Signaling in political budget cycles. How far are you willing to go?

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Abstract

Previous results on political cycles as a signal of competency assumed that opportunism was common knowledge. If opportunism is not common knowledge, there may be a partially pooling equilibrium where cycles indicate opportunism rather than competency. Insofar as more discretionality increases the asymmetry of information, the possibility of cycles increases, and elections may become less effective to select competent incumbents.

Key words: rational political budget cycles, two-dimensional asymmetric information, signaling, adverse selection, visibility

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1 Introduction

In the literature on opportunistic political cycles, cycles signal the competency of the incumbent to rational voters (Rogoff 1990, and Lohmann 1998). This paper asks whether it is possible that political budget cycles signal instead opportunism. The key difference is that we remove the implicit assumption that opportunism is common knowledge, so it is not obvious to voters just how far an incumbent is willing to go to get reelected.

Our reason for asymmetric information on opportunism is that opportunism is part of an individual's utility function, so opportunism has to be inferred from the actions of the incumbent, just like competence. The fact that politicians differ in opportunism is recognized by Tufte (1978) in his classic study of political control of the economy. He draws a clear-cut contrast between Ford, who was not willing to take the short view before elections, and Nixon, who was willing to exploit pre-electoral engineering to its utmost. That individuals can differ both in competency and in character is also at the heart of the Akerlof (1970) lemons model. The problem with lemons arises not only because there are different quality cars, but also because there are dishonest sellers who are willing to misstate the quality of a used car.[1] The issue of lemons literally pertains to politics: in a political campaign, voters

[1] Heterogeneity along the dimensions of competency and character is quite widespread. For instance, Covey et al. (1995, pp. 240-1) focus on the importance of competency and character for business organizations (they also give a homely example, that one wants physicians to be competent, to give us the right treatment, and honest, to not prescribe a costly treatment we do not need). These issues are formally addressed in, for example, the literature on corruption (Weinschelbaum, 1998) and governance (Dixit, 2001).

were asked if they would buy a used car from one of the candidates pictured running for office.

This paper develops an extended two-dimensional asymmetric information framework for rational political budget cycles (RPBC), to explore whether opportunistic incumbents may distort economic policy regardless of their degree of competence. A similar framework is used by Stein and Streb (1999) to focus on a different issue, the electoral manipulation of exchange rates. Under two-dimensional asymmetric information, RPBC lead to a partially pooling equilibrium, though there is an intermediate interval where they may also lead to a separating equilibrium. Insofar as asymmetric information on competency increases with the discretion of the executive, institutional reforms that limit discretionality reduce the possibility of cycles, and may make elections more effective to select competent incumbents.

Section 2 focuses on the potential trade-off between visible and less visible budget items. Section 3 considers the equilibria under asymmetric information on opportunism and competency. Section 4 looks at how asymmetric information on competency is related to institutional features. Section 5 presents the conclusions.

2 Economy and Polity

This Section describes the utility functions of voters and politicians, the government budget constraints and the electoral institutions.

2.1 Utility Functions

There are a large number of representative consumers, who are also voters. The economy is reduced to the net provision of public goods. The model follows the Rogoff (1990) distinction between public consumption and investment goods, that gives rise to more and less visible budget items. These budget items can be interpreted as public goods net of taxes. Visible budget items, g_t, are observed by voters contemporaneously, and less visible budget items, γ_{t+1}, are observed with a one-period lag. Section 4 will provide an alternative interpretation of lack of visibility.

Lifetime utility U of the representative individual is separable over time, and within each period it is separable over both goods:

$$U = \sum_{t=0}^{T} \frac{u(g_t, \gamma_{t+1})}{(1+\delta)^t}, \; u(g_t, \gamma_{t+1}) = w(g_t) + \frac{v(\gamma_{t+1})}{1+\delta}, \tag{1}$$

where v,w are strictly concave, $w\prime > 0$,$v\prime > 0$, and $v\prime(\gamma) \to \infty$ as $\gamma \to 0$(to assure an interior solution in what follows).

The incumbent is selected from among the population. An incumbent has preferences similar to voters, except for the satisfaction $K \geq 0$ from being in office, the ego-rent or kick from being the leader. This will be the source of opportunistic behavior. Let $\theta_t = 1$ when the individual is incumbent, and 0 when not. Z gives the incumbent's lifetime utility:

$$Z = U + \sum_{t=0}^{T} \frac{\theta_t K}{(1+\delta)^t} \tag{2}$$

We explore the consequences of opportunism being a random variable $\widetilde{K}$. We work with polar types. The incumbent can either be non-opportunistic, with realization $K = 0$, or opportunistic, with realization $K = \overline{K} > 0$, where $\overline{K}$ will be characterized in Section 3. The priors are that with probability $s > 0$ the incumbent is opportunistic, and with probability $1 - s > 0$ it is non-opportunistic. A non-opportunistic incumbent behaves as a benevolent social planner, while an opportunistic incumbent is willing to distort policy on behalf of its personal interests. The distance between both types, $d \equiv \overline{K} - 0 = \overline{K}$, determines the degree of heterogeneity. That opportunism may be large is a classic since the ideas that the driving force of politicians is to win elections (Schumpeter, 1942; Downs, 1957). What is less usual is that some incumbents may be non-opportunistic. Asymmetric information on opportunism springs naturally from the fact that K characterizes subjective preferences, so actions are needed to reveal preferences.

2.2 Budget Constraints

The government is subject to the following per-period budget constraint, where ε_t denotes competency:

$$g_t + \gamma_{t+1} = \varepsilon_t \tag{3}$$

A more competent government can provide more of both g_t and γ_{t+1}. For a given ε_t, a trade-off between g_t and γ_{t+1} exists: larger expenditures on visible public goods, and lower visible taxes, can be achieved at the cost of hikes in taxes, and reduction in expenditures, that only become visible after elections. This trade-off reflects budget cycles around elections, by which a larger pre-electoral budget deficit requires a larger post-electoral surplus.

Competency follows an MA(1) process, as in Rogoff and Sibert (1988), according to the realizations of current and lagged competency shocks:

$$\varepsilon_t = \varepsilon + \alpha_t + \alpha_{t-1} \tag{4}$$

The priors voters have about random variable $\widetilde{\alpha}_t$ are that with probability $r > 0$ the shock is positive ($\alpha_t = \alpha$, competent), and with probability $1-r > 0$ the shock is negative ($\alpha_t = -\alpha$, incompetent). Competency shocks $\widetilde{\alpha}_t$ are assumed to be independently distributed from the kick $\widetilde{K}$, though the only essential requirement is that both shocks not be perfectly correlated.

2.3 Voting Behavior

Let the total utility of a voter i be given by $U_t + q_{t,i}$, where $q_{t,i}$ is the personal appeal of a candidate to voter i. We assume $q_{t,i}$ is the realization of a random shock $\widetilde{q}_{t,i}$, the sum of a common component and an idiosyncratic component which are both white noise.

In regard to the institutional setup, we assume an incumbent's term in office lasts two periods. Furthermore, we will restrict the analysis in this paper to the case where the incumbent has a two-term limit, as in present US constitutional practice, so an incumbent can at most be reelected once (this allows to abstract from reputational consequences of opportunistic behavior).

3 Rational Political Budget Cycles

This Section develops a benchmark model that reproduces the basic Rogoff (1990) results, before removing the assumption that opportunism is common knowledge. The timing of the game each period is as follows. The incumbent observes the competency shock ε_t before it decides γ_{t+1} and g_t. Visible g_t is then observed by all individuals. The incumbent's decision problem is decomposable into on- and off-election periods. In off-election periods, budget decisions are not affected by electoral considerations.

3.1 Off-election Periods

Consider an off-election period t. The current competency shock only affects performance before elections, so this information is not relevant for the decisions of forward-looking voters. Since the kick from being in office is not at stake, an incumbent will pick g_t to maximize (1), subject to budget constraint (3). The FOC is

$$w\prime(g_t) = \frac{v\prime(\gamma_{t+1})}{1+\delta} \tag{5}$$

This condition determines optimal $g_t^*(\alpha_{t-1}, \alpha_t)$ and $\gamma_{t+1}^*(\alpha_{t-1}, \alpha_t)$. More competent incumbents deliver more visible and invisible public goods, and charge lower visible and invisible taxes. Indirect utility in off-election periods, $u_t^*(\alpha_{t-1}, \alpha_t) \equiv u(g_t^*(\alpha_{t-1}, \alpha_t), \gamma_{t+1}^*(\alpha_{t-1}, \alpha_t))$, is higher with competent incumbents ($\alpha_t = \alpha$). More relevant for electoral decisions, indirect utility $u_t^*(\alpha_{t-1}, \alpha_t)$ is also higher with candidates who were competent before elections ($\alpha_{t-1} = \alpha$), so voters will be more likely to reelect incumbents that have high competence in election periods.

3.2 Election Periods

Maximizing voters compare the incumbent with an opposition candidate chosen at random from the population. Voters base their decision on the perceived competency of the candidates and on the appeals shocks $q_{t,i}$ and $q_{t,i}^o$ (superscript o denotes the opposition candidate; no superscript is used for incumbent). This implies that there is probabilistic voting. An election will be determined by the median voter. An incumbent will be reelected if the expected indirect utility of median voter m in period $t+1$, conditional on information available in t, is higher with the incumbent than with the opposition candidate:[2]

[2]The expressions for expected indirect utility in (6) take into account the probability ρ_t the candidate is competent in the current period (e.g. $E[u_{t+1}^*(\alpha_t, \alpha_{t+1}) \mid \rho_t] \equiv$

$$E[u^*_{t+1}(\alpha_t, \alpha_{t+1}) \mid \rho_t] + q_{t,m} > E[u^{*o}_{t+1}(\alpha_t, \alpha_{t+1}) \mid \rho^o_t] + q^o_{t,m} \tag{6}$$

In the case of the opposition candidate, expected competency is exogenously given at $\rho^o_t = r$.[3] Since indirect utility $u^*_{t+1}(\alpha_t, \alpha_{t+1})$ is increasing in α_t, voting rule (6) implies that voters who maximize expected utility are more likely to reelect an incumbent when the probability ρ_t it is competent is higher. The information used to evaluate the probability ρ_t that the incumbent is competent is visible net expenditure, so the probability of reelection will be a function $p(g_t)$. There is no incumbency bias: rule (6) implies the incumbent's probability of reelection will be $\frac{1}{2}$ if it is perceived to be competent with the same probability as opposition candidate.[4]

3.3 One-dimensional Asymmetric Information

Our benchmark model simplifies Rogoff (1990), where competent incumbents choose high expenditure and low taxes before elections, to represent it in the same graphical manner as the classic Spence signaling model.

- Separating equilibria

$\rho_t E u^*_{t+1}(\alpha, \alpha_{t+1}) + (1-\rho_t) E u^*_{t+1}(-\alpha, \alpha_{t+1}))$, and the probability r candidates will be competent next period (e.g. $E u^*_{t+1}(\alpha, \alpha_{t+1}) \equiv r u^*_{t+1}(\alpha, \alpha) + (1-r) u^*_{t+1}(\alpha, -\alpha)$).

[3] We assume the challenger does not know its competency. If it did, non-opportunistic types experiencing a negative competency shock would not run, raising the expected competency of the opposition candidate above r.

[4] The winning candidate would be determined by whether $q_{t,m} - q^o_{t,m}$ is positive or negative for the median voter. Since the median of the idiosyncratic components averages out to zero, only the common component of personal appeal matters.

Say g_t^s is the level of visible public goods that a competent incumbent picks in a separating equilibrium, while an incompetent incumbent picks the lower level $g_t^* \equiv g_t^*(\alpha_{t-1}, -\alpha)$. Consequently, voter's beliefs will be given by:

$$\begin{aligned} g_t = g_t^s \qquad &\Rightarrow \qquad \rho_t = 1 \\ g_t = g_t^*(\alpha_{t-1}, -\alpha) \qquad &\Rightarrow \qquad \rho_t = 0 \end{aligned} \tag{7}$$

For other, out-of equilibrium, values of visible expenditure, we assume the lower threshold of each interval defines expected competency. For this to actually be a Perfect Bayesian Equilibrium, competent and incompetent incumbents must be willing to pick these signals. If the incumbent is incompetent, its expected utility from picking the separating signal g_t^s must not be larger than its expected utility from picking $g_t^*(\alpha_{t-1}, -\alpha)$:

$$E[Z^s \mid \alpha_t = -\alpha] \leq E[Z^* \mid \alpha_t = -\alpha] \tag{8}$$

Condition (8) can be expressed as the condition that an incompetent must not face a positive temptation to deviate from $g_t^*(\alpha_{t-1}, -\alpha)$. There is a continuum of possible separating equilibria, due to the multiplicity of signals that satisfy inequality (8). Applying the Pareto Dominance criterion, one can select the unique separating equilibrium where g_t^s is not dominated for a competent incumbent, namely the point where the temptation for an incompetent incumbent is zero (assuming an incompetent will not signal when indifferent):

$$T(g_t^s, g_t^*(\alpha_{t-1}, -\alpha) \mid -\alpha) = 0, \tag{9}$$

where the temptation to signal of an incumbent of type α_t,

$$T(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t) \mid \alpha_t) \equiv B(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t)) - C(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t) \mid \alpha_t), \tag{10}$$

is the difference between expected future benefits, due to the increased probability of enjoying the perks of being in office two periods more,

$$B(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t)) \equiv [p(g_t^s) - p(g_t^*(\alpha_{t-1}, \alpha_t))] \sum_{i=1}^{2} \frac{K}{(1+\delta)^i}, \tag{11}$$

and expected welfare costs, which comprise a current cyclical effect and a future wealth effect,

$$\begin{aligned} C(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t) \mid \alpha_t) &\equiv u_t^*(\alpha_{t-1}, \alpha_t \mid \alpha_t) - u_t^s(g_t^s, \varepsilon_t - g_t^s \mid \alpha_t) \\ &+ [p(g_t^s) - p(g_t^*(\alpha_{t-1}, \alpha_t))] \frac{E[u_{t+1}^*(\alpha_{t-1}, \alpha_t) \mid \rho_t^o] - E[u_{t+1}^*(\alpha_{t-1}, \alpha_t) \mid \alpha_t]}{1+\delta} \end{aligned} \tag{12}$$

The wealth effect is an added cost of signaling for an incompetent candidate, and a benefit for a competent candidate, because while an opposition candidate has a probability $\rho_t^o = r$ of being competent in $t+1$, an incumbent knows its competency α_t will be either be high or low for sure.

The probability of reelection $p(g_t) \in [\underline{p}, \overline{p}]$. Differentiating condition $T(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t) \mid \alpha_t) = 0$ with respect to g_t, one can find the pairs $(g_t, p(g_t))$ that leave an incumbent of type α_t indifferent:

$$p\prime(g_t) = \frac{\frac{v\prime(\gamma_{t+1})}{1+\delta} - w\prime(g_t)}{\frac{E[u_{t+1}|\alpha_t] - E[u^o_{t+1}|\rho^o_t]}{1+\delta} + \frac{(2+\delta)K}{(1+\delta)^2}} \tag{13}$$

The indifference curves through $g_t^*(\alpha_{t-1}, -\alpha)$ are depicted in Figure 1.[5] The indifference curves of an incompetent incumbent to the right of $g_t^*(\alpha_{t-1}, -\alpha)$ are steeper than the indifference curves of a competent incumbent.[6] The signal g_t^s that would leave an incompetent incumbent indifferent at $\rho_t = 1$ would make the competent better off.

<please insert Figure 1 about here>

Denote by K^{min} the opportunism such that $T(g_t^*(\alpha_{t-1}, \alpha), g_t^*(\alpha_{t-1}, -\alpha_t) \mid -\alpha) = 0$. We characterize opportunism as small when:

$$\overline{K} \leq K^{min} \tag{14}$$

If (14) holds, there would be no budget cycle since a competent would be able to signal its type by picking $g_t^s = g_t^*(\alpha_{t-1}, \alpha)$. Separating signal g_t^s in (9) only applies when larger than $g_t^*(\alpha_{t-1}, \alpha)$.

- Pooling equilibria

Pooling equilibria imply implausible out-of-equilibrium beliefs, namely that if an unexpectedly high g_t is observed, voters have to assume that

[5]Figure 1 assumes that opportunism K is high enough for the denominator of (13) to be positive. By FOC (5), the numerator is zero at $g_t^*(\alpha_{t-1}, \alpha_t)$. Due to the concavity of the utility functions v and w, indifference curves are convex, reaching a minimum at $g_t^*(\alpha_{t-1}, -\alpha)$ for an incompetent, and at $g_t^*(\alpha_{t-1}, \alpha)$ for a competent.

[6]For competent incumbents, the denominator in (13) is larger because of positive wealth effect in the future, and the numerator is smaller because they can provide more γ_{t+1} for any given g_t , so $\frac{v\prime(\gamma_{t+1})}{1+\delta} - w\prime(g_t)$ will be a smaller positive number.

doesn't raise the chances the incumbent is indeed competent. No pooling equilibrium survives the application of equilibrium dominance arguments. To see this, say that a pooling equilibrium exists and that it is given for example by the level $g_t^*(\alpha_{t-1}, \alpha)$ that is optimal for a competent incumbent. In a pooling equilibrium, $\rho = r$, so by voting rule (6) the probability of re-election $p(g_t^*(\alpha_{t-1}, \alpha)) = \frac{1}{2}$. Consider the indifference curves of each type of incumbent that go through point $(g_t^*(\alpha_{t-1}, \alpha), \frac{1}{2})$.

<please insert Figure 2 about here>

The deviation in Figure 2 that would leave an incompetent incumbent just indifferent between the pooling equilibrium and establishing a reputation of competency $\rho_t = 1$ would make the competent better off. Only the competent is willing to deviate from the pooling equilibrium. Applying the Cho-Kreps criterion, voters will infer the incumbent is competent if that g_t, or more, is observed. Applying this same argument to other possible equilibria, no pooling equilibrium survives.[7]

The results are summarized in Lemma 1, which covers Propositions 1, 2 and 3 in Rogoff (1990), and Proposition 1:

Lemma 1 *Under asymmetric information on competency and symmetric information on opportunism, applying the intuitive criterion and ruling out dominated equilibria, there is a unique equilibrium which is separating.*

[7] One can replicate this analysis for the signaling game in Persson and Tabellini (1990, chap. 5) and Alesina, Roubini, and Cohen (1997, chap. 2). When a separating equilibrium exists, pooling equilibria can be eliminated through the application of the intuitive criterion, so multiple equilibria can be ruled out in these rational business cycle models.

Proposition 1 *In a separating equilibrium, if opportunism is small there is no political budget cycle. If not, competent incumbents engage in a political budget cycle.*

3.4 Two-dimensional Asymmetric Information

With asymmetric information on both competency and opportunism, three intervals can be distinguished: small heterogeneity, where the equilibrium is separating; medium heterogeneity, where there are two equilibria, and large heterogeneity, where the equilibrium is partially pooling.

- Separating equilibria

Suppose expectations are as in (7). With four types, competent and incompetent, who can be opportunistic or not, the temptation to signal depends on competency α_t and opportunism K:

$$T(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t) \mid \alpha_t, K) \equiv B(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t) \mid K) - C(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t) \mid \alpha_t) \tag{15}$$

The cost $C(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t) \mid \alpha_t)$ is as in (12). The benefit of reelection $B(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t) \mid K)$ is as in (11) for opportunistic incumbents with $K = \overline{K}$, but zero for non-opportunistic incumbents with $K = 0$. Let g_t^{ext} denote the visible budget items for which the temptation to signal of a non-opportunistic, competent, incumbent becomes zero (and beyond which extreme the temptation becomes negative), i.e. $T(g_t^{ext}, g_t^*(\alpha_{t-1}, \alpha) \mid \alpha, 0) = 0$.

Let K^{ext} be the level of opportunism for which the temptation of an incompetent, opportunistic incumbent to pick g_t^{ext} and gain a reputation of competency $\rho = 1$ is exactly zero, i.e. $T(g_t^{ext}, g_t^*(\alpha_{t-1}, -\alpha) \mid -\alpha, K^{ext}) = 0$.

Heterogeneity $d = \overline{K}$ is large if:

$$\overline{K} > K^{ext} \tag{16}$$

Competent incumbents pick $g_t^s = g_t^*(\alpha_{t-1}, \alpha)$ if heterogeneity is small ($\overline{K} \leq K^{min}$), or g_t^s such that $T(g_t^s, g_t^*(\alpha_{t-1}, -\alpha) \mid -\alpha, \overline{K}) = 0$ if heterogeneity is medium ($K^{min} < \overline{K} \leq K^{ext}$). For large heterogeneity ($\overline{K} > K^{ext}$), a competent incumbent that is non-opportunistic is only willing to signal as far as g_t^{ext}, while an incompetent incumbent that is opportunistic is willing to go beyond that point. Hence, no separating equilibrium exists.

-Pooling equilibria

No pooling equilibrium is possible, because a non-opportunistic, incompetent, incumbent will always choose $g_t^*(\alpha_{t-1}, -\alpha)$, something that competent incumbents will never pick.

-Partially pooling equilibria

For $\overline{K} \leq K^{min}$ one cannot support any partially pooling equilibrium, because incompetent types are not willing to mimic $g_t^*(\alpha_{t-1}, \alpha)$, preferring to pick $g_t^*(\alpha_{t-1}, -\alpha)$ instead. We first analyze partially pooling equilibria with two signals, and then partially pooling equilibria with three signals.

One can rule out a partially pooling equilibrium where a non-opportunistic, incompetent, incumbent chooses $g_t^*(\alpha_{t-1}, -\alpha)$ and all other types of incumbents pick, say, $g_t^*(\alpha_{t-1}, \alpha)$. Figure 3 depicts the indifference curves that go through $g_t^*(\alpha_{t-1}, \alpha)$ when heterogeneity is large (the same argument would hold with medium heterogeneity). The indifference curves are derived by differentiation of $T(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t) \mid \alpha_t, K)$, for incumbents of types $(\alpha, 0)$, $(\alpha, \overline{K})$, and $(-\alpha, \overline{K})$.

<please insert Figure 3 about here>

By application of the Cho-Kreps intuitive criterion, this partially pooling equilibrium does not resist the deviation by type $(\alpha, \overline{K})$, that would be willing to go beyond the signal g_t that assures type $(-\alpha, \overline{K})$ a reputation of competency $\rho_t = 1$.[8] This same argument can be replicated for other points.

As to a partially pooling equilibrium with three signals, we posit the following solution for $\overline{K} > K^{min}$:

$$
\begin{aligned}
&g_t = g_t^s \Rightarrow \rho = 1 \\
&g_t = g_t^i \Rightarrow \rho = w, \qquad \text{where } w \equiv \frac{(1-s)r}{(1-s)r + \lambda s(1-r)} \\
&g_t = g_t^*(\alpha_{t-1}, -\alpha) \Rightarrow \rho = 0
\end{aligned}
\tag{17}
$$

The variable λ in (17) stands for the probability that an incompetent, opportunistic, incumbent is willing to mimic the intermediate signal $g_t^i \geq$

[8] This partially pooling equilibrium is derived in Stein and Streb (1999), where elections depend solely on competency, so it suffices for an incumbent to establish that the probability it is competent is above average to be reelected. With probabilistic voting, incumbents have an incentive to show they are competent for sure.

$g_t^*(\alpha_{t-1}, \alpha)$. Out-of-equilibrium values of g_t are assumed to lead to the same reputation of competency as the lowest value in each interval of (17). Signal g_t^s in (17) will be defined by the condition that it is the smallest $g_t \geq g_t^*(\alpha_{t-1}, \alpha)$ such that $T(g_t^s, g_t^i \mid -\alpha, \overline{K}) \leq 0$ and $T(g_t^s, g_t^i \mid \alpha, 0) \leq 0$. By elimination of Pareto dominated strategies, the intermediate signal g_t^i can also be determined uniquely. There are two distinct cases, when initial reputation at $g_t^*(\alpha_{t-1}, \alpha)$ is low, so $\lambda < 1$, and when reputation at $g_t^*(\alpha_{t-1}, \alpha)$ is high, so $\lambda = 1$.

(i) Low reputation. For a moment, let $g_t^i = g_t^*(\alpha_{t-1}, \alpha)$. When mimicking of $g_t^*(\alpha_{t-1}, \alpha)$ with probability $\lambda = 1$ by type $(-\alpha, \overline{K})$ leads to a point a in Figure 4 that lies below the indifference curve I_0 that goes through the points $(g_t^*(\alpha_{t-1}, -\alpha), \underline{p})$ and $(g_t, \overline{p})$, reputation is low. What is required is $\lambda < 1$, corresponding to probability of reelection q at point b on indifference curve I_0. This defines an equilibrium because no type will want to deviate.[9]

<please insert Figure 4>

This is not the only possible equilibrium. Since the single-crossing property fails when $\overline{K} > K^{min}$, the indifference curves of types $(\alpha, 0)$ and $(-\alpha, \overline{K})$ cross to the right of point b. Within this "lens", type $(\alpha, 0)$ maximizes utility at point where its indifference curve is just tangent to I_0, so $g_t^i = g_t^{\tan}$ Pareto dominates $g_t^*(\alpha_{t-1}, \alpha)$. However, if the tangency point is above $\overline{p}$, there is

[9]Type (-α,0) never deviates from $g_t^*(\alpha_{t-1}, -\alpha)$. For type ($\alpha$,0), either $T(g_t^s, g_t^i \mid \alpha, \overline{K}) = 0$, so it is just indifferent and picks $g_t^*(\alpha_{t-1}, \alpha)$ with probability 1, or $T(g_t^s, g_t^i \mid \alpha, 0) < 0$, so it strictly prefers g_t^i. For type (-α,$\overline{K}$) either $T(g_t^s, g_t^i \mid -\alpha, \overline{K}) = 0$, so it mixes between $g_t^*(\alpha_{t-1}, -\alpha)$ and $g_t^*(\alpha_{t-1}, \alpha)$, or $T(g_t^s, g_t^i \mid -\alpha, \overline{K}) < 0$. Type ($\alpha$,$\overline{K}$) will be willing to signal g_t^s because it has flatter indifference curves.

a corner solution at $q = \overline{p}$ and the elimination of Pareto dominated signals leads instead to the separating signal g_t^s, for $g_t^s \leq g_t^{\tan}$.

(ii) High reputation. Let $g_t^i = g_t^*(\alpha_{t-1}, \alpha)$. Consider point c in Figure 5 where probability of reelection is p with $\lambda = 1$. Since type $(-\alpha, K)$ is on a higher indifference curve than I_0, it indeed will pick $\lambda = 1$.

<please insert Figure 5>

The separating signal is determined by either $T(g_t^s, g_t^i \mid -\alpha, \overline{K}) = 0$ or $T(g_t^s, g_t^i \mid \alpha, \overline{K}) = 0$ –one of intermediate types will be indifferent between both values, while the other will have a strictly negative temptation, so neither will pick g_t^s–. As to other possible equilibria, though the points in the lens formed by the indifference curves of types $(\alpha, 0)$ and $(-\alpha, K)$ are at least weakly preferred by type $(\alpha, 0)$, they would require that type $(-\alpha, \overline{K})$ not mimic with probability one. This is impossible unless the lens intersects indifference curve I_0.[10] If both areas do not intersect, reputation stays put at m so point c is preferred by type $(\alpha, 0)$.

Summarizing,

Lemma 2 *Under asymmetric information on competency and opportunism, applying the intuitive criterion and ruling out dominated equilibria, there are three intervals. If heterogeneity in opportunism is small, the equilibrium is separating; if medium, the separating equilibrium coexists with a partially pooling equilibrium; if large, the equilibrium is partially pooling.*

[10]If the lens intersects I_0, the intersection will be both feasible and preferred by type $(\alpha, 0)$. We fall back to case (i), where either $g_t^i = g_t^{\tan}$ at tangency point with I_0, or there is corner solution with separating signal g_t^s at $q = \overline{p}$.

Proposition 2 *In a separating equilibrium, if heterogeneity is small there is no political budget cycle. If heterogeneity is medium, competent incumbents engage in a political budget cycle.*

Proposition 3 *In a partially pooling equilibrium, if the equilibrium is in mixed strategies, both competent and opportunistic incumbents engage in a political budget cycle; if the equilibrium is in pure strategies, only opportunistic incumbents engage in a political budget cycle.*

The specification of voter beliefs in the interval with medium heterogeneity will determine whether the equilibrium is separating or partially pooling. Incidentally, incumbents would prefer that voters coordinate expectations on the partially pooling equilibrium: if in pure strategies, a non-opportunistic, incompetent incumbent would be indifferent, while all other types would be strictly better off; if in mixed strategies, a non-opportunistic, competent incumbent would be strictly better off, while other types would be indifferent.[11]

3.5 Welfare Effects of Cycles

Elections comprise both a policy bias and a selection effect (Lohmann, 1998). The current welfare loss produced through cycles is the policy bias, that is

[11]While Alesina, Roubini, and Cohen (1997) can empirically reject systematic opportunistic cycles before elections implied by Nordhaus (1975), they cannot reject the implications of the seminal Rogoff (1990) paper that political cycles occur frequently, though not always, before elections. They object the Rogoff approach on the grounds that his result that only competent incumbents distort economic policy is troublesome and unrealistic (but in Rogoff and Sibert 1988, with a continuum of competency types, incumbents with low competency do distort policy a little). When opportunism is not common knowledge, incompetent incumbents can distort policy a lot.

not present in off-election periods. The selection effect is the positive wealth effect of being able to replace incumbents that are incompetent. The policy bias may be dominated by a selection effect, so the net welfare effect of elections is ambiguous (cf. Lohmann, 1998, Proposition 4). That is what happens here.

4 Low Visibility as Executive Discretion

The incumbent can successfully manipulate the budget because some budget items are not visible before elections. The Rogoff interpretation is based on a technological distinction between consumption and investment goods, but an institutional interpretation of visibility can be provided. If decisions that do not need the authorization of congress are less visible than decisions that can be solely decided by the executive power, low visibility will be increasing in the degree of discretionary power vested in the executive branch. This is not to say that all discretional expenditures and taxes are non-visible: the government wants to show the good side and hide the bad side. Rather, more discretionality gives more lee-way to hide the bad side.

4.1 A Continuum of Varieties

Let the public budget be spread over a continuum of varieties, where visible types are indexed between 0 and β and less visible types are indexed between β and 1. The per-period utility function $u(g_t, \gamma_{t+1})$ in (1) is replaced by

$$u(.) = \int_0^\beta w(g_t(\omega))d\omega + \int_\beta^1 \frac{v(\gamma_{t+1}(\omega))}{1+\delta}d\omega \tag{18}$$

and the resource constraint (3) is replaced by

$$\int_0^\beta g_t(\omega)d\omega + \int_\beta^1 \gamma_{t+1}(\omega)d\omega = \varepsilon_t \tag{19}$$

One can divide the maximization process in two steps. The first step is to find, for a given budget allocation between visible and less visible budget items, the functional that maximizes utility for each type of expenditure. The first order conditions are $w\prime(g_t(\omega)) = \lambda$ for $\omega \in [0, \beta]$, and $v\prime(\gamma_t(\omega)) = \mu$ for $\omega \in [\beta, 1]$, where λ and μ are constants given by Lagrange multipliers. These conditions imply $g_t(\omega) = g_t$ for $\omega \in [0, \beta]$ and $\gamma_t(\omega) = \gamma_{+1t}$ for $\omega \in [\beta, 1]$. The utility function simplifies to

$$u(g_t, \gamma_{t+1}) = \beta w(g_t) + (1-\beta)\frac{v(\gamma_{t+1})}{1+\delta} \tag{20}$$

and the resource constraint becomes

$$\beta g_t + (1-\beta)\gamma_{t+1} = \varepsilon_t \tag{21}$$

The second step is to allocate visible and less visible budget items optimally. In off-election periods, FOC (5) holds. In election periods, (20) and (21) can be substituted into $T(g_t^s, g_t^*(\alpha_{t-1}, \alpha_t) \mid \alpha_t, K)$. The trade-off is $d\gamma_{t+1}/dg_t = -\beta/(1-\beta)$, so the slope of the indifference curve is now pre-multiplied by β:

$$p\prime(g_t) = \beta \frac{\frac{v\prime(\gamma_{t+1})}{1+\delta} - w\prime(g_t)}{\frac{E[u_{t+1}|\alpha_t] - E[u^o_{t+1}|\rho^o_t]}{1+\delta} + \frac{(2+\delta)K}{(1+\delta)^2}} \tag{22}$$

4.2 Possibility of Cycles

Considering the underlying degree of opportunism as a given, we now look at how the institutional setup may affect the "effective" degree of opportunism:

Proposition 4 *The possibility of political budget cycles increases as visibility β decreases.*

Pf. The level of K^{min} falls because, as β decreases, the cyclical component of $C(g^*_t(\alpha_{t-1}, \alpha), g^*_t(\alpha_{t-1}, -\alpha) \mid -\alpha)$ decreases by (22). With lower costs of signaling, only lower benefits of signaling $B(g^*_t(\alpha_{t-1}, \alpha), g^*_t(\alpha_{t-1}, -\alpha) \mid K)$ can keep the equality. Hence, the length of the interval $[0, K^{min}]$ shrinks, so the parameter values $\overline{K}$ for which there are cycles expands.

Under this alternative interpretation, visibility depends on the institutional framework. To mitigate cycles, one can reduce the discretion of the executive.[12] For instance, the discretion of the US president is small. The president is subject to a large control of congress, when compared to the parliamentary system in Europe where the executive has quasi-legislative

[12] Another is to impose term limits. However, term limits that rule out reelection not only eliminate cycles, they also eliminate the electoral option of reelecting a competent incumbent.

powers (cf. Carey and Shugart, 1998). The differences in the discretion that the executive enjoys can help explain why Alesina, Roubini, and Cohen (1997, chaps. 4 and 6) observe there is no recent evidence of opportunistic cycles in the US, specially after 1980 when many federal transfer programs in the US have become mandatory by acts of Congress so they cannot be easily manipulated for short run purposes. In contrast, opportunistic cycles are present in other OECD countries.

Latin America stands in even starker contrast to the US experience. Latin America followed the lead pioneered by the US of a division of powers à la Montesquieu, but in practice there has been a concentration of quasi-legislative powers in the hands of the president. The degree of executive discretion is substantial (Carey and Shugart, 1998). Since the study by Ames (1987), there is also ample evidence of budget cycles in Latin America. More generally, budget cycles are especially strong among developing countries (Drazen, 2000). These differences in outcomes may reflect differences in institutional structures of the type outlined here.

4.3 Lemons in Politics

It is sometimes said that the worst, least scrupulous people are selected by the political process. However, the issue of lemons in politics, like lemons in markets, depends on the institutional structure. Institutions can determine which types are most successful in the political arena.[13] When the executive is given a lot of short-run leeway on budgetary matters, this may hurt the wrong type of incumbent (proof in Appendix):

Proposition 5 *Under two-dimensional asymmetric information, as visibility β falls, the probability a competent, non-opportunistic incumbent is in office falls.*

As to the effectiveness of elections to select competent incumbents, as visibility decreases, mimicking becomes more probable (which has negative selection effects), but the increase in mimicking lowers the probability an opportunistic, incompetent incumbent will be reelected (which has positive selection effects). The net effect depends on the proportion s of opportunistic incumbents in the population (proof in Appendix):

Proposition 6 *Under two-dimensional asymmetric information, as visibility β falls, elections become less effective to select competent incumbents if $s \leq 1/2$, while the effect is ambiguous if $s > 1/2$.*

5 Conclusions

In the Rogoff vein, we model the political cycle in terms of fiscal policy.[14] Previous literature on RPBC implicitly assumes that voters know the in-

[13] Caselli and Morelli (2001) endogenize the entry into politics, studying precisely the issue of what determines the mix of competency and honesty of elected officials.

[14] The story in terms of monetary policy would be quite similar, but explaining political cycles as the result of monetary surprises is less convincing (cf. Drazen, 2000).

cumbent's exact degree of opportunism, so as to figure out just how far the incumbent is willing to go to get reelected. This paper considers instead a setup with heterogeneity and asymmetric information on opportunism, due to the fact that the incumbent's preferences, the springs and wells of action, are not directly observed by voters.

Under two-dimensional asymmetric information, the Rogoff results on cycles still stand if heterogeneity in opportunism is not too large. There is also a partially pooling equilibrium where opportunistic incumbents cause cycles, regardless of their competence, which becomes the unique equilibrium when heterogeneity is large.

Non-visible budget items, at the root of asymmetric information on competency, can be linked to the discretion enjoyed by the executive. The possibility of RPBC is increasing in the lack of visibility, which may help explain why the impact of opportunistic cycles seems to have disappeared from Presidential elections in the US in recent years, in contrast to other countries. Discretionality may also affect the extent to which elections are effective to replace incompetent incumbents.

Appendix

Proof of Proposition 5: Denote by $A \equiv r(1-s)(q+(1-q)r(1-s)) + (1-r)[s\lambda(1-q)r(1-s)+((1-s)+s(1-\lambda))(1-\underline{p})r(1-s)]$ the probability type $(\alpha, 0)$ is in office after elections. The proposition follows from two facts, that $\partial A/\partial\lambda < 0$ and that λ increases, or at least remains constant, as β falls. The former fact follows from $\partial A/\partial\lambda = r(1-s)[(1-r(1-s)-(1-r)s\lambda)(\partial q/\partial w)(\partial w/\partial\lambda) - (1-r)s(q-\underline{p})]$, since $\partial q/\partial w > 0$ and $\partial w/\partial\lambda < 0$. As to the latter, have to review the borderline cases in both the separating and the partially pooling equilibria.

In a separating equilibrium, consider point $\overline{K} = K^{ext}$. The cyclical component of signaling costs is larger for type $(-\alpha, \overline{K})$ –it distorts the optimal intertemporal budget profile more than type $(\alpha, 0)$–, so as β falls its cyclical component falls more in absolute value. Even if it fell by the same amount, since at K^{ext} the indifference curve of $(\alpha, 0)$ cuts that of $(-\alpha, \overline{K})$ from below, when β falls slopes change in same proportion, so the indifference curve of $(-\alpha, \overline{K})$ remains flatter beyond that point. Hence, type $(-\alpha, \overline{K})$ will be willing to go farther to establish a reputation of competency $\rho = 1$, and the separating equilibrium gives way to a partially pooling equilibrium with $\lambda > 0$.

In a partially pooling equilibrium, consider two switch-over points. First, $\overline{K} = K^{mix}$ where $g_t^s = g_t^{\tan}$, so the tangency point in Figure 5 would be exactly at $q = \overline{p}$ –for $\overline{K} \leq K^{mix}$, there is a corner solution where $\lambda = 0$, while for $\overline{K} > K^{mix}$ there is interior solution where $0 < \lambda < 1$ and $g_t^i = g_t^{\tan}$– . A fall in β makes the slopes of types $(\alpha, 0)$ and $(-\alpha, \overline{K})$ change by the same percentage, so tangency point is still at $g_t^{\tan}$; however, as I_0 becomes flatter, separating signal g_t^s increases, so now $g_t^s > g_t^{\tan}$ and $\overline{K}$ leads to an interior solution with $\lambda > 0$. Second, consider $\overline{K} = K^{pure}$ where type $(\alpha, 0)$ is indifferent between $g_t^*(\alpha_{t-1}, \alpha)$ with $\lambda = 1$ and $g_t^{\tan}$ with $\lambda < 1$, so point c in Figure 6 would be on indifference curve of type $(\alpha, 0)$ just tangent to I_0 –for $\overline{K} < K^{pure}$, $\lambda < 1$, while for $\overline{K} \geq K^{pure}$ $\lambda = 1$–. Since a decrease in β reduces signaling costs of type $(-\alpha, \overline{K})$ more, I_0 is tangent to a lower indifference curve of type $(\alpha, 0)$. Hence, point c is now strictly above indifference curveof type $(\alpha, 0)$ tangent to I_0, and $\lambda = 1$ for values of $\overline{K}$ that before had $\lambda < 1$.

Proof of Proposition 6: Have to consider borderline cases in separating and partially pooling equilibrium. Since interval $[0, K^{ext}]$ where separating equilibrium exists shrinks as β falls –cf. proof of Proposition 5–, it remains to show that the positive selection effect of elections is larger in a separating equilibrium than in a partially pooling equilibrium. The probability that $\alpha_t = \alpha$ without elections is r, while with elections it is $r[\overline{p} + (1-\overline{p})r] + (1-r)[(1-\underline{p})r]$ in a separating equilibrium and $r[s(\overline{p} + (1-\overline{p})r) + (1-s)(q + (1-q)r)] + (1-r)[s\lambda(1-q)r + ((1-s) + s(1-\lambda))(1-\underline{p})r]$ in a partially pooling equilibrium, where q stands for probability of reelection when $0 < \lambda \leq 1$. The selection effect of elections (the difference between expected welfare in $t+1$ with and without elections) is $B \equiv (\overline{p} - \underline{p})F$ in a separating equilibrium, where $F \equiv (1-r)r\{E[u_{t+1}^* \mid \alpha_t = \alpha] - E[u_{t+1}^* \mid \alpha_t = -\alpha]\}$, and $C \equiv [s(\overline{p} - q) + (1 - \lambda s)(q - \underline{p})]F$ in a partially pooling equilibrium. The difference $B - C = [(1-s)(\overline{p} - q) + \lambda s(q - \underline{p})]F > 0$.

As to partially pooling equilibrium, as β decreases, λ tends to increase –cf. proof of Proposition 5–. However, the impact on selection effect, $\partial C/\partial\lambda = ((1-s) - s\lambda)(\partial q/\partial w)(\partial w/\partial\lambda) - s(q - \underline{p})$, is ambiguous. The derivative is negative for $\lambda \leq (1-s)/s$, but it can be positive for $\lambda > (1-s)/s$ (e.g., when q is linear in w; with logistic, however, effect is practically zero), which requires $s > 1/2$.

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Figure 1
Separating Equilibrium

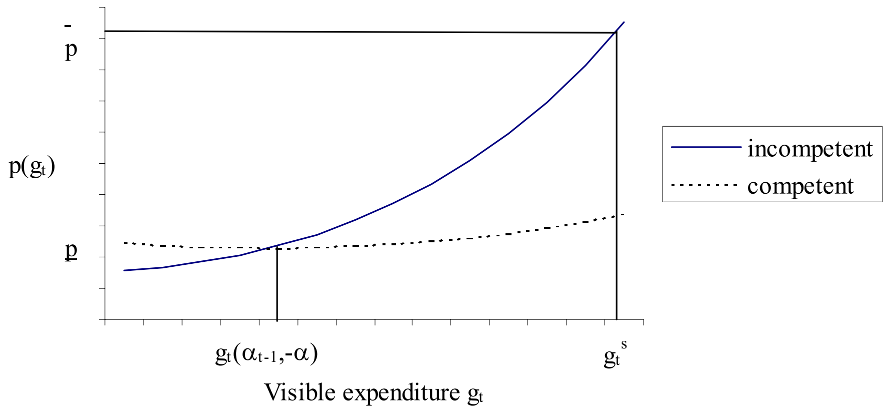

Figure 2
Deviations from Pooling Equilibrium

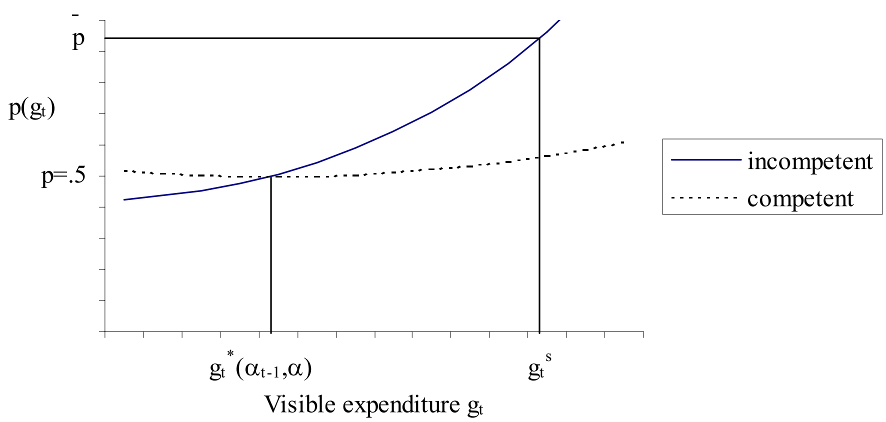

Figure 3
Deviations from $g_t^*(\alpha_{t-1},\alpha)$

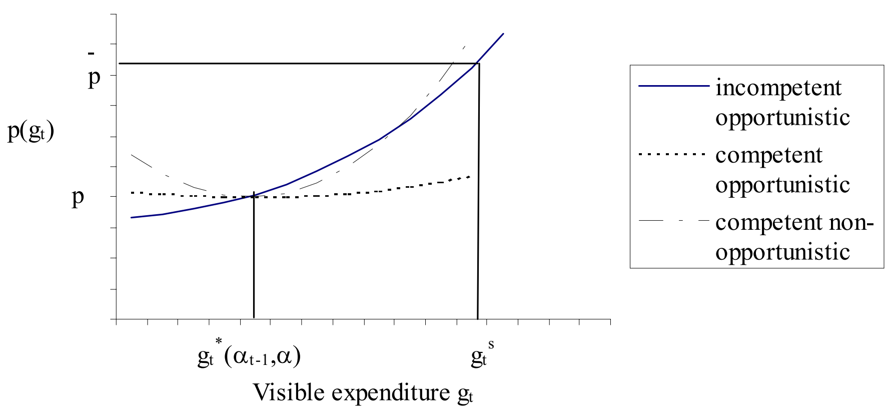

Figure 4
Partially Pooling Equilibrium: Mixed Strategies

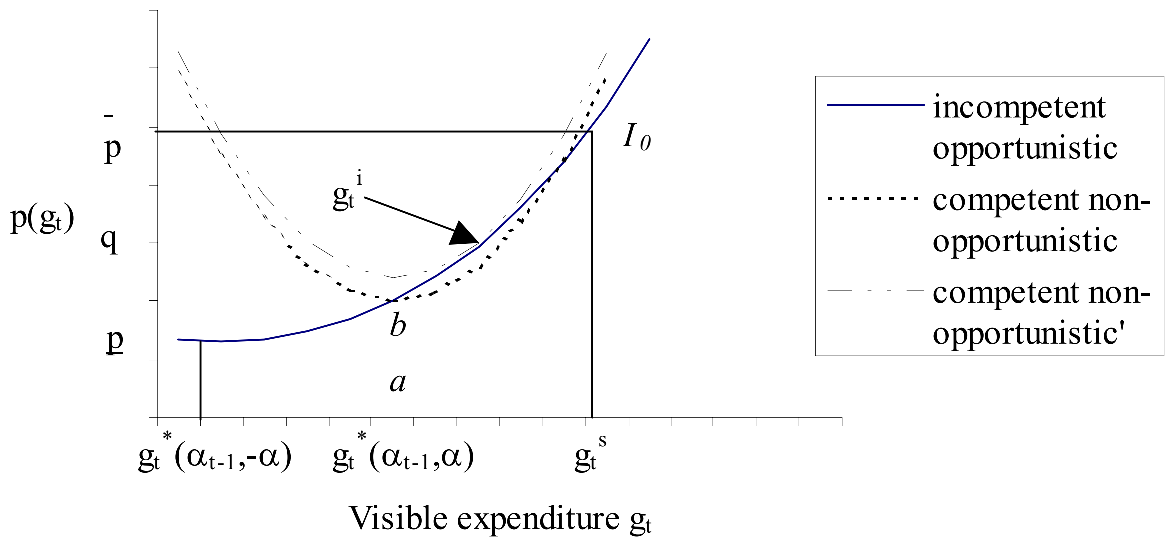

Figure 5
Partially Pooling Equilibrium: Pure Strategies