

ELECTIONS AND THE TIMING OF DEVALUATIONS* •

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I. Introduction

The main motivation for this study comes from a number of episodes in which devaluations required to correct exchange rate misalignments were postponed until after elections, in an effort to help the electoral chances of the party in office. Among the episodes that motivate our ideas on the political manipulation of exchange rates are the 1986 Cruzado Plan in Brazil, the failed 1989 Primavera Plan in Argentina, and the 1994 Mexican Peso crisis.¹

In the Cruzado plan, the exchange rate was pegged despite mounting current account deficits. Since an election loomed, Cardoso (1991) remarks that, in the best Brazilian political tradition, corrective actions were placed on hold. The devaluation came about right after the legislative elections. The main element of the Primavera plan was the reduction of the rate of crawl, with what was widely interpreted as an attempt to moderate inflation in the run-up to the 1989 presidential elections (Heymann, 1991). However, a speculative attack, amidst the suspension of external financing, led to a sharp devaluation that ended the stabilization attempt before the elections, with disastrous electoral results for the ruling party.

The most widely known example of a country that waited until after an election to correct an overvaluation is that of Mexico in 1994. As Obstfeld and

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¹ Israel in 1988 and Bolivia in 1989 are further examples of postponements of devaluations until after elections, according to Bruno and Meridor (1991) and Morales (1991).

Rogoff (1995) note, the skepticism over exchange rate commitments prevailing in Mexico in 1994 was compounded by the government's previous track record of devaluing in presidential election years. As we point out here, the government's temptation to devalue has a precise timing: after the elections.

This topic of the political implications of devaluations is not at all new. A classic paper by Cooper (1971) points out how devaluations in developing countries can impose sizable political costs on governments. Complementing this evidence at an episodic level, there are more systematic studies that support this pattern.

Gavin and Perotti (1997) include in a recent study of fiscal policy in Latin America a section on the determinants of shifts in exchange rate regimes from fixed to flexible. They find that the likelihood that such a shift will occur increases significantly right after an election has taken place.

Klein and Marion (1994) study the duration of exchange rate pegs to the US dollar for a sample of 17 Latin American countries in the period 1956-1991. In contrast with Gavin and Perotti, who focus only on regime shifts, these authors consider step devaluations as the end of a spell and the beginning of another. They find that the likelihood a peg will be abandoned increases immediately after an executive transfer.

Edwards (1993) studies the timing of 39 large devaluations (15% or more) in democratic regimes, and finds that they tend to occur early on in the term in office. Edwards mentions the classic rule of "devalue immediately and blame it on your predecessors". According to our interpretation, a government casting the blame in such a way may actually have a point, if the predecessor postponed a devaluation in order to avoid hurting its electoral chances.

Although the evidence on the relationship between elections and the timing of devaluations is still scant, and needs to be developed further, it appears to support the hypothesis that devaluations tend to be delayed until after elections. Our main goal in this paper is to provide a political economy model consistent with this evidence, stressing the temptation of the government to manipulate economic policy for political purposes.

The traditional political business cycle model, due to Nordhaus (1975), assumes backward-looking voters and a short-run trade-off between inflation and unemployment, to address the use of expansionary aggregate demand policies to boost employment and increase the incumbent's electoral chances.

Rogoff and Sibert (1988), Rogoff (1990), and Persson and Tabellini (1990) depart from the assumption of myopic voters. Instead, they assume voters are forward-looking rational agents acting under incomplete information, and obtain political cycles as a result of a signaling game between the government and the voters.

In Rogoff and Sibert (1988) and Rogoff (1990), the political cycle is not cast in terms of boosting employment, but rather in terms of manipulating fiscal variables for political purposes. Governments may want to please voters before elections by lowering taxes or raising expenditures, resulting in political budget cycles. The existence of political budget cycles had been pointed out by Tufte (1978), with data from the U.S. and Europe; Ames (1987) found this pattern in Latin America.

This paper follows the rational political budget cycle approach, extending it in two directions. First, it considers an open economy, to formalize the implications of political budget cycles for nominal exchange rates. The variable used as a signal of competency is the rate of devaluation which, in the context of the one-sector model we use, coincides with the rate of inflation, and acts as a tax on consumption. The relevant trade-off is between devaluation today and tomorrow, as in the Sargent-Wallace unpleasant monetarist arithmetic. Hence, the pattern of devaluations around elections are part of a political budget cycle, a feature that has been overlooked in conventional stories of political budget cycles that concentrate on a closed economy.²

The second extension is more fundamental, and applies to political budget cycles in open and closed economies. The typical assumption in this class of models is that governments share the utility function of voters, but derive additional utility from being in office (which may lead to opportunistic behavior). The only informational asymmetry regards the degree of competence of the government. We introduce a second dimension over which there is incomplete information: the degree to which the government is self-motivated. Voters do not know whether the incumbent is opportunistic or not. This simple

² Stein and Streb (1994) model electoral cycles in an open economy. In that paper, however, the emphasis was on the timing of stabilizations around elections, rather than focusing on devaluations as part of the political budget cycle.

assumption turns out to have important implications.

A nice justification for this assumption can be found in Tufte (1978). He presents quotes from politicians and economic advisors which show that, while some politicians would be willing to go to great lengths in order to be reelected, others won't. Nixon, for example, is portrayed as a politician who is well aware of the importance of manipulating the economy in order to win elections. Gerald Ford, in contrast, appears to have been a non-opportunistic politician. Tufte reports that, shortly before the 1976 presidential elections, William Seidman, a top economic advisor to Ford, said:

"I think Mr. Ford's chances of reelection are very good. As for the economic lull, we considered the use of stimulus to make sure we didn't have a low third quarter, but the president didn't want anything to do with a short-term view".

Our assumption of asymmetric information regarding opportunism can change the nature of the equilibrium in the signaling game, moving it away from a separating equilibrium and towards a partially pooling equilibrium. In this way, we move away from the typical implication of these models, an implication that we do not find attractive: that, in equilibrium, only the competent government manipulates economic policy in order to signal competency, while the incompetent simply reveal their incompetence and lose the elections.

The plan of this paper is as follows. Section Two introduces the economic model, with a cash-in-advance constraint that makes nominal devaluations a form of distortionary taxation. Section Three studies what happens with the economy once a political system is introduced, in an incomplete information setup where voters are uncertain about how competent and how opportunistic politicians are. Section Four looks at the empirical implications of the model, and how it can be related to the existing evidence on devaluations and electoral calendars in countries with exchange rate pegs. Section Five presents the conclusions and the extensions for future work.

II. The economic model: devaluations as distortionary taxation

We describe the economic system before introducing the political system. We work with a small open economy, over an arbitrary, finite, period $t=1,2,\dots,T$.

There are three building blocks. First, a wealth constraint that leads to a trade-off between present and future inflation, as in Sargent and Wallace (1981). Second, a cash-in-advance constraint that makes devaluation a distortionary tax on consumption, as in Calvo (1986). Third, a government that can be more or less competent, as in Rogoff and Sibert (1988).

We characterize production, financial assets, consumption, and market equilibrium conditions. The optimal rate of devaluation is derived, as well as the potential trade-off between current and future devaluation, which is recast as a linear trade-off between current and future consumption. This sets the stage for a government that may want to manipulate the rate of devaluation politically.

Production

There is a private good, y_c , and a public good, y_g . Labor is the only factor of production, and production functions are linear.

The private good is tradable and its dollar price is constant, $p_{ct}^* = p_c^*$. By the law of one price, the domestic price depends on the nominal exchange rate e_t

$$p_{ct} = e_t p_c^* \quad (1)$$

For private firms, linear technology implies that, in equilibrium, the real wage equals the price of output, $w_t/e_t = p_c^*$, so revenue is entirely paid out as wages. Government expenditure goes into public employment, which produces government services. As in Rogoff and Sibert (1988), we distinguish between competent and incompetent governments, using super-index $j=c,nc$. Competency means that the government needs low employment to produce a given amount of the public good, lack of competency that it needs high employment.

$$\begin{aligned} y_{ct} &= l_{ct}, \\ y_{gt} &= (1 + \gamma^j) l_{gt}, \quad \text{where } \gamma^{nc} = 0, \gamma^c = 1 \end{aligned} \quad (2)$$

Financial assets

There are two financial assets, money M_t and bonds B_t .

The bonds are indexed to the dollar exchange rate, so there is no devaluation risk. Real domestic returns equal the constant external interest rate r^* , while nominal returns are given by the interest rate i_t , where $e_t \equiv (e_t \cdot e_{t-1}) / e_{t-1}$ is the rate of devaluation.

$$1 + i_t \equiv (1 + \varepsilon_t)(1 + r^*) \quad (3)$$

We assume a simple cash-in-advance constraint, which leads to a consumption tax. Though consumers earn i_t on their holdings of the indexed bond B_{t-1} , they are subject to a withdrawal penalty if they convert it into cash to undertake consumption expenditure, $M_t = C_t$: consumers forego any interest on those amounts, which accrues to the government as tax revenues, $T_t = i_t M_t$ (the same would apply to a cash advance).³ In this setting, devaluation, through its influence on the nominal rate of interest, acts as a tax on consumption.

Government spending, in nominal terms, is $G_t = w_t I_{gt}$. Besides raising taxes T_t , debt D_t can be issued to pay for public expenditure and to serve outstanding debt, leading to the per period government budget constraint $T_t + \Delta D_t = G_t + i_t D_{t-1}$.

The intertemporal budget constraint implies that the present value of taxes equals the present value of government expenditure, Γ (assuming initial and final debt are zero).

$$\Gamma = \sum_{t=1}^T \frac{T_t / e_t}{(1 + r^*)^t}, \quad \text{where} \quad \Gamma \equiv \sum_{t=1}^T \frac{G_t / e_t}{(1 + r^*)^t} \quad (4)$$

³ Nicolini (1997) contrasts the cash in advance constraints proposed by Lucas in 1980 and Svensson in 1983. Our setup resembles Lucas, where consumers can readjust money balances immediately by exchanging bonds (we also allow consumers to obtain cash advances).

Consumption

The representative consumer has a concave, additive utility function, with a subjective discount factor of $1/(1+d)$ per period.

$$U = \sum_{t=1}^T \frac{u(c_t)}{(1+\delta)^t} \quad (5)$$

Labor supply is inelastic at a level of l , and the public good is also constant at a level of g , so neither enter the utility function explicitly.⁴

The per-period budget constraint is that total nominal income, $Y_t = w_t(l_{ct} + l_{gt})$, plus interest earned on net bond holdings, equal consumption expenditure, $C_t = p_t c_t$, plus financial asset accumulation, $Y_t + i_t(B_{t-1} - M_t) = C_t + \Delta B_t$.

With no initial or final asset holdings, the inter-temporal budget constraint implies that the present value of consumption cum consumption taxes equals total wealth, W , i.e. the present discounted value of income.

$$W = \sum_{t=1}^T \frac{(C_t + i_t M_t)/e_t}{(1+r^*)^t}, \quad \text{where } W \equiv \sum_{t=1}^T \frac{Y_t/e_t}{(1+r^*)^t} \quad (6)$$

The optimization problem of the consumer is to maximize utility subject to the cash-in-advance and wealth constraints:

$$L = \sum_{t=1}^T \frac{u(c_t)}{(1+\delta)^t} + \lambda \sum_{t=1}^T \frac{Y_t/e_t - (1+i_t)C_t/e_t}{(1+r^*)^t} \quad (7)$$

The first-order conditions for consumption imply that the effective price of consumption each period is the price in dollars augmented by the nominal interest rate (cf. Calvo, 1986). Letting $d=r^*$, the time path of consumption only depends on the effective price each period.

⁴ Leisure and public consumption goods are thus ignored in the analysis. Both the provision of public goods and the labor-leisure decision could be made endogenous, to yield political spending and business cycles. However, this is not necessary for our present purposes.

$$\frac{u'(c_t)}{(1+\delta)^t} = \frac{\lambda}{(1+r^*)^t} (1+i_t) \frac{P_t}{e_t}, \quad \text{for } t=1,2,\dots,T \quad (8)$$

Market equilibrium conditions

Labor can be employed by firms, or by the government. The labor market clears when the fixed supply equals demand.

$$l = l_{ct} + l_{gt}, \quad \text{for } t=1,2,\dots,T \quad (9)$$

Given the fact that the consumption good is tradable, equilibrium for the private good requires that the present value of consumption and production be equal. Production of the public good must equal, each period, the exogenously given level g .

$$\sum_{t=1}^T \frac{y_{ct}}{(1+r^*)^t} = \sum_{t=1}^T \frac{c_t}{(1+r^*)^t}, \quad (10)$$

$$y_{gt} = g, \quad \text{for } t=1,2,\dots,T$$

Optimal rate of devaluation

A social planner that maximizes a representative consumer's utility, subject to the market equilibrium conditions, solves:

$$L = \sum_{t=1}^T \frac{u(c_t)}{(1+\delta)^t} + \lambda \sum_{t=1}^T \frac{f_t(l_{ct}) - c_t}{(1+r^*)^t} + \sum_{t=1}^T \frac{\eta_t}{(1+\delta)^t} (f_t(l_{gt}) - g) + \sum_{t=1}^T \frac{v_t}{(1+\delta)^t} (l - l_{ct} - l_{gt}) \quad (11)$$

The first order condition for optimal consumption yields

$$\frac{u'(c_t)}{(1+\delta)^t} = \frac{\lambda}{(1+r^*)^t}, \quad \text{for } t=1,2,\dots,T. \quad (12)$$

Since $d=r^*$, consumption smoothing is optimal. Comparing (12) to (8), which consumers face in the market, and given that r^* is constant, the optimal rate of devaluation is constant. Thus, tax rates, defined by $\tau_t = i_t/(1+i_t)$, should be

constant. This policy is consistent with the Barro (1979) result of tax smoothing under distortionary taxation.

What determines the level of the optimal tax rate? From (4) and (6), $\tau^{opt} = i^{opt}/(1+i^{opt})$ is determined by the ratio of the present discounted value of government expenditure to wealth.

$$\tau^{opt} = \frac{\Gamma}{W}, \quad \text{where } \frac{\Gamma}{W} = \frac{\sum_{t=1}^T \frac{p^* l_{gt}}{(1+r^*)^t}}{\sum_{t=1}^T \frac{p^* l}{(1+r^*)^t}} \quad \text{and } l_{gt} = g/(1+\gamma_t) \quad (13)$$

A rise of government competency in the future, indicated by a larger g_t , for $t=2,3,\dots,T$, frees up labor for private production, so the optimal tax rate τ^{opt} falls.

Trade-off between current and future devaluation

Though tax-smoothing is optimal from a welfare perspective, the government can lower current devaluation incurring debt. Later, it must recur to a higher devaluation to pay off that additional debt, as in the Sargent-Wallace trade-off between present and future inflation.

The trade-off between current and future devaluation is analyzed for the case of constant relative risk aversion utility functions, where $u(c_t) = c_t^{1-\rho}/(1-\rho)$ and $\tau \geq 0$.

$$\frac{u'(c_t)}{u'(c_t')} = \frac{1+i_t}{1+i_t'} \Rightarrow \text{with CRRA} = \rho, \quad \frac{c_t}{c_t'} = \left[\frac{1+i_t}{1+i_t'} \right]^{-1/\rho} \quad (14)$$

Let $i_t = i_t'$, for $t=2,3,\dots,T$, to analyze the trade-off between decisions now and in the future. Introducing the identities $\tau_t = i_t/(1+i_t)$, and $(1+i_1)/(1+i_t) = (1-\tau_1)/(1-\tau_t)$, future tax rates can be expressed as a function of current tax rates.⁵

⁵ By (6) and (14), current consumption is a function of W and interest rates; by (4) and (14), it is a function of G and interest rates. Equating both expressions to eliminate

$$\tau_f = \left(\alpha \left(\frac{1 - \tau_f}{1 - \tau_1} \right)^{1-1/\rho} + 1 \right) \frac{\Gamma}{W} - \alpha \left(\frac{1 - \tau_f}{1 - \tau_1} \right)^{1-1/\rho} \tau_1, \quad \text{where } \alpha \equiv \frac{1}{1+r^*} \sum_{t=2}^T \frac{1}{(1+r^*)^t} \quad (15)$$

Here, $\alpha = 1+r^*$, for $T=2$, and decreases towards r^* , as T tends to infinity. With log utility (CRRA $\rho=1$), there is a linear trade-off between current and future taxes. However, the data points to a higher degree of risk aversion. Reinhart and Végh (1994), for instance, report that most estimates of the intertemporal elasticity of substitution (the inverse of the relative rate of risk aversion) are significantly different from zero, but below 0.80, so CRRA $\rho > 1$.

Lemma 1: For CRRA $\rho \geq 1$, there exists a strict trade-off between current taxes τ_1 and future taxes τ_f for values of $\tau_1 \leq G/W$. (cf. Appendix for proof).⁶

Trade-off between current and future consumption

Our last step is to show there is one-to-one relationship between current taxes and current consumption.

By Lemma 1, for $\tau_1 \leq G/W$, future taxes rise as current taxes fall, so relative future taxes rise; by first order condition (14), current consumption rises in relation to future consumption; because the resource constraint of the economy is given by $W - \Gamma$, a constant, current consumption also increases in absolute terms.

These facts allow us to use tax rates and consumption interchangeably over the relevant interval. This is analytically convenient: whatever the value of r , by (10), (6) and (4) there is a linear trade-off between current and future consumption.

consumption, the result in text can be derived.

⁶Simulations with CRRA functions in neighborhood of τ^{opt} show that the relationship is concave for $\rho > 1$, and convex for $\rho < 1$.

$$c_f = (1 + r^*)\alpha(W - \Gamma) - \alpha c_1 \quad (16)$$

This trade-off between present and future consumption can be exploited by an opportunistic incumbent in a setting of incomplete information, to make itself look more competent and increase its chances of reelection.

III. The political model: competence and opportunism

We now introduce elections, voters, and politicians under asymmetric information. Importantly, not only the capability but also the moral character of politicians is unknown to voters.⁷

The incumbent has an informational edge about its future competency, $i=c,nc$, which is not linked to current competency. The idea is that different periods have different salient issues which the incumbent may be more or less qualified to handle. Voters do observe current devaluation and debt.⁸

Incumbents can also differ in their opportunism, $i=o,no$, which in our model is reflected by how much an incumbent values sticking to power, beyond any commitment towards public welfare (this streak of character does not entail a political cost per se). Let $s_t=1$ when candidate s is incumbent, and $s_t=0$ when not. While a non-opportunistic incumbent has the same CRRA $\rho \geq 1$ utility function as the representative consumer, an opportunistic incumbent derives an additional pleasure from holding office,

$$Z = U + \sum_{t=1}^T \frac{z^i(s_t)}{(1 + \delta)^t}, \quad z^o(1) > 0, z^o(0) = z^{no}(0) = z^{no}(1) = 0 \quad (17)$$

The priors about candidates are that they are competent with probability q (incompetent with probability $1-q$) and opportunistic with probability s (non-opportunistic with probability $1-s$).

⁷ This relates to Covey et al. (1995), p. 240-1, who emphasize the twin dimensions of competence and character. Taking the case of a doctor, they remark that we require a doctor to be both competent (to make the right diagnosis and prescribe the right therapy) and honest (to not submit you to a surgery you don't need).

⁸ If current competency were relevant for future competency, we would additionally have to assume government debt is unobservable.

We take a two-period model, $T=2$, where elections are held at the end of $t=1$. After the benchmark case of complete information, incomplete information on competency is analyzed. We then concentrate on the consequences of a general model that includes incomplete information on both the incumbent's competency and opportunism. Finally, we briefly sketch how distortionary behavior becomes more likely under both the restricted and the general informational setups, as the time horizon is extended.

Complete information

Each period, the timing is that the government sets taxes, and then consumers decide the level of consumption. There are elections at the end of the first period.

The government picks taxes, but the signaling game is simplified replacing taxes by the implied level of consumption. Thus, for given levels of resources $W-G_i$ available under $i=c,nc$, the indirect utility function depends on q (the probability that second period incumbent is competent) and on current consumption.⁹

In the second period, tax decisions are trivial: to close the budget, $c_2^i = c_2^i(c_1)$, according to whether second-period incumbent $i=nc,c$.

In the first period, the incumbent has to decide the level of taxes, taking into account voter reactions. Indirect utility is increasing in q , so voters reelect an incumbent only if their expected utility is higher than with candidate elected at random, i.e., if the conditional probability that incumbent is competent is larger than q . Thus, voters will want to reelect a competent, and replace an incompetent, incumbent.

Since the government cannot affect its chances of reelection, it just picks the optimal policy. At the optimum, the marginal utility of consumption today must equal the expected utility of consumption tomorrow.

$$u'(c_1) = \theta u'(c_2^c(c_1)) + (1-\theta)u'(c_2^{nc}(c_1)) \quad (18)$$

⁹ It is as if the planner were directly choosing current consumption. Current consumption determines future consumption by linear trade-off (16).

Optimal first period consumption is increasing in q .¹⁰ Thus, an incumbent that is competent to handle future issues will assure high current consumption: denote it c_1^c . An incumbent that is incompetent will not be reelected: denote consumption c_1^m , the optimum under the "mix" of probabilities q and $1-q$ that the second period replacement may be competent, or not.

Thus, working by backwards induction, the subgame-perfect equilibrium is separating: elections provide a way of sorting out better candidates for the job of government.

Incomplete information on government competency

If voters cannot observe the degree of competency, it turns into a signaling game. Applying perfect Bayesian equilibrium, a separating equilibrium still stands.

In a separating equilibrium, consumption will be either low or high. The high level is that signal c_1^s only a competent incumbent is willing to send in equilibrium. This signal guaranties reelection, since $q=1$. For out of equilibrium values of consumption, we assume the following updating scheme:

$$\begin{aligned} c_1 < c_1^s &\Rightarrow \Pr(\text{reel } i) = 0 \\ c_1 \geq c_1^s &\Rightarrow \Pr(\text{reel } i) = 1 \end{aligned} \quad (19)$$

To find the actual c_1^s , the signaling game can be couched in terms of the gains and costs, for the different types of incumbents, of sending c_1^s .

The gain G is the utility of being in office in the second period. The cost of signaling C depends on the incumbent's type: it is the difference between indirect utility V at c_1^m , when the incumbent does not signal and is not reelected (the optimal signal discussed above), and at c_1^c , when it signals and is reelected; it can be broken down into the two terms in brackets, a fixed and a variable component.

¹⁰ A greater q puts more weight on the high consumption state, and less on the low consumption state, in the second period, so by decreasing marginal utility optimal consumption must rise in the first period.

$$G = \frac{z(1)}{(1+\delta)^2}, \quad \text{and, for } i = nc, c,$$

$$C(c_1^s | i) = V(c_1^m | i) - V(c_1^s | i) = [V(c_1^m | i) - V(c_1^s = c_1^i | i)] + [V(c_1^s = c_1^i | i) - V(c_1^s | i)] \quad (20)$$

The fixed component for incumbent $i=nc$, for signal $c_1^s=c_1^{nc}$ (optimal consumption if second period incumbent is incompetent), is a fixed cost: the probability a competent is in office in the second period falls from q to 0. For incumbent $i=c$, for signal $c_1^s=c_1^c$ (optimal consumption if competent), it is a fixed benefit: the probability a competent is in office in the second period jumps from q to 1.

The variable component is due to the distortion in the optimal time profile of consumption.

$$\frac{\partial C(c_1^s | i)}{\partial c_1^s} = -\frac{\partial V(c_1^s | i)}{\partial c_1^s} = -\frac{1}{1+\delta} [u'(c_1^s) - u'(c_2^i(c_1^s))], \quad i = nc, c \quad (21)$$

Marginal costs are positive for the incompetent for $c_1^s > c_1^{nc}$, by the concavity of the utility function. Over the relevant range of signals $c_1^s \geq c_1^c$, an incompetent's costs are always above those of a competent: at c_1^c , $C(c_1^s=c_1^c | i=nc) > 0 > C(c_1^s=c_1^c | i=c)$, and by (21) the cost derivative of an incompetent are not only positive, but rising faster, than those of a competent.

If the cost for an incompetent of sending the signal c_1^c is larger than the gain from reelection, that is the separating signal. Otherwise, a higher level of consumption is needed, where an incompetent is just indifferent between sending the signal or not (if indifferent, we assume it does not signal). A competent, however, will wish to signal, since it has the same gain but lower costs at that point. Hence,

Proposition 1: with incomplete information on competency, there is always a separating equilibrium, where a competent incumbent picks $c_1^s \geq c_1^c$ and an incompetent incumbent picks c_1^m .

Using the Cho-Kreps intuitive criterion to restrict out-of-equilibrium beliefs, a pooling equilibrium can be ruled out, as in Rogoff and Sibert (1988),

and Rogoff (1990).¹¹

Incomplete information on government opportunism

Once the uncertainty of voters is not only about the incumbent competency, but also about its opportunism, a partially pooling equilibrium survives.¹²

The crucial fact for the partially pooling equilibrium is that the non-opportunistic, incompetent, incumbent always picks c_1^m . A high level of consumption c_1^c can thus work as an informative signal.

Table 1.
Signals picked by different types of incumbents

Competency		
	Low (1-q) c_1^m	High (q)
Opportunism	No (1-s)	c_1^c
	Yes (s) c_1^m or c_1^c	c_1^c

From the viewpoint of voters, the conditional probability that the incumbent is competent, if c_1^c is observed, is either $q/(q+(1-q)s)$, or 1. As long as $s < 1$, this probability will be higher than q , the probability that somebody elected at random is competent, since a non-opportunistic incompetent never sends that signal.

Voters that maximize expected utility thus reelect an incumbent that delivers c_1^c , and replace an incumbent with c_1^m . Given this behavior of voters, competent governments have no incentive to signal with a higher level of

¹¹There will be an interior solution with separating signals, because the CRRA functions comply with Inada conditions: marginal utility tends to infinity as consumption goes to zero, so marginal cost ultimately becomes prohibitive for incompetent incumbent (likewise, there must be an interior solution in taxes, since $c_t \rightarrow 0$ as $\tau_t \rightarrow 1$). This differs from Stein and Streb (1994), where there was a bound on the range of signals, so with "honest governments" there was a separating equilibrium, while for sufficiently "deceptive governments" a corner solution with a pooling equilibrium was hit.

¹²Gibbons (1992), chap. 4, discusses partially pooling, or semi-separating, equilibrium.

consumption, because it does not increase their chances of reelection and it distorts the optimal time profile of consumption.

Proposition 2: with incomplete information on competency and opportunism, there is a separating equilibrium with low opportunism, and there is a partially pooling equilibrium with high opportunism. In both equilibria, a competent picks c_1^c and a non-opportunistic incompetent picks c_1^m . An opportunistic incompetent switches from c_1^m to c_1^c if the gains are high enough.

The incumbent that distorts economic policy is not the competent, as in the conventional story, but rather the incompetent, that tries to masquerade as a competent incumbent, in our addition to this story.

Extension to $T \geq 3$

If the incomplete information models are extended to more periods, the possibility of opportunistic behavior increases. We spell out the details for $T=3$, working by backwards induction from a $T=2$ equilibrium without opportunistic behavior (i.e., where the gain from reelection does not compensate the cost of distortionary behavior). The extensions to a longer time horizon follow the same logic.

In the restricted setup with incomplete information on competency, when T goes from 2 to 3, consider the costs and gains of signaling. As to the costs, though the trade-off a between current and future consumption falls, the number of future periods increases: both factors exactly cancel each other out by fact that $d=r$.¹³

¹³Costs are in expected value. Period 1 incumbent knows its competency $i=c,nc$ for period 2. It cannot know competency $j=c,nc$ of period 3 incumbent, just the chances q it itself is competent, or $1-q$ it is not, in which case it is substituted, with probabilities q and $1-q$, by competent and incompetent. The problem simplifies by condition (18), which equates $u'(c_2^{i,m})$ to the expected value of $u'(c_3^{i,c})$ and $u'(c_3^{i,nc})$.

$$\begin{aligned} \frac{\partial EC(c_1^s)}{\partial c_1^s} &= \left[\frac{u'(c_1^s)}{1+\delta} \right] + \left[q \frac{u'(c_2^{i,c}(c_1^s))}{(1+\delta)^2 + (1+\delta)^3} \alpha + (1-q) \left[\frac{u'(c_2^{i,m}(c_1^s))}{(1+\delta)^2} \frac{dc_2^{i,m}}{dc_1^s} + \frac{u'(c_2^{i,m}(c_1^s))}{(1+\delta)^3} \frac{dE\zeta_3}{dc_1^s} \right] \right] \\ &= \left[\frac{u'(c_1^s)}{1+\delta} - q \frac{u'(c_2^{i,c}(c_1^s))}{(1+\delta)} - (1-q) \frac{u'(c_2^{i,m}(c_1^s))}{(1+\delta)} \right] \quad \text{for } i = nc, c, \text{ since} \\ \frac{dc_3^{i,c}}{dc_1^s} &= \frac{dc_3^{i,nc}}{dc_1^s} = \frac{dE\zeta_3}{dc_1^s} \quad \text{and} \quad \frac{dE\zeta_3}{dc_1^s} = -(1+r) \frac{dc_2^{i,m}}{dc_1^s} - (1+r)^2 \quad \text{by resource limits} \end{aligned} \tag{23}$$

Aside from the effect of risk aversion, the expected costs of signaling are not fundamentally affected by the extension of the time horizon. The expected gains from reelection, however, are clearly propped up by the fact that reelection for period 2 means to also win, with probability q (when period 1 incumbent's competency for period 3 is high), the option to be reelected for period 3.

$$EG = \frac{z(1)}{(1+\delta)^2} + q \frac{z(1)}{(1+\delta)^3} \tag{24}$$

Hence, for a given degree of opportunism $z(1)$, the option to win future elections can make the separating signal c_1^s become larger than c_1^c .¹⁴ And, for any given $z(1)$, as the horizon is extended beyond $T=3$, it becomes ever more likely that the separating equilibrium will actually be distortionary.

In the general setup with uncertainty both on competency and opportunism, we consider what happens when opportunism is a permanent trait of character (politicians can neither reform, nor spoil, themselves).

Given a period 2 equilibrium that is separating, the period 1 equilibrium in the general setup can become semi-pooling for the same reasons that the separating equilibrium can become distortionary in the restricted setup. A non-opportunistic incompetent will not pick c_1^c , so it is an informative signal that allows other types of incumbents to be reelected.¹⁵ An opportunistic,

¹⁴ For $T=3$, c_1^c has to be redefined to take into account uncertainty about incumbent's competency in period 3.

¹⁵ A non-opportunistic incumbent would only want to mimic c_1^c if the distortion caused by deviating from c_1^m were smaller than the gain, i.e., avoiding a similar distortion by an

incompetent incumbent, however, is more likely to pick c_1^c in period 1, since the gains from reelection rise: in line with expression (24) above, besides the gain from period 2 incumbency, there is an option value of reaping, with probability q , the gains from reelection in the separating equilibrium of the period 2 game. If there is a separating equilibrium for $T=3$, a further extension of the time horizon makes a semi-pooling equilibrium more likely.¹⁶

The extension of the time frame to $T=3$ thus makes it more likely for opportunistic behavior to distort economic outcomes both under the restricted and the general informational setups, because of the option value of future reelections.

IV. Empirical implications of the model

The model has implications for the behavior of exchange rates around elections. We compare the implications of the different information structures for the time profile of devaluations using the two-period model.

Our benchmark is what happens under complete information. A competent incumbent is reelected, smoothing taxes and setting a constant rate of devaluation. An incompetent incumbent loses the elections, setting the devaluation rate optimally given that it will be replaced by a competent with probability q and by an incompetent with probability $(1-q)$: after the elections, the devaluation rate decreases if the new government is competent, and increases if it is incompetent. However, in expected value there is no distortion before elections.

incompetent opportunist that is incumbent in period 2. This, however, is impossible, since it would have to distort for sure in period 1, to avoid a probability $s(1-q) < 1$ of an incompetent, opportunist, incumbent distorting in period 2.

¹⁶This second model includes the first one. When opportunism is a lasting trait, an opportunistic, incompetent incumbent reveals its character once it deceives voters. For $T=3$, if the period 1 incumbent reveals, by cheating, it is opportunistic, in period 2 we revert to the restricted model of incomplete information, where the incumbent must show for sure it is competent in order to be reelected. For $T>3$, since an incumbent that is opportunistic will not be reelected once it reveals it is also incompetent, the model reverts to the general case until a new disappointment arises (i.e., an incumbent that shows it is both opportunistic and incompetent).

Under incomplete information about competence, the incompetent behaves like under complete information, losing the elections for sure. The competent incumbent may pick the optimal rate of devaluation, unless there is a great degree of opportunism, in which case it must signal, before elections, with a devaluation rate below the optimal one, and, after elections, it has to increase the devaluation rate to satisfy its budget constraint. Hence, in expected value the optimal time profile of devaluation can be tilted (downwards today, upwards in the future) by a competent incumbent.

Under incomplete information about competency and opportunism, an incompetent government that is not opportunistic reveals its type and loses the elections. A competent incumbent will smooth the devaluation rate and be reelected, as under complete information. An opportunistic, incompetent, incumbent might be tempted to mimic the competent to win the election, so a partially pooling equilibrium can emerge. Hence, in expected value a tilt in the optimal time profile can again take place when an incumbent is reelected.

Obviously, although in the model competence is observed ex-post, empirically it is not easy to distinguish the competent and incompetent, or the degrees of opportunism. However, either of the two incomplete information setups imply that when governments do manipulate the exchange rate, they manipulate it in the same direction: postponement of devaluations until after elections. This will be done by the competent if all governments are known to be opportunistic, and by an opportunistic incompetent if some are not opportunistic. This captures the empirical regularities mentioned in Gavin and Perotti (1997) and Klein and Marion (1994).

The difference between the two informational setups is not only about who distorts policy. There is a difference in the probability a devaluation takes place after elections. The predictions of the restricted model are not very binding, since a government that is reelected can either devalue with probability 1 or 0, according to whether the separating signal is distorting or not (it can either be less or more likely than a new government to devalue, since new governments devalue with probability $1-q$). The extended model, on the other hand, has another falsifiable implication when opportunism is an unknown: the chances a government that is reelected devalues are lower than for a new government (0 and $s(1-q)/(s(1-q)+q)$) are both smaller than $1-q$). It might be interesting to check empirically if the probability of a devaluation depends on

whether the incumbent (or incumbent party) is reelected or not. However, the influence of other factors that affect the outcome of elections would have to be accounted as well.

V. Conclusions

We presented a rational political budget cycle model for an open economy, where elections play a key role in explaining movements in nominal exchange rates.

To the standard setup of this class of models, which introduces incomplete information regarding the competence of the government, we added a twist: incomplete information regarding the degree to which the incumbent is opportunistic. As a result, we can obtain a partially pooling equilibrium where the incompetent deviates from optimal policy, rather than just the standard separating equilibrium where the competent might have to deviate to signal its competence. In the run-up to an election, an incompetent and opportunistic government can be tempted to reduce the rate of devaluation, increasing it after the elections take place.

A number of authors, such as Gavin and Perotti (1997) and Klein and Marion (1994), have found an empirical link between elections and the timing of devaluations. The model in this paper links both phenomena analytically and is consistent with the evidence. By focusing on the abandonment of pegs or on regime switches, however, the empirical studies do not use all the information available to answer the question of whether the rate of devaluation is lower in the period leading to an election, as compared to the period immediately following the election. We intend to fill this void in a future paper.

The fact that governments tend to postpone devaluations until after elections can also be used to explain why exchange rates can become overvalued before elections. However, this implication cannot be derived in a one good economy, so the distinction between tradables and non-tradables must be introduced to address this issue.

In summary, the insights of the paper are simple: first, to make explicit the implications of political budget cycles for nominal exchange rates, and, second, to recognize the information asymmetry that voters face regarding both the competence and the character of politicians, generalizing the conventional

story on voter behavior.

Appendix

Lemma 1: For CRRA $\rho \geq 1$, there exists a strict trade-off between current taxes τ_1 and future taxes τ_f for values of $\tau_1 \leq \Gamma/W$.

Proof: differentiating (16),

$$\frac{d\tau_f}{d\tau_1} = \frac{-\alpha \left(\frac{1-\tau_f}{1-\tau_1} \right)^{1-1/\rho} \left(1-\tau_1 + \left(\tau_1 - \frac{\Gamma}{W} \right) \left(1 - \frac{1}{\rho} \right) \right)}{1-\tau_1 - \alpha \left(\tau_1 - \frac{\Gamma}{W} \right) \left(1 - \frac{1}{\rho} \right) \left(\frac{1-\tau_f}{1-\tau_1} \right)^{-1/\rho}}$$

When $\tau_f = \tau_1$, both tax rates equal $\tau^{\text{opt}} = \Gamma/W$. Hence, the derivative at that point equals $-\alpha < 0$. If $\tau_1 < \Gamma/W$, the denominator is positive. Since $0 \leq (1-1/\rho) \leq 1$, and $1-\tau_1 \geq \Gamma/W - \tau_1$, $1-\tau_1 \geq (\Gamma/W - \tau_1)(1-1/\rho)$, the numerator is negative.

Note: τ_f cannot exceed one, so a lower bound on τ_1 exists.

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