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The Trade-off between Monetary and Fiscal Stability: International Lenders and Political Instability

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The Trade-off between Monetary and Fiscal Stability: International Lenders and Political Instability

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Abstract

This paper analyses the intertemporal public finance decision under political instability. The government's choice between inflationary finance and foreign debt is constrained by an interest rate, which is affected both by market conditions and debt conditionality. The main result is that there is typically a trade-off between seigniorage taxation and foreign debt. There are two implications. First, monetary and fiscal stability can typically not be achieved at the same time. Second, myopic behaviour produced by political instability leads to a reduction of seigniorage, not to an increase as argued, for instance, by Cukierman, Edwards and Tabellini (AER, 1992).

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Keywords: debt conditionality; seigniorage; government deficit; public finance; political instability, developing countries.

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1 Introduction

Public finance decisions in many developing and transition countries are and were often plagued by three political economy problems which reinforce one another. First, foreign and domestic bondholders lose confidence in any form of bond issue and are no longer willing to hold government debt. Second, loans on international credit markets are expensive or curtailed because of bad macroeconomic performance. International financial institutions like the International Monetary Fund (IMF) apply conditions to their credits (debt conditionality). Third, given that existing tax collection problems cannot be overcome in the short run, there is typically pressure on the government to use seigniorage for financing government expenses.

On top of these obstacles, public finance decisions are typically also affected by more directly political considerations. In particular, political instability is known to produce myopic behaviour by the government in power. There are two types of related literatures. The first one is about re-election chances and the government's short term measures to influence them.[1] The other type either simply ignores the electoral process or argues that elections are not appropriate for modelling the country-specific situation.[2] In this case, the incumbent government also highly discounts the future in favour of short term gains.[3] More cynically, one could say that the government tries to secure the spoils at least for the foreseeable future.

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[1] This is the argument of the traditional political business cycle literature (e.g. Nordhaus, 1975) as well as the modern (*endogenous*) political instability literature where the instability originates in electoral uncertainty (e.g. Tabellini and Alesina, 1990).

[2] The insurrection literature (e.g. Grossman, 1991) captures the exogenous or endogenous probability of uprisings. Closely related is the literature on *exogenous* political instability: the government also faces an exogenous chance of losing power. Real world examples include the threat of a coup d'état or revolution as well as some unforeseeable event such as the terrorist attack in Spain prior to the elections in March 2004.

[3] In Cukierman, Edwards and Tabellini (1992), for instance, the government prefers the immediate benefit from seigniorage to the longer term effects of structural change. In Devereux and Wen (1998) the result is more public spending at the expense of economic growth. Svensson's (1998) model produces a low level of property rights investment, which hampers private investment in the future. In Bohn (2005) the government reduces public investment due to various forms of political instability. In Bohn (2000) the government goes for high levels of seigniorage, even though international institutions apply debt conditionality on monetary stability, thereby providing less foreign debt.

Political uncertainty without elections often occurs in more or less authoritarian developing countries with a high degree of social or ethnic heterogeneity (henceforth polarisation).

This paper analyses the intertemporal public finance decision under exogenous political uncertainty and exogenous polarisation. The government finance decision is constrained by the aforementioned absence of domestic debt and the inability to change either tax base or tax rate. Public goods are financed by three sources of government revenue: a given proportional tax, seigniorage and foreign debt. The amount of available debt is determined by an interest rate, which is affected both by market conditions and debt conditionality. In this setup, the optimal choice of the government exhibits a trade-off between inflationary finance and foreign debt. Monetary and fiscal stability can typically not be achieved at the same time. The main mechanism is that political instability increases an incumbent government's effective discount rate for future periods and hence reduces its concern for future debt repayment obligations. Even though the interest rate is endogenous, it is typically optimal to increase government debt and reduce seigniorage, when political instability goes up. This paper, therefore, contradicts Cukierman, Edwards and Tabellini's (1992) as well as Bohn (2000) who find that political instability leads to more seigniorage.

This paper extends the existing literature in two respects. First, it provides a more comprehensive view of alternative sources of government revenue. Cukierman, Edwards and Tabellini (1992) model seigniorage and taxation, Devereux and Wen (1998) capture domestic debt and taxation, and in Svensson's (1998) model there is only taxation. In contrast, this paper captures three alternative sources of government revenue. In particular, the model in this paper includes foreign debt because foreign debt is a crucial source of revenue in developing countries with inherent (exogenous) political instability. Second, this paper emphasises the importance of the intertemporal setup. In Bohn (2000), international financial institutions give credits in response to previous period monetary stability (*ex ante* debt conditionality). The government tries to comply in order to benefit from foreign debt in the future. However, increased myopia due to more political instability means more

heavily discounted future benefits. Hence the government prefers high levels of seigniorage now while accepting less credits being made available by international financial institutions in the future. In Cukierman, Edwards and Tabellini (1992), the mechanism is similar. More instability means that seigniorage now is more appreciated and a tax reform affecting future revenue will be valued less (especially in a polarised society where the other government has other priorities). Here, however, the situation is different. Foreign credits depend on *contemporaneous* debt conditionality. Myopia produced by political instability reduces the perceived burden of debt repayment and the government wants to borrow as much as possible. This can be exploited by the government by reducing seigniorage. Therefore, the findings here contradict those in Bohn (2000) and Cukierman, Edwards and Tabellini (1992).

The remainder of the paper is organised as follows. Section 2 presents the intertemporal framework of the theoretical model. Section 3 summarises and simplifies the government maximisation problem. Section 4 discusses the impact of political instability and debt conditionality. Section 5 concludes.

2 The Model

The model captures the intertemporal decision problem of the government, in particular the optimal choice between revenue from debt and inflation tax. It consists of two periods: period 1 (current period) and period 2 (final period). There are two sectors in the economy: (i) the government and (ii) the private sector. The model is specified in real terms.

Government Preferences and Political Instability

Government preferences over periods 1 and 2 are given by the following total utility (or welfare) function:

$$W = V_1(C_1) + H_1(G_1, F_1) + E\{\rho\,(V_2(C_2) + H_2(G_2, F_2))\}. \tag{1}$$

The $V.(\bullet)$ functions are concave and twice continuously differentiable utility functions of the government in private sector consumption C (henceforth private consumption utility). The $H.(\bullet)$ functions are utility functions in the government provision of public goods G and F (henceforth public goods utility). E is the expectation operator and $\rho < 1$ is the government discount factor. Total government utility is additively separable in two senses: first, with respect to periods; and second, with respect to utility derived either from private consumption or from public goods provision.

Assuming two types of governments[4] political instability comprises two features: (i) the probability of government change and (ii) political polarization. After the first period the incumbent government may lose office to the other set of policymakers with a fixed probability π; it stays in power with probability $(1 - \pi)$.[5] It is assumed that there are two ethnic or social groups. Each one benefits more from one of the two public goods. Each of the two types of government provides both types of public goods, but to differing degrees. Political polarization then depends on the differences of policymakers' preferences with respect to

[4] Their objectives are basically identical. They only differ in that the two types of policymakers (symmetrically) provide different amounts of two public goods (or support two group interests to different degrees). In fact, the chance of another government with opposite objectives taking over in the next period is what produces the political instability and hence myopic behaviour.

[5] In a multi-period setting, this random change of government at fixed intervals would be referred to as Markov switching (or Markov chain). If several time periods were considered and their lengths were fixed, for instance, at six months, some governments would only be in power for half a year, fewer would last for a year, and fewer yet for any longer period of time. This is a simple way of describing government change, but it matches the situation in many developing or transitional countries. In Russia, for instance, there were 5 changes of government in 1998 and 1999 despite the fact that no Duma or presidential elections were held. President Yeltsin alternately replaced representatives of the nomenclature (Chernomyrdin, Primakov, Putin) with so-called reformist Prime Ministers (Kiriyenko, Stepashin) in arbitrary and irregular intervals.

their public good provision. The public goods utility function H is specified for one type of government (for the other type, α must be replaced by $(1-\alpha)$):

$$H(G,F) = \frac{1}{\alpha(1-\alpha)} \min\{\alpha G, (1-\alpha)F\}. \tag{2}$$

For simplicity, their disagreement in public goods provision is parameterized symmetrically by α which is exogenous. The denominator in equation (2) is a normalization such that

$$H(G,F) \;=\; F+G \;=:\; X, \tag{3}$$

where X is the total public goods provision and the marginal public goods utility $H'(X)$ equals unity (cf. section 3 and appendix A). Without limiting the general validity of the analysis, it is assumed that $1 \geq \alpha \geq \frac{1}{2}$. When α equals half, the two types of government have identical preferences; the more distant α is from half, the more they disagree on how much to spend on each of the two public goods. If preferences of both policymaker types are very dissimilar, political polarization is large. Political polarization measured by α contributes to political instability because it accounts for the extent of preference changes given a change in government. For α equals half, the political instability effect of a government change is eliminated.

Budget Constraints

The government budget constraints for both model periods (1 and 2) are:

$$\begin{aligned} G_1 + F_1 &\leq \tau\bar{Y} + S_1 + D. \qquad (4) \\ G_2 + F_2 + (1+r)D &\leq \tau\bar{Y} + S_2. \end{aligned}$$

Real government expenditure consists of consumptive spending only (except for debt repayment in period 2). F_1, G_1, F_2 and G_2 are the amounts chosen by the government to

spent on the two types of public goods in both periods. There are three sources of government revenue (right hand side). The focus is on the alternative choice of debt versus inflation taxation. Seigniorage is a government instrument both in period 1, S_1, as well as in period 2, S_2. At the same time, the government can choose to borrow on international credit markets in period 1, but has to repay its debt D, which is done in the final period (so that the model is closed). If the government discount factor ρ in equation (1) equalled the international discount factor, $\frac{1}{1+r}$, the government would always want to increase debt under political instability because there is a chance that another government would have to repay the debt. However, r is endogenous (as discussed further down) and the government is, therefore, price constrained in its choice of D. Following the parsimonious model notion, ordinary taxation is modelled at a rudimentary level only. It is calculated from exogenous tax rate τ and exogenous tax base $\bar{Y}$.[6]

The private sector budget constraints for both periods are simply:

$$C_1 \leq (1-\tau)\bar{Y} - S_1 - \gamma(S_1). \tag{5}$$

$$C_2 \leq (1-\tau)\bar{Y} - S_2 - \gamma(S_2).$$

Each period real private consumption depends on real income net of non-distortionary taxes minus inflation taxation and its deadweight loss γ. The function γ is assumed to be rising and convex in seigniorage ($\gamma' > 0$, $\gamma'' > 0$). Intuitively, this is a reasonable (though not compelling) assumption because the marginal increase in seigniorage at a higher level of seigniorage is typically associated with a more substantial rise in inflation compared to the rise of inflation at a lower level of seigniorage (Cagan, 1956).[7] For simplicity, it is assumed that γ is the same in both periods, but this has no bearing on the results.

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[6] This implies two simplifying assumptions: (i) this is a no growth economy; and (ii) the tax rate cannot be changed. It also implies that taxes are non-distortionary.

[7] Direct welfare costs include the shoe leather, the Olivera-Tanzi and redistribution effects. It suffices that the overall effect of inflation on welfare costs are linear, it may even be slightly concave. In developing and transition economies the effect of inflation on welfare costs is, however, more likely to be convex because high levels of inflation typically also erode the trust of the private sector in using the national currency for

The model could be interpreted in per capita terms, but the private sector is passive in the sense that it cannot take optimizing decisions on labor, savings or investment. Thus, there is no income growth and the two private sector budget constraints are not directly linked intertemporally. With regard to the privat sector budget constraint the model is similar to the model in Cukierman, Edwards, and Tabellini (1992).

Debt and Debt Conditionality

Debt conditionality could be modelled to be purely quantity-constrained, if we assumed a total loss of a country's credit-worthiness with commercial lenders. Then the IMF would lend a certain amount of funds depending on some performance criteria. In this paper, however, a broader view is taken. It is assumed that the country in question has full access to international credit markets. There is no debt ceiling; instead, debt is price-constrained: the more the country wants to borrow, the higher the interest rate. In addition, international financial institutions still exert some influence. If they withdraw (part of) their credits because the country fails to fulfill certain debt conditionality criteria, the interest rate rises, but the country is still able to borrow from commercial lenders.

The willingness of international financial institutions like the IMF or the World Bank to lend depends on criteria referred to as debt conditionality. The aim is not only to avoid default and ensure repayment; instead debt conditionality is typically motivated by more general considerations such as economic and political stability or long run growth. In this paper, two performance criteria (Ray, 1998) as employed by the IMF (Guitián, 1995) are used: (i) deficit to GDP ratio (deficit reduction criterion); and (ii) money supply growth ($\hat{M}$, monetary stability criterion). As GDP equals exogenous income here, the GDP ratio criterion (i)

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transactions. Thereby, the levels of barter trade and currency substitution in the economy are raised. Thus welfare losses are caused by seigniorage directly as well as through its effect on barter and currency substitution. Barter has been a problem in many developing and transition countries, in particular in Russia, and currency substitution was a wide-spread problem, for instance, in Eastern European as well as Latin American countries.

reduces to deficit (equal to debt D in this model). As for the monetary stability criterion (ii) we derive the following relationship between S and $\hat{M}$ from the quantity equation ($M * V = Y * P$, V being velocity) together with the definition of real seigniorage ($S \equiv \frac{\dot{M}}{P} = \frac{\dot{M}}{M}\frac{M}{P}$) and the exogeneity of Y in the first period: $S = \hat{M}\frac{\bar{Y}}{V}$. Instead of basing the criterion on the money supply growth rate, it can also be based on seigniorage S (while acknowledging that fluctuations in V can affect S).

Endogenous Interest Rate

While incorporating both commercial and institutional lenders, the interest rate equation remains fairly general:

$$r = \zeta(D, \phi(D, S_1, \delta, \sigma)) = \psi(D, S_1, \delta, \sigma). \tag{6}$$

The ζ function distinguishes between the positive impact of an increase of the quantity of debt on the interest rate and the equally positive effect of debt conditionality function ϕ, where δ and σ represent IMF conditionalities with respect to deficit (which corresponds to debt D in this 2-period model) and inflation (which is measured by seigniorage in period 1, S_1). Most of the following assumptions on equation (6) are straightforward:

$$\text{(i)} \quad \psi_k > 0, \qquad \text{where} \qquad k = D, S_1, \delta, \sigma \tag{7}$$

$$\text{(ii)} \quad \psi_{DD} > 0,$$

$$\text{(iii)} \quad \psi_{S_1S_1} \geq 0 \qquad \text{or} \qquad \frac{(1-\gamma')^2 V'' - \gamma'' V'}{\rho\beta} \leq \psi_{S_1S_1} < 0,$$

$$\text{(iv)} \quad \psi_{DS_1} = \psi_{S_1D} \geq 0,$$

$$\text{(v)} \quad \psi_{D\delta} > 0 \qquad \text{and} \qquad \psi_{S_1\sigma} > 0,$$

$$\text{(vi)} \quad \psi_{D\sigma} = 0 \qquad \text{and} \qquad \psi_{S_1\delta} = 0,$$

Raising debt D, seigniorage S_1 or debt conditionalities γ and δ leads to an increase in the interest rate - as described by (i). Assumption (ii) reflects the dominant direct effect of D on the interest rate: at high levels of D, the interest rate explodes. Unsustainable levels of debt lead to prohibitive interest rates. Assumption (iii) refers to the second derivative with respect to S_1. It may be negative, but must be above some threshold (where β refers to political uncertainty and polarisation as discussed in section 3) to ensure that our government decision problem is a well-defined maximisation problem. One could have also made an argument for a direct effect of S_1 in ζ along the lines of assumption (ii). Assumption (iv) says that the cross-derivatives should, obviously, be non-negative. Assumptions (v) and (vi) reflect the idea of a conditionality, which means that the marginal effect of D (S_1) on the interest rate is increased by a rise in its respective conditionality factor δ (σ), but there are no cross-effects.

Even though the interest rate rises with reduced monetary ($S_1 > 0$) and fiscal ($D > 0$) stability, strategic default or debt renegotiations are not envisaged. There are three reasons for not incorporating either of them in the model: (i), from a conceptual point of view, the focus of the paper is on the choice between debt and seigniorage under political instability, not on the strategic game between the government and the international community (which is also interesting, but another paper); (ii), from a methodological point of view, it is difficult to capture both political instability and default in one and the same model (analytical results of a 2-period model would certainly not be possible); and (iii), empirically, default is much less relevant than commonly thought. According to International Development Association and International Monetary Fund (IDA and IMF, 2001) the incidence of recent debt rescheduling was only 12 percent in the group of some 60 countries which do not belong to the HIPC group (so-called heavily indebted poor countries).

3 Government Problem and Technical Complications

The government maximization problem and its solution are not straightforward for two reasons: (i) there is a time-inconsistency problem; and (ii) there are too many instruments. The time-inconsistency problem arises because the uncertainty about which government is in power is resolved before the government decides about seigniorage S_2 and public goods F_2, G_2 in the second period. Hence the government would have to reoptimise, if this were not taken into account. Therefore, the solution involves backward induction and the government optimisation in the first period is constrained by the optimal decision taken by any government in period 2.

Instruments and Public Goods Utility

Nonetheless, it is instructive to start by reviewing the maximisation problem in the first period as if there were no time-inconsistency problem: the government maximises total utility function (1) subject to constraints (4) and (5). The government has two types of instruments at its disposal: (i) its revenue choice between seigniorage and debt (S_1, S_2, D); and (ii) its decision on public spending on each of the two public goods in both periods (F_1, G_1, F_2, G_2). Increasing this period's revenue and spending it on public goods in period 1 raises contemporaneous public goods utility H. If the increase in revenue is due to an increase in period 1 seigniorage, government utility derived from private sector consumption is reduced at the same time. If it is paid for by more credits, the additional debt has to be repaid based on the going interest rate in period 2, which reduces funds available for public goods in period 2 and hence decreases utility derived from them. Credits and the intertemporal distribution of public goods spending are determined – inter alia – by the effective discount factor which also includes the effect of political instability as shown in equation (10) further down.

Equation (2), which refers to the specific (though quite sensible) assumption on public

utility H, has three specific implications. First, the optimal distribution of the total public goods spending between F and G is crosswise symmetrical for both types, say i and k, of governments (when in power). Second, government utility H derived from type i's choice of F and G (when in power) is equal to government utility derived from type k's choice (when in power):

$$H^i(G^i, F^i) = G^i + F^i = X^i = X = X^k = G^k + F^k = H^k(G^k, F^k). \tag{8}$$

Third, the (real) total value of public goods spending H is normalised – for each government – by the sum of its arguments (F+G), when chosen optimally by any incumbent government. (The marginal utility of public goods spending is unity.) For i and k representing different governments and $\alpha > \frac{1}{2}$ being assumed (without loss of generality), note, however, that government k's optimal choice for F and G is, of course, suboptimal for government i: $X^i = H^i(G^i, F^i) > H^i(G^k, F^k) = \frac{1-\alpha}{\alpha} X^i$.

Government Utility Simplified

On this basis[8], the government utility function (1), can be simplified. For each period separately, utility derived from private consumption and from public goods spending is considered for the government in power in period 1 only. Superscripts are only used for the other government (marked by k). In period 1, this government's optimal choice for F and G results in $H(G_1, F_1) = X_1$. Thus first period utility is

$$V(C_1) + H(G_1, F_1) = V(C_1) + X_1 \tag{9}$$

If this government is still in power in period 2 (with probability $(1 - \pi)$), it will choose F and G such that $H(G_2, F_2) = X_2$. If, however, this government loses power in period 2

[8] We also use two other earlier assumptions: (i), public goods spending F and G does not appear in the private sector budget constraints (5); and (ii), government objective function (1) is additively separable.

(with probability π), it has to put up with the public goods spending chosen by the other government, i.e. $H(G_2^k, F_2^k) = \frac{1-\alpha}{\alpha} X_2$. Hence its second period total expected utility is:

$$\begin{aligned} E \quad \{ \quad \rho \quad & (V(C_2) \; + \; H(G_2, F_2) \;) \} \qquad (10) \\ = \quad \rho \quad & \Big(\; (1-\pi) \; (V(C_2) + X_2) \quad + \quad \pi \; (V(C_2) + \frac{1-\alpha}{\alpha} X_2) \; \Big) \\ = \quad \rho \quad & (\; V(C_2) \; + \; \beta(\alpha, \pi) X_2 \;) \end{aligned}$$

Thus government utility in period 2 depends on the effective discount factor which comprises three exogenous parameters: discount factor ρ, political polarisation α and the probability of losing power π. The latter two parameters are subsumed under quasi-exogenous parameter β, which is to represent political instability:

$$0 \leq \beta(\alpha, \pi) = (1-\pi) + \pi \frac{1-\alpha}{\alpha} \leq 1. \qquad (11)$$

Note that political instability augments the effect of the discount factor: it lowers the valuation for the second period, i.e. it increases government myopia. Obviously, $\beta = 1$ if both governments have identical preferences ($\alpha = \frac{1}{2}$) or if the government stays in power with certainty ($\pi = 0$). For $\alpha = 1$ *and* $\pi = 1$, $\beta = 0$. In other words, β decreases with more political diversity (polarisation $\alpha \uparrow$) and/or more political uncertainty (probability of government change $\pi \uparrow$).

Equations (9) and (10) show that total government utility does not depend on the optimal distribution of public goods spending between F and G, but on its total amount. Nor does it depend on which government is in power. Nonetheless, the fact that there are two potential governments does have crucial implications for any government decision on the total amount of public goods spending as well as on credits and seigniorage, because political instability augments the discount factor. In fact, the model is constructed that way to allow for the analysis of political instability by itself (as, for instance, in Devereux and Wen, 1998, or

Svensson, 1998) as opposed to analysing the effect of different types of government with different objectives (as, for instance, in Aghion and Bolton, 1990, or Tabellini and Alesina, 1990).

Second Period Maximisation

Due to the time-inconsistency problem the second period maximisation problem must be solved first in order to obtain the overall solution:

$$\max_{S_2,F_2,G_2} \quad V(C_2) \quad + \quad H^j(F_2^j, G_2^j) \qquad\qquad j = i,k \tag{12}$$

$$\text{s.t.} \quad \text{(i)} \qquad G_2 + F_2 + (1+r)D \leq \tau\bar{Y} + S_2$$

$$\text{(ii)} \qquad C_2 \leq (1-\tau)\bar{Y} - S_2 - \gamma(S_2).$$

As the uncertainty of who chooses F_2 and G_2 is resolved, the expectation operator on public sector utility H vanishes. From equation (8) we know that both governments choose different levels of F_2 and G_2, but both governments' choices result in the same level of public goods utility. Hence constraint (i) can be substituted in irrespective of the government in power. With constraint (ii) also substituted in, we obtain the identical maximisation problem for either government and hence the identical optimal choice for S_2 (which could be used to solve the distribution problem by deriving $H(G_2, F_2) = F_2 + G_2$ and hence F_2 and G_2). The first order condition (FOC) with respect to S_2 for second period optimisation is:

$$(-1 - \gamma'(S_2))\; V'(C_2) \;+\; 1 \;=\; 0, \tag{13}$$

which simply states for period 2 that the loss in marginal private consumption utility due to an increase in second period seigniorage must equal the gain in marginal public goods utility (which is unity according to equation (3)). Note that optimal second period seigniorage is independent from the first period choice for D and S_1.

First Period Maximisation

The period 1 revenue and expenditure problem of the government can now be specified on the basis of government preferences as stated in (1) and equations (9) and (10). Government budget constraints (4) and private sector budget constraints (5) can be substituted into equations (9) and (10) for $F_t + G_t =: X_t$ and C_t, $t = 1, 2$, respectively. Considering the solution for the second period (which enters as a λ constraint), the fundamental maximisation problem is:

$$\begin{aligned} \max_{S_1, D, \lambda} \quad & V\left((1-\tau)\bar{Y} - S_1 - \gamma(S_1)\right) + \rho \; V\left((1-\tau)\bar{Y} - S_2 - \gamma(S_2)\right) \\ & + \left(\tau\bar{Y} + S_1 + D\right) + \rho \; \beta\left(\tau\bar{Y} + S_2 - (1+\psi)D\right) \\ & + \lambda \; \left((-1-\gamma'(S_2))\, V'(C_2) \; + \; 1\right) \end{aligned} \tag{14}$$

We obtain three first order conditions, with respect to S_1, D and λ. The latter corresponds to the aforementioned FOC derived from the maximisation in period 2 (equation 13). The other two are:

$$\begin{aligned} (-1-\gamma'(S_1))\, V'(C_1) \; + \; 1 \; - \; \rho\beta\psi_{S_1} \; &= \; 0 \\ 1 \; - \; \rho\beta(1+\psi) \; - \; \rho\beta D\psi_D \; &= \; 0 \end{aligned} \tag{15}$$

The first FOC requires that the marginal gain in public goods utility due to a marginal increase in first period seigniorage (which is unity due to the assumption made in equation 2) equals the marginal disutility of reduced first period private consumption plus the marginal disutility of discounted second period public consumption (which depends on the reaction of interest rate r on increased first period seigniorage, ψ_{S_1}). The second FOC equates the marginal gain in public goods utility in period 1 due to a marginal increase in debt (which is unity) with its discounted disutility in period 2. The latter consists of two effects, a volume

effect of increased D (which is $(1+\psi)\rho\beta$) and a price effect depending on the reaction of interest rate r on marginally increased debt D, ψ_D. Note that the discount factor is $\rho\beta$, i.e. it includes the impact of political instability.

4 Results

FOCs help to understand the mechanisms of the model and provide some prima facie understanding of effects, but they do not capture any feedback effects. The rest of the formal solution is technical and will only be sketched out here. Two more steps are required. First, FOCs are, of course, only the necessary conditions. The sufficient condition for a maximum is that the determinant of the Bordered Hessian of (14) must be positive. Finally, we want to characterize the impact of marginal changes of exogenous parameters on optimal values for government instruments. In the following, perturbation results are obtained for the four exogenous parameters of the model. The probability of government change π and political polarisation α are subsumed by β, the political instability parameter, which was introduced in equation (10). Parameters δ and σ indicate debt conditionality with respect to deficit and seigniorage, respectively. For all of these, perturbation results can be obtained, for instance, by deriving total differentials and using the Cramer Rule. There is no impact on second period seigniorage of any of the exogenous parameters, because second period optimisation is completely separate as derived in equation (13). For debt and first period seigniorage the results are as follows.

Political Instability

First, we are interested in the effect of political instability β on the optimal government choice of debt and seigniorage in period 1. Remember that both the probability of government change π and political polarization α are negatively related to β, which takes values between 0 (complete political instability) and 1 (perfect political stability). Applying total

differentials leads to the following perturbation result, which holds at the equilibrium.

Proposition 1 (Political Instability)

The impact of increased political instability (lower β) on debt and first period seigniorage depends on the specific functional format of the interest rate equation (as well as the functional format of private sector utility in period 1). For $\psi_{S_1} > 0$, but small, we obtain the following "normal reaction":[9]

(i) $\frac{dD}{d\beta} < 0.$

(ii) $\frac{dS_1}{d\beta} > 0$

Increased political instability means that the second period is less valued. Debt is now a less costly source of revenue than seigniorage. Additional debt can be afforded because repayment in the second period is less likely, i.e. the second period is discounted more heavily. Given that there is more revenue now, it is optimal to reduce seigniorage in order to reduce the negative effect of seigniorage and its deadweight loss on private sector utility.

There are three effects on the second period government budget constraint, two price and a quantity effect. On the one hand, more debt in period 1 increases the interest rate and implies higher levels of debt repayment. On the other hand, less seigniorage has a partly offsetting effect through its dampening impact on the interest rate. A "normal reaction" means that the latter effect does not dominate the other two. Overall, the burden on the second period government budget constraint is, therefore, increased. "Normal reaction" always implies that the level of debt increases.

This "normal reaction" is likely to occur, even if $\psi_{S_1} > 0$ and large. However, an "abnormal reaction" cannot be excluded. Perturbation results based on general functional formats are too complex to give a clear analytical answer. Nonetheless, not much would be gained by

[9] Confer appendix B for a sufficient condition and for the result, when S_1 does not affect the interest rate (in violation of assumptions 7).

producing an "abnormal reaction" in a simulation exercise. The logic is clear and is outlined in the following.

Suppose the effect of S_1 on the interest rate were large. Then it would be optimal for the government to choose a low level of first period seigniorage irrespective of the existing degree of political instability. When political instability increases (lower β), it is less costly for the government to strain the public budget in the second period. Under specific functional formats and parameter constellations, the optimal way of exploiting this may be to produce an increased interest rate by raising the level of seigniorage while reducing the level of debt. The latter has 2 effects. It reduces the debt repayment and has a dampening effect on the interest rate, thereby (partly) offsetting the increase caused by the higher level of seigniorage.

However, first period public goods utility is only increased, if the increase in seigniorage is larger than the reduction in debt. Then, under specific constellations, the welfare gain from increased first period public revenue may outweigh the loss caused by the increase in seigniorage. The loss includes: (i) the effect of higher seigniorage on the reduction of first period private sector utility; and (ii) the net effect of the first period public revenue composition on second period public goods utility (which comprises the aforementioned two price and one quantity effects on debt repayment as discussed in the previous paragraph).[10] The "abnormal reaction" seems highly constructed, but is theoretically possible.

Discussion: The main result of this paper is the aforementioned "normal reaction" for the trade-off between debt and seigniorage. This paper confirms the standard result of political instability producing myopic behaviour. However, it contradicts the finding that the myopia results in more seigniorage. That result was obtained in Cukierman, Edwards and Tabellini (1992), where the government chooses to finance its budget with more inflationary finance while postponing structural reform. It was also obtained in Bohn (2000), where the govern-

[10] Second period private sector utility will not be affected, because the optimal choice of second period seigniorage does not depend on first period instruments as discussed in section 3

ment responds to debt conditionality based on monetary stability by limiting inflationary finance this period in order to be eligible for higher levels of international credits next period. In this paper, there are debt conditionalities based on seigniorage as well as debt. These conditionalities are modelled as contemporaneous links. The model reveals a trade-off between fiscal and monetary conditionality: myopia produced by political instability typically leads to less seigniorage and more debt.

Debt Conditionality

Here, we are interested in the effect of debt conditionalities σ and δ (based on seigniorage and deficit, respectively) on the optimal government choice of debt and seigniorage in period 1. For both conditionalities, we consider the case where an increase in σ or δ translates into a higher interest rate charged for credits. However, the functional format remains general. Applying total differentials leads to the following perturbation result, which holds at the equilibrium.

Proposition 2 (Debt Conditionalities)

(i) $\frac{dS_1}{d\sigma} < 0.$

(ii) $\frac{dS_1}{d\delta} > 0$

(iii) $\frac{dD}{d\delta} < 0.$

(iv) $\frac{dD}{d\sigma} > 0$

The impact of increased debt conditionalites (higher σ, higher δ) on debt and first period seigniorage is as expected: conditionality on itself leads to a reduction, conditionality on the alternative source of revenue produces an increase. The trade-off effect of the two conditionalities is confirmed. The findings indicate, therefore, that it may be difficult for international financial institutions to achieve both objectives, monetary and fiscal stability, at the same time.

5 Conclusion

This paper introduces a parsimonious framework for studying the problem of optimal government finance under political instability. It is suited for analysing the case of most developing and some transition countries, where political instability is inherent to the political structure of the country rather than caused by electoral uncertainty as in Western democracies. A country's political situation is characterised by its uncertainty about government change and its political polarisation within society. Alternative means for financing government spending on public goods are considered: taxation, seigniorage, and foreign debt. The amount of available debt is determined by an interest rate, which is affected both by market conditions and debt conditionality (the latter being imposed by international financial institutions like the IMF).

Two main conclusions emerge from the analysis. First, political instability does lead to myopic government behaviour as argued in the literature. However, it is not optimal for the government to increase revenue by expanding seigniorage. This result contradicts earlier findings by Cukierman, Edwards and Tabellini (1992) and Bohn (2000). Contrary to these previous models, here, debt and seigniorage are alternative sources of current period government revenue.[11] An increase in political instability leads to myopic behaviour, because there is a lower valuation of debt repayment obligations in the future. Hence the government typically desires a higher level of debt. Total government revenue is increased while optimality requires a reduction of seigniorage.

The second conclusion deals with effects of debt conditionality. Conditionalities based on monetary and fiscal stability both reveal an important trade-off which arises from the fact that seigniorage and debt are alternative sources of current period government revenue. Debt Conditionality on debt leads to a reduction, debt conditionality on the alternative source of revenue produces an increase of debt. The trade-off effect of the two conditionalities is

[11] In Cukierman, Edwards and Tabellini (1992), foreign debt is ignored. Bohn (2000) only captures future foreign debt in response to the seigniorage decision in the current period.

confirmed. These results cast doubt on the ferocity with which the IMF used to require debtor countries to achieve monetary and fiscal stability at the same time. But our findings take us one step further: we can draw policy recommendations. According to the model, the trade-off between deficit reduction and monetary consolidation can be avoided, if debt conditionality either refers to deficit or to seigniorage, but not to both. Which one to focus on depends on a judgement of the relative desirability of monetary versus fiscal stability objectives.

Future work on public finance under political instability and debt conditionality could go in various direction. The first one refers to work in progress. We are going to test empirically the effects of debt conditionality and political instability studied in previous theoretical papers. Preliminary work indicates that this is going to be a difficult task. While there is data on political instability, data capturing the link between interest rates and debt conditionality applied to individual countries is not readily available. Such empirical work might, however, help shed more light on the effectiveness of (previous) IMF policies.

As for theoretical work, a natural complement to this short run model is a long run perspective including, nonetheless, political instability. This could be done in an infinite horizon framework or, possibly, in a three-period model. Not only would additional time periods contribute to a more complex model structure, but a number of additional issues would have to be addressed, for instance: (i) how to include growth in the model and study its impact on political instability; (ii) how to incorporate a government tax instrument; and (iii) how to include debt repayment in such a long run model. In a more extended framework that includes some of the above issues it might be conjectured that a certain initial level of political stability is required as a precondition for getting on a path of recovery. We might, for instance, get a multiple equilibria story for optimal government behaviour under political instability similar to the one obtained by, for instance, Ehrlich and Lui (1999) for optimal rent-seeking behaviour.

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Appendix

A Optimal Public Goods Spending

The following exposition draws on Cukierman, Edwards, and Tabellini (1992). The same approach is also used in Svensson (1998). For convenience, polarisation assumption (2) which is embedded in the government utility function H for public goods spending is restated for the type i government:

$$H^i(G^i, F^i) = \frac{1}{\alpha(1-\alpha)} \min\{\alpha G^i, (1-\alpha)F^i\}. \tag{A.1}$$

Since (A-1) contains a minimum function, optimality can only be achieved for

$$(1-\alpha)F^i = \alpha G^i. \tag{A.2}$$

As the utility function H for the type k government is symmetrical according to its definition in section 2, so is the optimal distribution between F^k and G^k: $(1-\alpha)G^k = \alpha F^k$.

Government i's optimal total public goods spending X^i can be written as

$$X^i := F^i + G^i = \frac{G^i}{1-\alpha} = \frac{F^i}{\alpha}. \tag{A.3}$$

By reinserting into utility function (A-1) the optimal values for F and G in terms of X ($G^i = (1-\alpha)X^i$, $F^i = \alpha X^i$) a simple result for total public goods utility H is obtained:

$$\begin{aligned} H^i(G^i, F^i) &= \frac{1}{\alpha(1-\alpha)} \min\{\alpha(1-\alpha)X^i, (1-\alpha)\alpha X^i\} \\ &= X^i = F^i + G^i. \end{aligned} \tag{A.4}$$

We can now see that the denominator in equation (A-1) was chosen as a normalisation such that the marginal public goods utility is unity. Furthermore, given that utility function (A-1) is symmetrical for both types of government, the optimal values for F and G are crosswise identical ($F^i = G^k$ and $G^i = F^k$) and

$$H^i(G^i, F^i) = X^i = X = X^k = H^k(G^k, F^k). \tag{A.5}$$

B Sufficient Condition for Proposition 1

Sufficient conditions for the "normal reaction" stated in proposition 1 are as follows:
For $\frac{dS_1}{d\beta} > 0$, it suffices that

$$\psi(D\psi_D + D^2\psi_{DD} - 1 - \psi) \;<\; D\psi_{DS_1}(1 + \psi + D\psi_D) \tag{B.1}$$

Given that the right hand side is positive, a more restrictive sufficient condition is that either term on the left hand side is smaller or equal to 0. $\psi_{S_1} = 0$ is sufficient, but would violate assumption (7) (i). Alternatively, the following is sufficient:

$$D\psi_D + D^2\psi_{DD} - 1 - \psi \;<\; 0. \tag{B.2}$$

For $\frac{dD}{d\beta} < 0$, it suffices that

$$\begin{aligned} -\rho\beta \qquad & (\psi_{S_1} + D\psi_{S_1 D})\, D\, \psi_{S_1} \\ & > \left[\left(-\gamma'' V' + (1-\gamma')^2 V''\right) - \rho\beta D\psi_{S_1 S_1}\right][1 + \psi + D\psi_D] \end{aligned} \tag{B.3}$$

The term in the second square brackets on the right hand side is positive, whereas the one in the first square brackets is negative for $\psi_{S_1 S_1} \geq 0$. (The latter term is still likely to be negative, even if $\psi_{S_1 S_1}$ turns negative as long as it remains within the limits prescribed by assumption (7) (iii)). Hence the condition is certainly fulfilled for $\psi_{S_1} = 0$ and for $\psi_{S_1} > 0$, but small. It may even be fulfilled for larger values of ψ_{S_1}.