goods in the previous year. That is, while $\overline{\gamma}_0$ is randomly chosen from Γ, let $\bar{\gamma}_t = \tilde{\gamma}_{t-1}$ for all $t \in T$, $t \neq 0$. The novelty is that this budget rule introduces a new restriction under perfect compliance, due to the fact that policy in t sets the status quo for $t+1$:

$$\bar{\gamma}_{t+1} = \gamma_t \tag{28}$$

Given this path-dependency, we can no longer decompose the complete game into a sequence of independent two-period games.

Before considering the implication of this budget rule, let us consider a simpler problem. Suppose there is an unconstrained executive E that must formulate optimal plans in the initial non-electoral period $t = 0$. The objective function can be expressed as follows:

$$\underset{\{\gamma_0, \gamma_1, \gamma_2, \cdots\}}{Max} \quad V_0 = E\left(\sum_{i=0}^{\infty} \beta^{2i} v(\gamma_{2i},\, \theta_{2i}) + \sum_{i=1}^{\infty} \beta^{2i-1}\left[v(\gamma_{2i-1},\, \theta_{2i-1}) + \beta \mu_{2i}^{I}(\gamma_{2i-1})\ \chi\right]\right) \tag{29}$$

Viewed at $t = 0$, when the government sets policy in advance, the probabilities of reelection $\mu_t^I(\gamma_t)$ are exogenous and equal to $1/2$ in expected value because voters will take γ_t as a given in electoral periods. Therefore, the government's best policy is to plan to pick $\gamma_t = \gamma_t^*$ that is socially optimal every period, which maximizes social welfare.

The problem with this optimal plan, of course, is that it is not time-consistent: when an electoral period arrives, the government has an incentive to deviate expenditure towards visible items. This credibility problem underlies Proposition 1.

What happens if the status quo is no longer exogenous, as in Proposition 1? Instead, it is set endogenously according to rule (28). Well, this effectively curbs the credibility problem: if the government applies optimal policy in period $t = 0$, it acts as a commitment to follow this same policy in all future periods. However, it does not make sense to assume that the executive is constrained to follow any rule, unless it has to share the power to change rules with another body. Otherwise, if the executive is also vested with legislative power, it can do and undo any rule it likes, being effectively unconstrained. The natural environment where the executive shares rule-making power is when there is separation of powers, and an agreement has to be reached with the legislature on changes in the budget.

Under separation of powers, if $\gamma_0 = \gamma_0^*$, then $\gamma_t = \gamma_t^*$ for all $t > 0$. We detail the argument under closed rule, but the argument for open rule is similar. The key fact about rule (28) is that the incumbent will not be able to spend more on visible public goods in electoral years because of the restrictions that L imposes on E. Consider for example $t = 1$. L will veto any policy to raise γ_1 above γ_0, if $\gamma_0 \in [\gamma^*, \gamma^u]$, because such a change would lead L to utility lower than at γ_0 in electoral period $t = 1$, pushing it further away from its ideal point γ^* (that move would also push policy away from optimal policy in all future electoral periods). The same argument can be replicated for all future electoral periods, which in our environment are identical to the problem in period 1.

This specific endogenous budget rule acts as a commitment device. The incumbent can no longer affect its chances of reelection through the manipulation of fiscal policy, so this effectively checks cycles. Introducing the superindex h to stand for "history-dependent budget", we have that

Proposition 6 *Suppose there is separation of powers and the status quo is the previous periods' budget. With perfect compliance, there exists a unique pure strategy equilibrium $\hat{\lambda}^h$ such that, for $t \in T$, $d_t^{L,h} = 1$, $\gamma_t^h = \tilde{\gamma}_t^{E,h} = \gamma^*$ and, for $t \in T_1$, $\lambda_t^V = 1$ if and only if $\theta_t^e = g_t/\gamma_t^e \geq \bar{\theta} + \varepsilon_{t-1}$.*

Corollary 6 *There is no electoral cycle.*

Our results can be related to the criticisms that, among others, Shepsle and Bonchek (2000) make of zero-budget rules, which they consider detrimental because they give the agenda-setter huge power. In fact, when E is the agenda setter, $\bar{\gamma} = 0$ allows E to impose $\gamma_t = \gamma^u$, eliminating all the moderating influence of checks and balances on PBC. Our model not only makes the point that the historical budget rule is better than a zero-budget rule: in a stationary environment, the historical budget rule eliminates cycles, allowing the optimal policy to be implemented every period.

5.0.2 Imperfect compliance

With imperfect compliance, the analysis of the budget process has to take into account δ, the degree of compliance with the budget law. Under open rule, E can propose the budget $\tilde{\gamma}_t^{E,h} = \frac{\gamma^* - (1-\delta)\tau}{\delta}$ in period $t = 0$. If this solution is possible (i.e., if $\tilde{\gamma}_t^{E,h}$ is non-negative), this will lead E to implement the optimal budget that period, and also in all subsequent periods. Of course, L would accept. Under closed rule, E would make that same proposal (otherwise, L would make that counter-proposal, which E would end up accepting). In other words, as with perfect compliance, the identity of the agenda setter does not matter from the viewpoint of our credibility problem with a historical budget rule. Therefore, it is possible to eliminate cycles under this setup. That is, unless we hit a corner solution.

If there is a corner solution, it will not be possible to avoid cycles. This is obviously the case when $\delta = 0$. More generally, there are PBC for $\delta < \frac{\tau - \gamma^*}{\tau} = 1 - \alpha$. More precisely,

Proposition 7 *Suppose there is separation of powers and the status quo is the previous periods' budget. There exists a unique pure strategy equilibrium* $\hat{\lambda}^h$ *such that, (i) for* $t \in T$, $d_t^{L,h} = 1$, $\tilde{\gamma}_t^{E,h} = \max\left\{0, \frac{\gamma^* - (1-\delta)\tau}{\delta}\right\}$,
(ii) for $t \in T_2$, $\gamma_t^h = \gamma^*$,
(iii) and for $t \in T_1$, $\gamma_t^h = \min\left\{\gamma_t^u,\ \tau - \delta[\tau - \tilde{\gamma}_t^s]\right\}$, *and* $\lambda_t^V = 1$ *if and only if* $\theta_t^e = g_t/\gamma_t^e \geq \bar{\theta} + \varepsilon_{t-1}$.

Corollary 7 *Electoral cycles depend on the degree of compliance:*

1. *If* $\delta \geq 1 - \alpha$ *, then* $\Delta^h(\delta) = \Delta^*$*;*
2. *If* $\delta < 1 - \alpha$*, then* $\Delta^* < \Delta^h(\delta) \leq \Delta^u$*;*
3. $\Delta^h(\delta)$ *is non-increasing in* δ*.*

The results are a simplified version of Proposition 5, where the legislature was the agenda setter, due to the fact that the initial status quo does not matter because the budget rule makes outcomes gravitate towards optimal policy. The results in Proposition 7 are pretty intuitive, because it is clear that institutions do not work as a commitment device if the degree of compliance is low.

This proposition implies a sharp (and falsifiable) prediction: if the status quo is not exogenous, but is given instead by the previous budget, then PBC should be present in countries with imperfect compliance with the law. This can be empirically related to the evidence on the existence of stronger cycles in developing countries, where there is typically less compliance with the rule of law than in developed countries (Lema, Saporiti and Streb 2004 study these empirical implications).

6 Discussion

In this paper we analyze a model of PBC with asymmetric information on the actual budget allocation. Under the standard assumption of unification of powers, the model predicts optimal policy during off-electoral periods, but not just ahead of the elections. Policy distortions in the composition of government spending occur just before elections because the incumbent's incentive to appear competent during these periods induces overspending on the public consumption good (the more visible good), simultaneously reducing spending on the public capital good below the socially optimal level.

The fact that the executive incumbent is unable to credible compromise to the optimal allocation policy is at the heart of these electoral distortions. Furthermore, it turns out that this problem is in fact generated by concentration of powers, which allows the executive to choose any policy it desires. Instead, when there exists separation of powers, appropriate checks and balances work as a commitment device that reduces the size of electoral fiscal cycles, making all players better off (including the executive incumbent). With an exogenous status quo, this moderating force depends on the details of the bargaining game, namely the exact status quo location, the actual agenda-setting authority and the degree of compliance with the budget law. With an endogenous status quo given by the previous period's budget, the predictions are a lot simpler: separation of powers eliminates PBC, unless there is a low degree of compliance with the approved budget.

More generally, in relation to the debate on rules versus discretion, our discussion of PBC shows that a way to solve the credibility problem, making the budget rule a credible commitment, is to introduce an institutional arrangement of separation of powers that limits the discretion to change rules. Even though we do not consider signaling models of PBC à la Rogoff, it should be expected that separation of powers affect electoral fiscal cycles in a similar way. The legislature basically tries to avoid distortions in the allocation of budget resources. This should reduce the electoral distortions of fiscal policy, preserving the signaling role of the provision of public goods.[25]

[25] Notice that in models of PBC à la Rogoff, the timing of events is reversed in relation to Lohmann. That is, the incumbent observes its competence before choosing the per-period policy, not afterwards. However, the informativeness of the signal is not larger in equilibrium, since there is a separating equilibrium with both types of models. Besides, the Rogoff timing brings in an extra complication. The signal depends on the incumbent's type, something that is not required to explain the policy bias in electoral periods. Moreover, it has the unappealing implication that competent incumbents distort the most, while the utterly incompetent incumbents do not (Streb 2003 shows how heterogeneity in opportunism can overcome this feature).

Our results are derived in a stationary environment where the optimal allocation of the budget is constant over time. In a stochastic environment, one can conjecture that the budget rule we analyze may still be optimal if shocks to the desired budget allocation follow a random walk. What may change the results more fundamentally is lifting the assumption that the legislature has no electoral stakes. In this regard, our case is the best scenario where the legislature controls the executive to try to assure the socially optimal policy is followed.

¿From an empirical viewpoint, the analysis carried out in this paper may be useful to understand why political fiscal cycles tend to be more pronounced in developing countries (Shi and Svensson 2002 a, 2002b, and Persson and Tabellini 2002) and in new democracies (Brender and Drazen 2003). While not focusing on separation of powers and budget institutions, recent empirical evidence has shown that many aspects of the political system have a significant impact over fiscal cycles.[26] Closely related to our present approach, Schuknecht (1996) suggests that there should be more room for fiscal manipulation in developing countries because checks and balances are usually weaker in those countries. This last connection between the political process and PBC is precisely the one that we formally explore in this work.[27]

Our model might be extended to study the role of divided government in presidential systems, as well as coalition governments in parliamentary systems. For instance, Alesina and Rosenthal (1995) show how divided government is a tool to moderate the executive in a presidential system. A similar logic may apply in an opportunistic framework, where an opposition legislature may play a special role in moderating cycles. Finally, our model of PBC under separation of powers could also be employed to understand how the incumbent chooses among different fiscal instruments or why it uses some of them more frequently in some countries than in others.[28] Even though fis-

[26]The factors that have been stressed are electoral rules, forms of government, level of democracy, degree of electoral competitiveness, information and transparency, and voters' previous experience with electoral politics. See in particular Gonzalez (2000, 2002), Shi and Svensson (2002a, 2002b), Persson and Tabellini (2002, 2003) and Brender and Drazen (2003).

[27]Lema, Saporiti and Streb (2004) empirically explore how checks and balances affect PBC in the budget deficit, using the degree of compliance with the law as a measure of effective checks and balances. They find that the degree of compliance with the law (using data on rule of law and on law and order from the ICRG) is indeed a significative factor that moderates PBC.

[28]For instance, tax cuts before elections seems to be more frequent in OECD countries, while changes of the expenditure composition and budget deficits are usually observed in Latin American countries. For more on that, see for example Block (2002), Persson and Tabellini (2002) and Shi and Svensson (2002a, 2002b).

cal policy includes several items, like taxes, expenditure and debt, there is no general model of rational PBC that explains how politicians choose between these instruments. Following the logic of our model, it should be expected that institutional details play an important role in the selection. This is because the executive should manipulate those fiscal instruments where it has greater agenda-setting authority. It is left for a future research to formally explore this conjecture, as well as its empirical validity.

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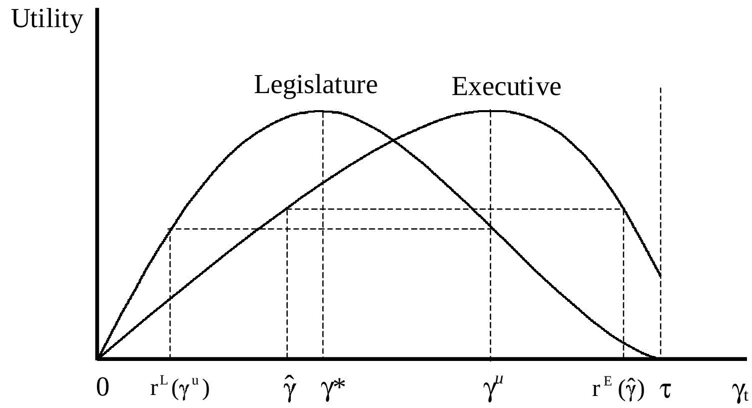
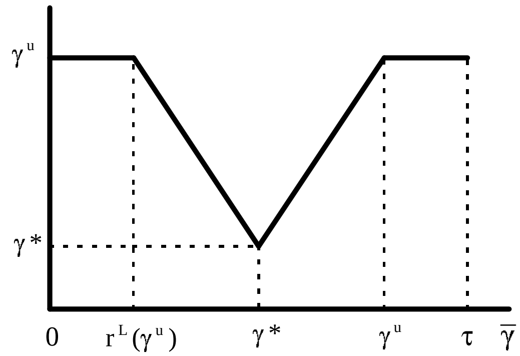
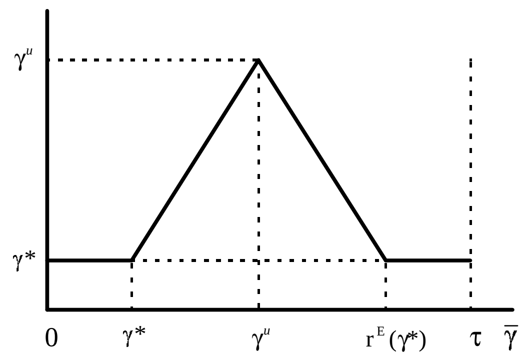


Figure 1: Incumbents' Preferences over γ_t

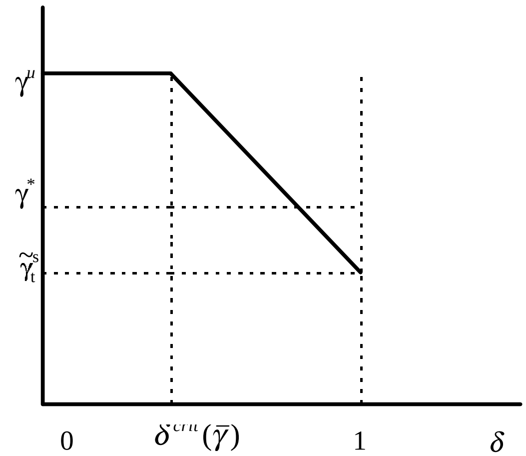


(a) Closed rule

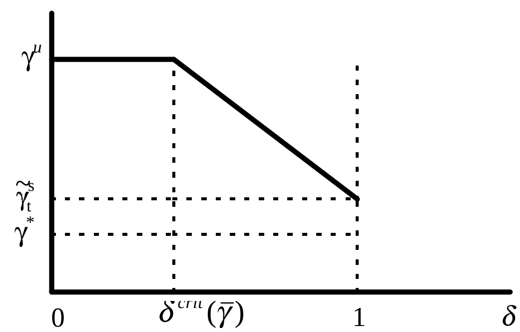


(b) Open rule

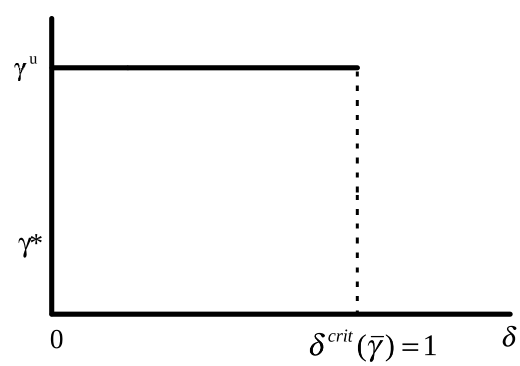
Figure 2: Authorized Expenditures



(a) $\bar{\gamma} \in (r^L(\gamma^u), \gamma^*)$

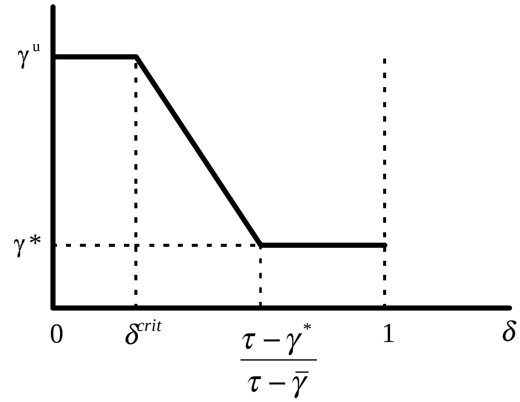


(b) $\bar{\gamma} \in [\gamma^*, \gamma^u)$

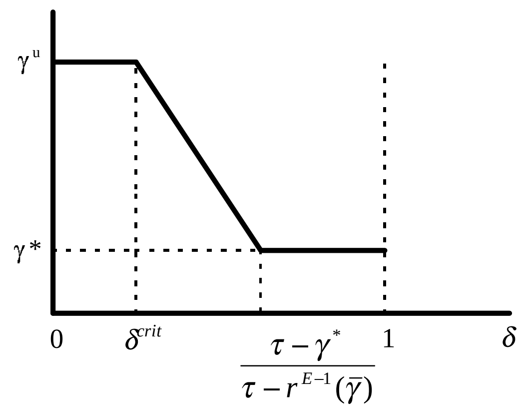


(c) $\bar{\gamma} \in [0, r^L(\gamma^u)] \cup [\gamma^u, \tau]$

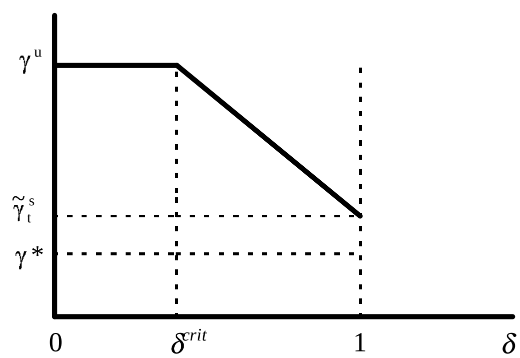
Figure 3: Actual Expenditure under Closed Rule



(a) $\bar{\gamma} \in [0, \gamma^{*}]$



(b) $\bar{\gamma} \in [r^{E}(\gamma^{*}), \tau]$



(c) $\bar{\gamma} \in (\gamma^{*}, r^{E}(\gamma^{*}))$

Figure 4: Actual Expenditure under Open Rule