Public Finance under Political Instability and Debt Conditionality

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Abstract

This paper presents an intertemporal political economy model of sustainable public finance relevant for many developing or transition countries: instability is inherent to the political structure and foreign debt is a crucial source of government revenue.

The main results are: First, political instability causes myopic government behaviour as it induces higher debt levels, but it does not lead to an increase in inflation taxation as in Cukierman, et al. (1992). Second, debt conditionality aiming at monetary stability is particularly effective in heterogeneous societies with unstable governments. Third, it is shown that IMF policies requiring debtor countries to achieve both monetary and fiscal stability are suboptimal.

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1. Introduction

Sustaining public spending including publicly funded investment projects seems to be particularly difficult in politically turbulent times. This problem is highlighted in several historical examples (for instance, in European countries in the inter-war period and in Latin American countries in the end-1970s and beginning 1980s), but it is also relevant for many developing countries today. In the political and economic transition in Eastern Europe in the 1990s, the budget squeeze turned out to be one of the major problems. In Russia, for instance, the total *federal* budget in 1998, the year the government defaulted on its bonds, shrank in dollar terms to the size of the government budget of the Irish Republic.

Typically, there are at least four fundamental problems of such sustainable public finance which reinforce one another. First, foreign and domestic bondholders loose confidence in any form of debt issue and are no longer willing to hold government debt. Second, international loans are curtailed because of bad macroeconomic performance, including charges of mismanagement and corruption. Third, given that existing tax collection problems cannot be overcome in the short run, it is appealing for any government to use seigniorage for financing government expenses. Fourth, this happens against the background of political instability which is a main reason for myopic government behaviour. In essence, political decisions tend to be determined by short-term considerations instead of structural investment in the long run.

Political instability in a Western democracy differs from political instability in most developing or (early) transition countries. Political instability in Western countries is intrinsically linked to electoral uncertainty. By contrast, less democratic countries are often politically fragmented and/or heterogeneous societies, and government changes tend to occur frequently and/or unpredictably. Empirical studies such as Cukierman, Edwards and Tabellini (1992) show that government changes in developing countries can largely be explained by factors (such as political repression) which cannot be modelled as response to government economic policies or by any form of electoral process.

Accordingly, models of political instability distinguish between *endogenous* political instability (to capture explicitly the electoral response to government policies) and *exogenous* political instability (where there is no such feedback effect, thereby allowing to focus on other issues). At the end of the 1980s, a string of papers (based on endogenous political instability) analysed fiscal policy in a democratic two-party system.[1] These papers emphasise the strategic role of debt for electoral success (for instance, Persson and Tabellini, 1990, and

[1] More recent papers on two-party systems do not focus on fiscal policy, but incorporate, for instance, voter uncertainty about the economy (Roemer, 1994, and Schultz, 1999 and 2002).

Aghion and Bolton, 1990) and/or conclude that governments may borrow excessively when there is a chance of being voted out of office in the next period (for instance, Tabellini and Alesina, 1990, and Persson and Svensson, 1989). This result of myopic government decisions on debt will be further discussed later (but in the context of exogenous political instability). The standard approach in the papers on endogenous political instability is to model two different types of government with distinct preferences (for instance, for higher or lower levels of taxes or debt).

By contrast, this paper is part of a growing literature which acknowledges that political instability may be exogenous to government choices on fiscal policy. Cukierman, Edwards and Tabellini (1992), Devereux and Wen (1998), Svensson (1998), and Bohn (2000), for instance, model government change as a Markov chain. This approach also allows them to incorporate an exogenous degree of political polarisation (or social heterogeneity), i.e. to account for conflicting interests within society. There are still two types of governments, but their objectives are identical except that they (symmetrically) provide two different kinds of public goods or support two different group interests. In these models (optimal) government behaviour is driven by the political instability itself, not by differences in preferences.

This paper improves the existing literature in two respects. First, it offers a more complete treatment of the problem of sustainable public finance. Rational governments optimise given that there are three alternative sources of revenue, i.e. taxes, debt and seigniorage[2], as well as both consumptive and investment expenditures. In contrast, the previous literature only captures different aspects of the government finance problem. Those papers incorporate *either* debt creation and taxation (as, for instance, in Devereux and Wen, 1998) *or* infrastructure investment and taxation (as in Svensson, 1998) *or* seigniorage and taxation (as in Cukierman, Edwards and Tabellini, 1992).

As a second extension, this paper captures the effects of foreign debt and debt conditionality on optimal government behaviour under exogenous political instability. Thus two aspects of many developing or early transitional countries are modelled in one and the same framework: the exogenous nature of their political instability and the key role of foreign debt in their public finance. Despite this fact, thus far (except for Bohn, 2000), the exogenous political instability literature has either discussed domestic debt only or ignored debt altogether. As for the amount of available debt, this typically depends on World Bank or IMF conditionality.

[2] As for seigniorage, the political instability approach here can be viewed as an extension to the optimal inflation literature (for instance, Phelps, 1973, and Mundell, 1965), in particular to Ferreira (1999) where inflationary finance can be used for public investment.

Whereas Bank conditionality is less clear cut, IMF conditionality refers to "performance criteria (e.g., fiscal deficit to GDP ratio, growth of money supply, etc.)" (Ray, 1998).

By including both foreign debt and seigniorage as alternative sources of government revenue (as well as modelling the debt process explicitly and incorporating public investment as a government instrument) some theoretical findings of previous papers are reversed, others are substantiated. First, Cukierman, Edwards and Tabellini's (1992) result that political instability increases the optimal level of seigniorage chosen by the government is challenged. They argue that myopic behaviour prevents the government from reforming an inefficient tax system which, in turn, "forces the government to rely more on seigniorage and less on regular taxes as a source of revenue." In this paper, as in Cukierman, Edwards and Tabellini (1992), political instability does cause myopic government behaviour. However, political instability induces higher debt levels, but does not lead to an increase in optimal inflation taxation. An optimising government is prepared to reduce seigniorage in order to expand the amount of debt granted by international financial institutions. Thus the aforementioned finding of increased government borrowing (under endogenous political instability) in democratic two-party systems is confirmed for foreign debt in the developing country context as well.

The second result emphasises how problematic debt conditionality can be. If international financial institutions aim at deficit reduction, but not at lowering seigniorage, the optimal government response is to reduce the deficit without compromising monetary stability. As seigniorage and additional debt are alternative sources of government revenue, one would think there is a trade-off between achieving deficit reduction and attaining low inflation. In a static environment this is typically the case. However, once one includes conditionality in a dynamic context, this trade-off may disappear. Perversely, the trade-off is still present, if international financial institutions target both objectives. Furthermore, conditionality aiming at a lower deficit also causes a decrease in public investment. Taken together, these results substantiate theoretically the increasingly popular view that debt conditionality can easily go wrong. Indiscriminate IMF policies requiring debtor countries to focus on both monetary and fiscal stability appear questionable.[3]

The third result is that debt conditionality based on monetary stability considerations is particularly effective in heterogeneous societies with unstable governments. Increased political instability raises the relative value of today's government spending. Therefore, the government successfully tries to expand its revenues from increased foreign debt by reducing

[3] If deficit reduction is the major objective, this paper suggests to use debt conditionality based on deficit, but to refrain from conditionality aiming at monetary stability. At the same time, the negative effect on public investment can be counterbalanced by additional conditionality based on such investment.

seigniorage (because international financial institutions are willing to grant more loans as a reward for increased monetary stability). Bohn's (2000) finding that IMF conditionality turns ineffective in politically highly unstable societies is reversed. In that model, the more myopic government expands its revenues directly by increasing seigniorage.

Sections 2 and 3 present the intertemporal model and discuss its economic and political components. Section 4 offers an outline of the solution (with more details in the appendix). The findings are discussed in section 5. Section 6 concludes.

2. Model Structure

The model consists of two periods: period 1 (current period) and period 2 (next period). There are three sectors in the economy: (i) the government; (ii) two partial interest groups; and (iii) the private sector. The model is specified in real terms.

Government Budget Constraints

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

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

There are three sources of government revenue (right hand side). First, *taxation* is calculated from tax rate τ and income as tax base. First period income $\bar{Y}$ is exogenous (an endowment), second period income Y depends on government investment I in the previous period. Investment can be interpreted as standard infrastructure investment, but also as investment in structural or anti-corruption measures leading to more efficiency and hence higher private sector production and income levels.

Taxation is an aspect of the model which is modelled at a rudimentary level only (similar to Aghion and Bolton, 1990): (i) the income tax rate is fixed; (ii) it is proportional; (iii) there are no tax distortions; (iv) inefficiencies in the tax collection process are ignored[4]; and (v) there is no indirect consumption or capital taxes. Most of these assumptions are made to simplify the

[4] They relate to information costs, tax collection costs, etc. Available tax revenues are typically modelled as a fraction of collected taxes: $(1-\theta)^* \tau^* Y$.

analysis and relaxing them would not contribute to a better understanding of the issues under scrutiny. The most critical assumption is probably that income tax rates cannot be changed. This assumption could be relaxed with no harm done, but it can also be argued that in many developing and transitional countries changing tax rates is by no means a speedy process without obstacles. If the country in question is not a plain dictatorship, parliamentary opposition is often strong and policy changes involving taxation are not feasible in the short run, i.e. in one or two model periods. Talking about political instability in developing and transitional countries model periods should not be viewed as four or five year parliamentary sessions, but as shorter periods of a couple of years or less.

Second, *seigniorage S* is modelled as government instrument. In many developing countries it is not unrealistic to assume that there is no distinction between central bank and government. The link to the rate of monetary growth and the deadweight loss of seigniorage taxation is discussed further down. Third, *foreign debt D* can be obtained in period 1, but has to be repaid in period 2 (including interest *rD*). The amount of available debt is not constrained by its price, but there is a debt ceiling which depends on available collateral. This is also discussed in the next section.

Government expenditure consists of two kinds: *investment I*; and consumptive spending *F* and *G* (henceforth *partial interest spending*). In most of the aforementioned similar models, government consumption is interpreted as expenditures for public goods. In this model, *F* and *G* are provisions for different groups of specific clients. The common feature is that they do not enter the private sector budget constraint. Here, however, the interpretation is taken further. *F* and *G* are viewed as funds diverted from the government budget to members of the ruling classes (or near government institutions or firms). Clans surrounding Mobutu in Zaïre, various segments of the Suharto family in Indonesia, or alternative groups of the so-called oligarchs in Russia are examples in question. In the real world, a large proportion of these funds are transferred to foreign bank accounts. As foreign creditors could potentially lay their hands on these assets, they are viewed as implicit collateral in this model – as discussed in the next section.

Government Preferences and Political Instability

Government preferences over periods 1 and 2 are given by the following utility function:

$$W = V_1(C_1) + H_1(G_1, F_1) + E\left[\rho\left(V_2(C_2) + H_2(G_2, F_2)\right)\right] \quad . \qquad \textbf{(2)}$$

The *V.(·)* functions are concave and twice continuously differentiable utility functions in private sector consumption C. The *H.*(·) functions are the partial interest utility functions in government provision G and F for the two partial interest groups. *E* is the expectational operator and ρ is the government's discount rate. 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 partial interest provision.

Assuming two types of governments (i.e. policymakers) political instability means: (i) the probability of government change and (ii) political polarisation. After the first period the incumbent government may loose office to the other set of policymakers with a fixed probability π; it stays in power with probability (*1* - π).[5] Each of the two types of government cares for both partial interest groups, but to differing degrees. Political polarisation then depends on the differences of policymakers' preferences with respect to partial interests. The government utility function *H* for partial interest spending is specified for one type of government (for the other type, α must be replaced by (*1*-α)):

$$H(F,G) = \frac{1}{\alpha(1-\alpha)} \min\left[\alpha G, (1-\alpha)F\right] \quad . \qquad \textbf{(3)}$$

For simplicity, their disagreement in partial interest spending is parameterised symmetrically by α which is exogenous. 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 partial interest groups. If preferences of both policymaker types are very dissimilar, political polarisation is large. Thus political polarisation measured by α contributes to political instability because it accounts for the extend of preference changes given a change in government. For α equals half, the instability effect of a government change is eliminated.

[5] Technically, this random change of government at fixed intervals is 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 political instability, 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 (Chubais, Stepashin) in arbitrary and irregular intervals.

Private Sector Budget Constraints

The private sector budget constraints for both periods are given by:

$$\begin{aligned} C_1 &\leq (1-\tau)\overline{Y} - S_1 - \gamma_1(S_1) \\ C_2 &\leq (1-\tau)Y(I) - S_2 - \gamma_2(S_2) \end{aligned} \quad . \tag{4}$$

Each period real private consumption depends on real income net of all taxes and deadweight losses. Income taxation is assumed proportional and non-distortionary, whereas seigniorage taxation carries deadweight loss γ – to be specified in the next section. The model could be interpreted in per capita terms, but the private sector is passive (as, for instance, in Cukierman, Edwards, and Tabellini, 1992) in the sense that it cannot take optimising decisions on labour, savings or investment. Thus the two budget constraints are not linked intertemporally.

3. Seigniorage and Debt

Money Supply Growth, Inflation and Seigniorage

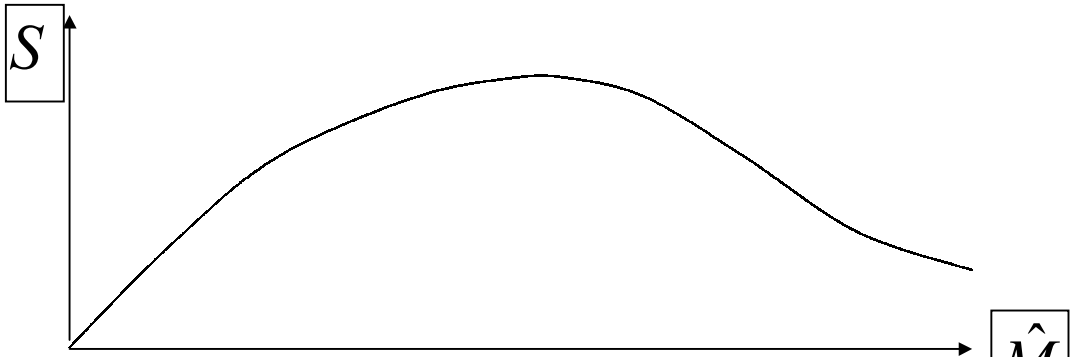
The discussion in this subsection is beyond the formal model presented in the paper. Only real seigniorage is captured in the model, but there is an implicit link to money, prices and inflation. (Real) seigniorage taxation is the financing of government spending by means of new base money injection, i.e. the change in real money (the change in nominal money, $\dot{M}$, divided by price level *P*):

$$S \equiv \frac{\dot{M}}{P} = \frac{\dot{M}}{M}\frac{M}{P} = \hat{M}\, L\left(\hat{P}^e\right) \quad . \tag{5}$$

Real seigniorage revenues *S* can be rewritten in terms of the rate of monetary growth $\frac{\dot{M}}{M}$ ($= \hat{M}$) and the real supply of money $\frac{M}{P}$. *In equilibrium*, money supply equals the demand for real base money balances $L\left(\hat{P}^e\right)$, where $\hat{P}^e$ is the expected rate of inflation and *L* decreases in $\hat{P}^e$. It is well established that there is a strong link between the expected rate of inflation and the actual rate of monetary growth (in the steady state they are identical). In his study of

hyperinflations, Cagan (1956) showed empirically that there is a Laffer-type trade-off between the seigniorage tax rate $\hat{M}$ and the seigniorage tax base $L(\hat{P}^e)$. This implies a maximum value for *S* as shown in the figure depicting seigniorage and monetary growth. Later, Sargent (1977) and Christiano (1987), for instance, confirmed this result.

Figure: Seigniorage



Source: Cagan (1956) and Cukierman, Edwards and Tabellini (1992)

As the relationship between seigniorage and inflation is not modelled explicitly in this paper the implicit assumption is that the government chooses an optimal rate of monetary growth, i.e. a growth rate on the rising branch in the figure. In terms of model results, this means that there may be situations in which the level of seigniorage cannot be raised any more. In more technical terms, this implies that the results only apply, if there is no corner solution, i.e. if *S* has not reached its maximum.

Deadweight Loss of Seigniorage

Seigniorage taxation produces welfare losses for the private sector. This so-called deadweight loss traditionally includes at least three types of costs: First, higher inflation leads to lower levels of real money holdings, thereby raising the cost of keeping a certain level of liquidity (the shoe leather argument). Second, inflation produces a loss of regular tax revenue (the so-called Olivera-Tanzi-effect), if there is no base structure indexation. There are costs involved in preserving the same level of government tax revenues, which must be born by the private sector in the end. Third, various redistribution effects, for instance between debtors and creditors, also cause welfare losses.[6]

[6] Note that there is no positive effect for the country as a whole due to a reduction of the real value of debt, because foreign debt is typically denominated in foreign currency.

The deadweight loss can be expressed by the following function:

$$\gamma_t = \gamma_t(S) \quad . \tag{6}$$

Deadweight loss γ is rising and convex ($\gamma_t' > 0$, $\gamma_t'' > 0$, t=1,2). Intuitively, this is a reasonable 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 (as suggested by the rising branch of the figure). Thus it suffices that the effect of inflation on welfare costs is linear, it may even be slightly concave.

In the context of developing and transition economies, the concept of deadweight loss may be extended, because high levels of inflation typically erode the trust of the private sector in using the national currency for 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 *b* and currency substitution *c*. Currency substitution has been a wide-spread problem, for instance, in Eastern European as well as Latin American countries.

Foreign Debt

In this paper, funds can be obtained at a given international rate (no price rationing) up to a debt ceiling (i.e. there is quantity rationing). Involuntary default cannot occur, because there is perfect information. Strategic default is avoided, because rational international creditors can set the debt ceiling at a level which makes default undesirable for the government. There is no risk of debt repudiation or a need for renegotiations as, for instance, in Hart and Moore (1998). Instead, it is assumed that the country in question can be obliged to honour its debt obligations. According to International Development Association and International Monetary Fund (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).[7]

In principle, a debt contract can be enforced, if there is a credible punishment strategy or if debt is fully collateralised (explicitly or implicitly). Obstfeld and Rogoff (1996) suggest three

[7] The model can also be adjusted to account for partial repayment as long as this is known in advance. In equation (7) [which corresponds to constraint (iii) in equation (8)], D must be replaced by δD, where $0<\delta<1$ represents the fraction which is repaid. Given that D is also replaced by δD in constraint (ii) of equation (8) the maximisation problem of the government does not change.

potential sanctions: (i) cutting the country off from future credits; (ii) imposing trade sanctions; and (iii) seizing the country's foreign assets. The potential damage for the country effectively determines the debt ceiling. Sanction (i), i.e. depriving a country of its access to international credit markets, is not always a credible threat (as in the case of a powerful country like Russia). Nor can it be modelled in a 2-period model. Option (ii), i.e. imposing trade sanctions, has never been done successfully in the real world.

Only option (iii) seems sensible and doable in this paper. As mentioned before, funds spent on partial interest groups (F+G) do not turn up in the private sector budget constraint. Instead, a large portion is expected to end up in foreign bank accounts, of which a fraction could be used by international creditors as implicit collateral. As there is full collateralisation the question arises why the government does not use the collateralised assets instead of borrowing. The answer is simply that the collateralised assets do not belong to the government. In fact, the government chooses to spend on partial interest groups to raise its utility directly. In addition, partial interest spending raises the debt ceiling due to its role as collateral. Assuming proportionality, the amount of potential collateral depends on the amount of foreign assets which can be seized by international creditors in the second period in case of default: $\eta * (F_2 + G_2)$.[8]

There are two potential problems with this approach. First, if it is known that foreign creditors use foreign assets as collateral, why would partial interest groups not reduce the portion of funds put on bank accounts that are liable to punitive action. The argument is simple: given that this is a perfect information setting, partial interest groups know that their funds will be used by international creditors as implicit collateral, but will never have to be touched. Instead, their purpose is merely to determine the debt ceiling. Second, if the debt ceiling depends on a fixed proportion of partial interest spending F+G, there would be an additional incentive for governments to expand this kind of unproductive spending. This is prevented, if there are other endogenous factors affecting the debt ceiling – as discussed in the next subsection.

IMF conditionality

The willingness of international creditors (in particular financial institutions like the International Monetary Fund (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, several "performance criteria" (Ray, 1998) as employed by the International Monetary Fund (IMF) are used to modify the potential debt ceiling: (i) deficit to GDP ratio (deficit reduction criterion); (ii) money supply growth (monetary stability criterion); and (iii) investment to GDP (public investment criterion).[9] As GDP equals income which is exogenous in the first period, the GDP ratio criteria (i) and (iii) reduce to deficit (equal to debt D in this model) and investment I, respectively. As for the monetary stability criterion (ii) we derive from the quantity equation ($M*V=Y*P$, V being velocity) together with equation (5) and the exogeneity of Y in the first period: $S = \hat{M} * \overline{Y}/V$. 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).

If we assume (additively separable) linear relationships as the simplest possible debt conditionality criteria, the debt ceiling is determined by the following inequality:

$$(1+r)D \leq \eta*(F_2+G_2) - d*D - s*S_1 + i*I \quad . \qquad \textbf{(7)}$$

Debt interest and principal must not exceed the potential collateral (observed for period 2) modified by the three performance criteria (as determined in period 1). There is a linear punishment for real deficit and real seigniorage levels as well as a bonus for the level of real public investment. It is assumed that the right hand side of equation (7) is between 0 and (F_2+G_2).

We also assume that the constraint (7) holds with equality. Formally, this is only true, if at the debt ceiling total government utility increases in D ($\partial W/\partial D > 0$). From the discussion of the model solution in the next section it will, however, be clear that parameter constellations would have to be highly implausible if this condition were to be violated.[10]

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[8] Throughout, a "*" represents multiplication.

[9] These three criteria capture by and large today's "economic policy consensus" on IMF conditionality. Guitián (1995) discusses three categories. First, the "*stable macroeconomic setting*" particularly refers to the fiscal (deficit) criterion and to the monetary (stability) criterion here. Second, "*economic infrastructure*", and third, "*institutional infrastructure*" are both captured by the investment criterion here. Of course, conditions are more numerous and specific in the real world, but there seems to be an attempt to simplify IMF conditionality anyway (cf. Economist, 2001, and Goldstein, 2001).

[10] The argument goes as follows: Under government utility function H (equation 3), the marginal utility of government spending is shown to be unity for each period. Instead of having to evaluate the marginal impact of D on total government utility, it suffices, therefore, to look at the net present value of debt in the government

4. Model Solution

Government Maximisation Problem

Given the specifications in the last section the current government must solve the following maximisation problem:

$$\max_{\substack{G_1,F_1,G_2,F_2 \\ S_1,S_2,R_1}} \quad V_1(C_1) + H(G_1,F_1) + E\left\langle \rho \left\{ V_2(C_2) + H(G_2,F_2) \right\} \right\rangle$$

$$\begin{aligned} s.t. \quad (i) \quad & G_1 + F_1 + I \leq \tau \bar{Y} + S_1 + D \\ (ii) \quad & G_2 + F_2 + (1+r) D \leq \tau Y(I) + S_2 \\ (iii) \quad & (1+r)D \leq \eta * (F_2 + G_2) - d * D - s * S_1 + i * I \\ (iv) \quad & C_1 \leq (1-\tau)\bar{Y} - S_1 - \gamma_1(S_1) \\ (v) \quad & C_2 \leq (1-\tau)Y(I) - S_2 - \gamma_2(S_2) \; . \end{aligned} \qquad \textbf{(8)}$$

The problem exhibits several intertemporal links. First, higher investment increases private sector income as well as tax revenues in the following period. Second, increased investment (as well as higher partial interest spending in period 2) relaxes the debt constraint, but augmented seigniorage (as well as increased deficit) in period 1 tightens it. Third, increased debt facilitates higher investment this period, thus leading to higher income and tax revenues, but higher repayment obligations next period. Fourth, higher seigniorage can also be used for investment leading to an increase in income and tax proceeds. Essentially, the government budget constraint exhibits a trade-off between the intertemporal effects of investment financed by seigniorage versus investment financed by debt.

Potentially, there is a time-inconsistency problem. In period 1 the incumbent government optimises based on expectations for period 2 in which the government changes with probability π. In principle, the government can reoptimise in period 2 – once the uncertainty is resolved. However, it will be shown in the next subsection that, under assumption (3), both governments always choose the same level of total partial interest spending ($F+G$). Hence the debt ceiling is uniquely determined (constraint (*iii*) in equation (8)) and so is, therefore, second period seigniorage – according to constraint (ii).

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budget constraint. The net present value only depends on the government effective discount factor and the international credit market discount factor. Even if there is only a small degree of political instability, it is shown to be highly plausible that the government will have an incentive to use debt for consumption smoothing between periods, i.e. borrow in period 1 and repay in period 2. So, even if it is not optimal to use up the available debt facilities for investment purposes, the government will still

Partial Interests and Government Utility

Government problem (8) is made tractable because of three assumptions: (i), partial interest spending F and G does not appear in the private sector budget constraint; (ii), government objective function (2) is additively separable; (iii), the polarisation assumption embedded in equation (3), the government utility function H for partial interest spending, has a special functional format. Due to assumptions (i) and (ii) government optimisation problem (8) can be decomposed into two problems: first, the optimal *distribution* of the total partial interest spending between F and G; and second, the *fundamental* revenue and expenditure problem of the government.

The optimal distribution problem is not really interesting since its results hinge on specific (though quite sensible) assumptions for partial interest utility H (assumption (iii)). Indeed, the mathematical solution of the distribution problem for partial interest spending (cf. appendix) is only required for being able to solve the fundamental revenue and expenditure problem of the government. Due to assumption (iii) the fundamental problem of the government is independent of the actual government in power. Nonetheless, the fact that there are two potential governments does have crucial implications for any government decision on the total amount of partial interest spending, on investment, on debt, and on seigniorage financing. In fact, the model is constructed that way to allow the analysis of political instability by itself as opposed to analysing the effect of different types of government with different objectives.

As shown in the appendix, assumption (iii), which refers to the functional format of utility function H, has three specific implications. First, the optimal distribution of the total partial interest spending between F and G is crosswise symmetrical for both types of governments (when in power). Second, government utility H derived from type i's choice of F and G (when in power) is equal government utility derived from type k's choice (when in power):

$$H^i(F^i,G^i) = F^i + G^i = X^i = X = X^k = F^k + G^k = H^k(F^k,G^k) \quad . \qquad \textbf{(9)}$$

In either case, the marginal utility of partial interest spending is unity. Third, the (real) total value of partial interest spending H is normalised – for each government – by the sum of its arguments (F+G), when chosen optimally by any incumbent government. For i and k

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want to make use of borrowing opportunities up to the debt ceiling (debt-financed consumption smoothing).

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*: $X^i = H^i(F^i, G^i) > H^i(F^k, G^k) = \frac{1-\alpha}{\alpha} X^i$.

On this basis, the government utility function (2), can be simplified. For each period separately, utility derived from private consumption and from partial interest 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 $H(F_1, G_1) = X_1$. Thus first period utility is

$$V_1(C_1) \quad + \quad H(G_1, F_1) \quad = \quad V_1(C_1) \quad + \quad X_1 \quad . \qquad \textbf{(10)}$$

If this government is still in power in period 2 (with probability (1-π)), it will choose *F* and *G* such that $H(F_2, G_2) = X_2$. If, however, this government looses power in period 2 (with probability π), it has to put up with the partial interest spending chosen by the other government, i.e. $H(F_2^k, G_2^k) = \frac{1-\alpha}{\alpha} X_2$. Hence its second period total expected utility is:

$$\begin{aligned} & E \left\langle \rho \left\{ \quad V_2(C_2) \quad + \quad H(G_2, F_2) \quad \right\} \right\rangle \\ & = \rho \left\{ \quad (1-\pi) \left[V_2(C_2) \quad + \quad X_2 \right] \quad + \quad \pi \left[V_2(C_2) + \frac{1-\alpha}{\alpha} X_2 \right] \right\} \qquad \textbf{(11)} \\ & = \rho \left\{ \quad V_2(C_2) \quad + \quad \beta(\alpha, \pi) X_2 \quad \right\} \quad . \end{aligned}$$

Thus government utility depends on two exogenous parameters, political polarisation α and the probability of loosing power π, which are subsumed under quasi-exogenous parameter β, which is to represent political instability: $0 \leq \beta(\alpha, \pi) = (1-\pi) + \pi \frac{1-\alpha}{\alpha} \leq 1$. 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 $\pi\uparrow$).

The Fundamental Problem of the Government

The fundamental revenue and expenditure problem of the government can now be specified on the basis of the original government problem (8) and equations (10) and (11). Constraints (i), (ii), and (iii) are combined to obtain two modified government budget constraints solved for $(F_1 + G_1)$ and $(F_2 + G_2)$, respectively. Remembering that $F_t + G_t = X_t$ (t=1,2) these government budget constraints can be substituted into equations (10) and (11). Equally, private sector budget constraints (iv) and (v) for C_t (t=1,2) can be inserted into (10) and (11). Then the new objective function is:

$$\max_{S_1, S_2, I} \quad W(S_1, S_2, I) \quad \text{with}$$

$$\begin{aligned} W(S_1, S_2, I) \;=\; & V_1\left[(1-\tau)\bar{Y} - S_1 - \gamma_1(S_1)\right] \\ & + \rho V_2\left[(1-\tau)Y(I) - S_2 - \gamma_2(S_2)\right] \\ & + \tau\bar{Y} + \frac{\eta + \rho\beta(1+r+d)}{m}(\tau Y(I) + S_2) \\ & + \frac{m - s + \rho\beta(1+r)s}{m} S_1 - \frac{m - i + \rho\beta(1+r)i}{m} I \end{aligned} \qquad \textbf{(12)}$$

$$\textit{where} \qquad m = 1 + r + d + \eta(1+r) \quad .$$

We derive the following first order conditions (FOCs) with respect to policy variables S_1, S_2, and I – a prime (‘) denotes, as usual, the derivative with respect to a function’s argument:

$$V_1'(c_1)\ \left(-1 - \gamma_1'(S_1)\right) + 1 - \frac{1 - \rho\beta(1+r)}{m} * s = 0 \quad . \qquad \textbf{(13)}$$

$$\rho * V_2'(c_2)\ \left(-1 - \gamma_2'(S_2)\right) + \frac{\eta + \rho\beta(1+r+d)}{m} = 0 \quad . \qquad \textbf{(14)}$$

$$\rho * V_2'(c_2)\ (1-\tau) * Y'(I) + \frac{\eta + \rho\beta(1+r+d)}{m} * \tau Y'(I) - 1 + \frac{1 - \rho\beta(1+r)}{m} * i = 0. \qquad \textbf{(15)}$$

Several insights can be gained from analysing the FOCs. Proceeding in four steps the FOCs are discussed under less and less restrictive assumptions. We introduce a condition (first step) under which the FOCs collapse to those of a problem without debt (second step). Then we

interpret the FOCs for the case without debt conditionality (third step), before finally considering the case with various debt conditionalities.

Interpreting FOCs for a Special Case

In the first step, note that there is a crucial relationship between the effective government discount factor ($\rho * \beta$)[11] [12] (time preference modified by the impact of political instability) and the international credit market discount factor ($\frac{1}{1+r}$). If $\rho * \beta = \frac{1}{1+r}$, the government is indifferent between more or less debt-financed consumption smoothing (or even none at all), because the net present value of the portion of debt which is not invested is zero. That is, one unit of additional debt this period minus repayment next period $(1+r)$ discounted with ($\rho * \beta$) is zero: $1 - \rho * \beta * (1+r) = 0$. It is important to realise three features of this condition: (i) It includes the measure for political instability.[13] (ii) Generically, equality between both discount factors is never fulfilled. Therefore, it does not make a lot of sense to consider this case in earnest, but it may be useful as a tool for interpreting results. (iii) Under political instability[14] it is likely that $\rho * \beta < \frac{1}{1+r}$ (as long as ρ is not much larger than $\frac{1}{1+r}$). For developing and transition countries we can safely assume that the inequality is always fulfilled. Then there is an incentive to shift consumption to the first period. More generally, this explains why there is myopic government behaviour under political instability.

In the second step, we note that, for $\rho * \beta = \frac{1}{1+r}$ (henceforth condition (*)), we obtain $\frac{1-\rho\beta(1+r)}{m} = 0$ and $\frac{\eta + \rho\beta(1+r+d)}{m} = \frac{1}{1+r} = \rho * \beta$ in equations (13)-(15). The FOCs collapse to those of a comparable maximisation problem without debt or, equally, to those of a problem with an exogenous debt ceiling. Under (*) – as in the problem with exogenous debt ceiling – the actual level of the debt ceiling is irrelevant (parameters η, d, s, and i do not

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[11] To be precise, this is the inverse of the government discount factor, just as $1/1+r$ is the inverse of the credit market interest factor.

[12] The effective government discount factor only applies to the intertemporal link in the government budget, not to the intertemporal link in private consumption. This is so because utility derived from government spending depends on the government type. Thus political instability β is relevant. Private consumption, however, is valued identically. Thus the discount factor corresponds to the time preference rate.

[13] The condition $\rho = 1/1+r$ as specified in Alesina and Tabellini (1989) is incorrect for a model with exogenous political instability.

[14] That is $0 \leq \beta < 1$, whereas $\beta = 1$ refers to no polarisation or uncertainty at all.

matter), i.e. the optimal amounts of investment or seigniorage do not depend on the level of debt.[15] The reason is that the government is indifferent to debt-financed consumption smoothing; thus debt conditionalities cease to have any effect on the optimum.

The interpretation of the now simplified FOCs is straightforward. Equations (13) and (14) compare the marginal utility of partial interest consumption (i.e. spending) and private consumption. In the first period, the marginal utility of partial interest spending (unity) exceeds the marginal utility of private consumption, at the optimum, by the distortionary effect of seigniorage taxation. The same holds for the second period, but we have to consider that the discount rates for both marginal utilities differ: for partial interest spending it is $\rho*\beta$, whereas for private consumption it is only ρ, the time preference rate.[16] The condition for the second period can be written as $\rho * V_2'(c_2) * (1+\gamma_2'(S_2)) = \rho * \beta$; that is, at the optimum, the marginal utility of private consumption must be smaller for higher levels of political instability (smaller β; note that, under (*), $\beta < 1$ implies $\rho > \frac{1}{1+r}$).

Equation (15), finally, relates the marginal investment in period 1, more precisely the foregone marginal utility of partial interest spending due to first period investment (unity), to its effects on both private and partial interest consumption in period 2. The effect on private consumption is the marginal increase of net-of-tax income (that is the fraction of the marginal productivity of investment which is not taxed away) multiplied by the marginal utility of private consumption and discounted by ρ. The effect on partial interest consumption refers to the discounted marginal rise in government taxes (that is the other fraction of the marginal productivity of investment which the government receives) multiplied by unity, the marginal utility of partial interest consumption. Here the discount rate is $\rho*\beta$ (which is obtained by applying (*) to the fraction of the second term in equation (15)).

Interpreting FOCs in the General Case

In the third step, we inspect the FOCs for the more realistic case, $\rho * \beta < \frac{1}{1+r}$, but we do still not allow for debt conditionalities (in particular s=0 in equation (13) and i=0 in (15)). Debt may now be used for two purposes: debt-financed consumption smoothing and debt-financed investment. It is worth noting that the FOC for seigniorage in period 1 is unchanged (to the

[15] For obtaining a well-defined optimisation problem it is, however, crucial that there is not just endogenous debt, but also a revenue instrument of the government in the first period (here seigniorage).

[16] This is so, because political instability β is irrelevant for private consumption. Both types of government value private consumption identically, but differ in their valuation of partial interest spending.

situation under (*)) and seigniorage is still independent from the debt ceiling, i.e. the actual amount of borrowing.

However, optimal investment and second period seigniorage change. The condition for second period seigniorage can now be written as $\rho * V_2'(c_2) * (1 + \gamma_2'(S_2)) = \rho * \beta * \varepsilon$, $\varepsilon > 1$.[17] Ceteris paribus the marginal utility of private consumption and/or the distortionary effect of seigniorage taxation must be higher than under (*). Both can be achieved with a higher level of second period seigniorage. As ε increases in η (i.e. the parameter which determines the debt ceiling in the absence of debt conditionalities), this effect is reinforced by raising the debt ceiling exogenously. The dependence of ε on η indicates that the government borrows as much as possible now. Thus a higher level of second period seigniorage would be explained by higher debt repayment obligations in period 2.

As for the FOC with respect to investment, the coefficient of the marginal utility of partial interest consumption in period 2 (second term in equation (15)) is now also $\rho * \beta * \varepsilon$ (instead of $\rho * \beta = \frac{1}{1+r}$ as under (*)). Here, however, it only matters that $\rho * \beta * \varepsilon < \frac{1}{1+r}$[18], i.e. that $\rho * \beta * \varepsilon$ is now smaller than the international credit market discount factor. This means that abandoning condition (*) reduces the unit value of the second term in equation (15). There may, however, be a countervailing effect. As suggested by equation (14), the marginal utility of private consumption ($V_2'(c_2)$) may be higher (due to lower consumption and/or higher seigniorage taxation). Thus the overall effect on investment of giving up condition (*) is unclear. Suppose the first effect (lower value of the coefficient of the second term) dominates. Then, for the first order condition to hold, the marginal productivity of investment would have to increase at the optimum, thus requiring lower investment.

What happens, if the debt ceiling is increased exogenously (higher η)? As ε increases in η, the reduction in the coefficient of the marginal utility of partial interest consumption in period 2 is limited. Thus the required reduction in investment would be less pronounced or, for ε close to 1, the countervailing effect would dominate and investment would even

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[17] Where $\varepsilon = \varepsilon(\eta) = {\eta + 1 - a}/{(1-a) * (\eta + 1)}$, with $0 > a > 1$ being defined by $\rho * \beta = {1-a}/{1+r} < {1}/{1+r}$.

[18] Actually, $\rho\beta < \rho\beta\varepsilon = \rho\beta * \frac{\eta + 1 - a}{(1-a) * (\eta + 1)} = \frac{1}{1+r} * \frac{1 + \eta - a}{1 + \eta} < \frac{1}{1+r}$. However, in equation (14) only the left hand side inequality matters, because $\rho * \beta * \varepsilon$ is weighed against ρ in the first term, whereas in equation (15) the right hand inequality matters because $\rho * \beta * \varepsilon$ is weighed against unity (third term).

increase in the optimum. In any case, even if debt-financed investment is not profitable any more (i.e. there are not enough investment projects satisfying equation (15)), it will always be optimal for the government to try to extend the debt ceiling as much as possible. This is so because consumption smoothing is profitable given that the effective government discount factor is smaller than the international credit market discount factor. The net present value of each unit of debt used for consumption smoothing is positive: $1-\rho\beta*(1+r)=1-\frac{1-a}{1+r}*(1+r)=a$.

In step 4, we reintroduce debt conditionalities with respect to deficit *d*, seigniorage *s* and investment *i* (given $\rho*\beta<\frac{1}{1+r}$ as under step 3). Debt conditionality with respect to public investment *i* has a positive effect on the debt ceiling. Thus investment in period 1 does not only reduce partial interest spending in period 1, but also softens the budget constraint. In equation (15) this means that the foregone marginal utility of partial interest spending due to first period investment (which is unity for *i*=0) is reduced by the fourth term, thereby suggesting an increase in investment. Debt conditionality with respect to deficit, however, reduces the coefficient of the marginal utility of second period government spending (the second term). It also increases the foregone marginal utility of partial interest spending in period 1 in the case of $i\neq 0$ (i.e. it decreases the fourth term).[19] Both effects reinforce one another and suggest that investment might also go down.

In equation (14), only debt conditionality with respect to deficit has an impact. Tightening this conditionality (raising *d*) means decreasing the coefficient of the marginal utility of partial interest spending (second term), thereby suggesting a reduction of second period seigniorage (and/or an increase in second period consumption). As for equation (13), debt conditionalities only appear in the third term (and the interpretation is analogous to one on the fourth term in equation (14)). For $s\neq 0$, the unity marginal utility of partial interest spending is reduced, suggesting a reduction of first period seigniorage (and/or an increase of period 1 consumption) at the optimum. Here, too, debt conditionality with respect to deficit reduces this effect[20], i.e. it raises again the marginal utility of partial interest spending (given that $s\neq 0$). With increased debt conditionality with respect to deficit we might also, therefore, obtain an increase in first period seigniorage.

The 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

[19] Thus, debt conditionality with respect to deficit partially offsets the effect of debt conditionality with respect to investment. An increase in the debt ceiling produced by exogenous parameter η has the same effect.

[20] Again, an increase in the debt ceiling produced by exogenous parameter η has the same effect.

formal solution is technical and will only be sketched out here. Two more steps are required. First, to ensure that the first order conditions are not just necessary, but also sufficient conditions, the concavity properties of the problem must be scrutinised by checking the matrix of second derivatives (the Hessian) for semi-definiteness. Finally, results are obtained for the five exogenous parameters which were discussed in sections 2 and 3. The probability of government change π and political polarisation α are represented by β, the political instability parameter, which was introduced in equation (11). Parameters d, s, and i indicate debt conditionality with respect to deficit, seigniorage, and public investment, respectively. For all of these, perturbation results around the equilibrium can be obtained by deriving total differentials and using the Cramer Rule or by applying the inverted Hessian. Findings of the analysis are summarised in the Table of Results further down. They are discussed in the next section.

5. Discussion

Political Instability

As stated before, exogenous political instability takes two forms: political polarisation and/or uncertainty about the future government. An increase in polarisation means that policy choices of the other government, if in power in the second period, produce more undesirable results. A higher chance of government change means that it is less likely that policy choices which are optimal for the current government will be implemented in the future. In both cases, this causes the government to value the present more highly than an uncertain and undesirable future. This is the basis for the result of myopic government behaviour in the literature. In Cukierman, Edwards and Tabellini (1992) political instability leads to less structural change and higher seigniorage, in Devereux and Wen (1998) to higher government spending and lower growth, in Svensson (1998) to lower investment in property rights and lower private investment, and in Bohn (2000) to higher seigniorage and lower investment in the taxation technology (i.e. investment of a kind which is different to the infrastructure or anti-corruption investment of this model).

Given the well-established result of myopic government behaviour, it is surprising that in this model optimal government behaviour does not lead to an increase in current period seigniorage under more political instability. The explanation is that the model is richer in the sense that there are alternative revenue sources, debt and seigniorage, which are both endogenous, i.e. determined by government behaviour. Intuitively, the result can be explained as follows. If there is debt conditionality based on seigniorage, the debt ceiling could be raised above its

optimal level, if the government were prepared to raise less seigniorage. Obviously, the government would not want to do that. However, an increase in political instability leads to a lower valuation of debt repayment obligations. Thus the government desires a higher level of debt which requires a reduction of seigniorage. Put together, the government does actually act myopically. But instead of raising revenues through seigniorage, it reduces seigniorage in order to increase its debt and, thereby, raises first period spending power.

Formally, the negative impact of political instability on first period seigniorage ($\frac{dS_1}{d\beta} \geq 0$, where lower β means more political instability) is determined – inter alia – by the partial derivative of the FOC for first period seigniorage (cf. equation 13) with respect to political instability: $\frac{\rho(1+r)s}{1+r+d+\eta(1+r)}$. There are two cases. In case (i), debt conditionality is (also) based on monetary stability (s>0). Then, for a reduction of β (i.e. more political instability), inflation taxation is curtailed (s in the numerator) in order to reduce its negative conditionality effect on debt. However, the reduction in seigniorage is limited, if there is also conditionality based on deficit (d>0, d being in the denominator). Overall, the welcome increase in debt in period 1 causes an increase of repayment obligations in period 2, which is, however, considered less detrimental now that the relative valuation of period 2 has gone down (due to the increase in political instability). In case (ii), there is no conditionality based on monetary stability ($s=0$). Hence there is no impact of political instability on seigniorage as discussed in the previous paragraph.

With respect to investment and second period seigniorage, too, an intertemporally optimising government is likely to behave myopically under increased political instability. Political instability reduces investment, if the (marginal) conditionality based on public investment (i) is smaller than the marginal tax revenue increase of investment: $\tau Y'(I) > i$ (henceforth condition (**)). There are weaker sufficient conditions, but at least for sufficiently small values of i, it is guaranteed that more political instability leads to lower investment under increased political instability. Condition (**) refers to revenues and expenditures in period 2. It can be interpreted on the basis of a unit increase of investment in period 1. The induced rise of period 2 tax revenues must exceed the expansion of debt repayment obligations caused by the rise in investment, i.e. first period investment must raise net revenues in the second period. As increased political stability (higher β) raises the relative value of second period spending, it is clear that investment will increase in order to augment net revenues in the second period.

It has just been argued that more political stability causes an increase of investment, if there is a net revenue effect of investment in period 2. Increased political stability leads to higher

seigniorage in period 2 under the same sufficient condition (**). As the valuation for the second period goes up relative to period 1, an optimising government is planning to raise spending, thus requiring higher revenues in period 2. Put together, this is achieved directly by raising second period seigniorage and indirectly through the positive net revenue effect of increased first period investment.

Debt Conditionality

In this paper, it has been assumed that (i) the government of a developing or transition country is faced with international creditors who base their decisions not only on available collateral, but also on debt conditionality; and (ii) the debt ceiling is a binding constraint as there are sufficient profitable investment opportunities the government could seize. Under these conditions, the government will, obviously, try to avoid the loss of loans. Perturbation results on seigniorage in both periods as well as investment are obtained for each of the three conditionality criteria (based on deficit, monetary stability and/or public investment). In all cases, clear-cut results can be obtained, if $\beta * \rho < \frac{1}{1+r}$, i.e. condition (*) is fulfilled.

Table of Results (for $\rho * \beta < \frac{1}{1+r}$)

		S_1	I	S_2
Political instability ↑:	**β↓**	**↓ or 0**	**↓ (?)**	**↓ (?)**
- government change probability ↑	π↑			
- political polarisation ↑	α↑			
Conditionality based on deficit ↑	**d↑**	**↑ or 0**	**↓**	**↓**
- under more political stability	under β high	(↑) or 0		
- under more political instability	under β low	⇑ or 0		
Conditionality based on monetary stability ↑	**s↑**	**↓**	**0**	**0**
- under more political stability	under β high	(↓)		
- under more political instability	under β low	⇓		
Conditionality based on investment ↑	**i↑**	**0**	**↑**	**↑**

Debt conditionality based on deficit: If international creditors raise their punishment for government deficit and, thereby, lower the debt ceiling, the government reduces investment and switches revenues from debt to seigniorage in period 1. However, the increase in

seigniorage can only happen, perversely, if there is also some level of debt conditionality based on monetary stability (s>0).[21] Then, for a reduced level of debt (equals deficit in this two period model), the effect of the punishment for seigniorage is felt less severely and seigniorage goes up to compensate for the loss of revenue from debt. However, if there is no debt conditionality aiming at monetary stability, increased conditionality based on deficit has no effect on the optimal level of seigniorage chosen by the government.

Under debt conditionality based on deficit there are also three intertemporal effects: (i) lower investment reduces second period private income as well as utility on consumption; (ii) it also lowers tax receipts in period 2; and (iii) lower levels of debt reduce the repayment burden in period 2. Given that the government budget constraint in the second period is affected by countervailing effects (lower tax revenues, lower debt repayment), it is surprising that there is an unambiguous result: increased conditionality based on the government deficit (d) produces lower second period seigniorage.

Debt conditionality based on investment: If international creditors choose to raise the beneficial effect of investment on the debt ceiling, first period seigniorage is not affected, but investment and second period seigniorage go up unambiguously. As higher investment leads to higher debt, the intertemporal effects are the reverse of those just described for an increase of conditionality based on deficit (d).

Debt conditionality based on seigniorage: If international creditors increase the punishment for seigniorage, the debt ceiling is lowered. To limit the reduction of available debt first period seigniorage goes down unambiguously. Seigniorage in the second period and investment are not affected.

Debt Conditionality under Increased Political Instability

It has been established that each of the three types of debt conditionality has an impact on seigniorage and/or investment. But the effect may differ under alternative degrees of political instability. In Bohn (2000), it is claimed that very high political instability turns IMF conditionality based on monetary stability (s) virtually ineffective, i.e. it does not prompt the government to reduce seigniorage. The argument there is based on the fact that more political instability means a relatively higher valuation of the current period. A rational government will

[21] Formally, $dS_1/dd \geq 0$ depends – inter alia – on the partial derivative of the FOC for first period seigniorage (equation 13) with respect to debt conditionality based on deficit: $(1-\rho\beta(1+r))s/m^2$.

prefer to increase present period revenue by raising its seigniorage tax instead of fulfilling conditions (low level of seigniorage) required for obtaining foreign debt in the future.

Here, we also obtain results for the impact of political instability on effects caused by debt conditionality. In the case of investment and second period seigniorage results are unclear. In the case of first period seigniorage, they are unambiguous, but they seem counterintuitive at first glance. They are opposite to those in Bohn (2000), because debt is modelled more explicitly: debt and seigniorage are alternative sources of first period government revenue; and there is an explicit debt repayment obligation in period 2.

First, consider higher debt conditionality based on monetary stability (s). As already discussed, seigniorage will be lowered to avoid that the debt ceiling is reduced too much. If there is also a high level of political instability (i.e. the valuation of the second period is relatively low), the government is less concerned with debt repayment in period 2. Thus the government can afford a higher level of debt (i.e. debt repayment) and will, therefore, reduce seigniorage by even more (in order to be granted a higher debt ceiling) compared to a situation with less political instability. Second, the case of higher debt conditionality based on deficit (d) is not intuitive, but unambiguous with respect to first period seigniorage: for increased debt conditionality based on deficit (d), first period seigniorage increases more, if there is higher political instability.

6. Conclusion

This paper introduces a simple framework for studying the problem of optimal government finance under political instability and debt conditionality. It is suited to analyse the case of developing and transition countries, where political instability is inherent to the political structure of the country rather than caused by electoral uncertainty as in Western democracies.

Three 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. Contrary to previous models, here, debt and seigniorage are alternative sources of government revenue. An increase in political instability leads to a lower valuation of debt repayment obligations in the future. Thus the government desires a higher level of debt which – with some degree of debt conditionality based on monetary stability – requires a reduction of seigniorage. In this model, myopic government behaviour means (i) raising revenues by increasing the level of debt (not seigniorage) and (ii) reducing any kind of public investment

into the future, be it structural, anti-corruption or infrastructure investment (aspect (ii) being in line with the previous literature).

The second conclusion deals with effects of debt conditionality. Conditionality based on investment is clearly beneficial in the sense that it prompts an optimising government to unambiguously increase investment. However, conditionalities based on monetary stability and deficit reduction both reveal an important potential trade-off which arises from the fact that seigniorage and additional debt are alternative sources of government revenue. Debt conditionality based on monetary stability induces policymakers to reduce seigniorage, but only in order to be able to increase revenues from expanding the debt ceiling. Conditionality based on deficit reduction produces the opposite result as the optimal government response is to reduce deficit (equal to debt here) while raising seigniorage (as long as there is some degree of debt conditionality based on monetary stability). In addition, debt conditionality based on deficit causes a decrease in investment.

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 stability can be avoided, if debt conditionality alternatively refers to the 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. If the deficit objective is considered very important by international financial institutions, the negative impact on investment can be alleviated by additional conditionality based on investment. In fact, any debt conditionality should be supplemented by additional conditionality aiming at public investment.

The third conclusion is that the impact of all types of debt conditionality is affected by the level of political instability. In most cases, effects on debt, seigniorage and investment are not straightforward nor unambiguous. There is, however, a clear-cut result in the case of debt conditionality based on monetary stability. Under increased political instability its seigniorage-reducing effect is augmented as government preferences shift from the future to the present. By reducing seigniorage the government can increase the debt ceiling and thus increase today's revenues. Again, this result contradicts previous findings which indicate that high levels of political instability render debt conditionality based on monetary stability virtually ineffective. The result in this paper is good news for the IMF, because it suggests that debt conditionality based on monetary stability can be used even in politically diverse societies with unstable governments. There is a downside, however. The result implies higher reliance on debt.

Future work on public finance under political instability and debt conditionality could go in various direction. First, the tax process could be modelled more elaborately. For instance, the government could be given a tax instrument. This would also require to include a term for the deadweight loss to capture tax distortions. Second, debt conditionality should be modelled by a non-linear structure. This could well affect the results, but might also produce a blurred picture. Third, the theoretical results on the effect of debt conditionality and political instability could be tested empirically. This is, however, a difficult and entirely new project. While there is data on political instability, data for debt conditionality applied to individual countries is not readily available. Furthermore, data ranking political instability and debt conditionality would have be used alongside with quantitative data on debt, seigniorage, and investment. Such empirical work might, however, help shed more light on the effectiveness of IMF policies.

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Appendix: Optimal Partial Interest Spending

The following exposition draws from Cukierman, Edwards, and Tabellini (1992). The same approach is also used in Svensson (1998). For convenience, polarisation assumption (3) which is embedded in the government utility function H for partial interest spending is restated for the type i government:

$$H^i(F^i, G^i) \;=\; \frac{1}{\alpha(1-\alpha)} \;\; \min\left[\alpha G^i, (1-\alpha)F^i\right]. \qquad \textbf{(A-1)}$$

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

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

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 partial interest spending X^i can be written as

$$X^i \;\equiv\; F^i \;+\; G^i \;=\; \frac{G^i}{1-\alpha} \;=\; \frac{F^i}{\alpha}. \qquad \textbf{(A-3)}$$

By reinserting in 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 partial interest utility *H* is obtained:

$$\begin{aligned} H^i(F^i, G^i) \;&=\; \frac{1}{\alpha(1-\alpha)} \;\; \min\left[\alpha(1-\alpha)X, (1-\alpha)\alpha X\right] \\ &=\; X \qquad\qquad =\; F^i + G^i \end{aligned} \qquad \textbf{(A-4)}$$

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

$$H^i(F^i, G^i) \;=\; X \;=\; H^k(F^k, G^k). \qquad \textbf{(A-5)}$$