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ABSTRACT

This paper argues that the limited ability to help developing countries in a crisis should shift the focus to policies helping in reducing the ex ante probability of crises. Indirectly, such policies would also alleviate the depths of realized crises. Two specific ideas are explored:

I. International reserves escrow accounts: Managing international reserves provides an effective mechanism for self insurance. The hazard of this mechanism is that international reserves are easy prey for opportunistic policy makers in polarized countries characterized by political instability. This hazard may be alleviated by escrow accounts run by the International Financial Institutions (IFIs), where part of the international reserves of a country are saved and would be used if pre-set conditions, like large TOT deteriorations, are met. The IFIs may offer a subsidized return on these escrow accounts in order to encourage countries to reduce external borrowing and to increase fiscal savings. Such subsidies may be welfare improving due to the over borrowing bias induced by sovereign risk.

II. IFIs as lenders of last resort to finance fiscal reforms: I illustrate this possibility in a modified version of Cukierman, Edwards and Tabellinis (AER 1992) model. I identify conditions where IFIs function as the lenders of last resort, financing fiscal reforms. IFIs financing may shift the equilibrium from an inefficient outcome with a low tax base and high inflation to a superior outcome, associated with a more sound tax system.

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The Chad-Cameroon Petroleum Development and Pipeline Project:

> "Following the Government's agreement with the World Bank, Chad's Parliament on December 30, 1998 approved a law setting out the Government's poverty reduction objectives and arrangements for the use of oil revenues, along with the Management of the Petroleum Revenue Program agreed to with the Bank. Revenues due to Chad are deposited in an escrow account, established at Citibank in London.
>
> Under the law, 10% of Chad's oil direct revenues (dividends and royalties) should be held in trust for future generations, a so-called Future Generations Fund. Of the remaining funds, 80% of royalties and 85% of dividends are to be devoted to education, health and social services, rural development, infrastructure, and environmental and water resource management, and 5% of royalties should be earmarked for regional development in the oil-producing area, in addition to budget allocations the region already receives. Up to December 31, 2007, 15 % of direct oil revenues can be spent on general expenditures; after that date, these revenues will be earmarked to priority sectors for poverty reduction. Indirect revenues (income taxes) will flow directly from the escrow account to the Treasury account held in the Central Bank. They will finance general expenditures."
>
> World Bank update, Oct. 4, 2004

The role of International Financial Institutes (IFIs) in the modern global economy remains a highly contested issue. The recent Argentinean crisis vividly illustrated the limited ability of IFIs to hasten the slow resolution of debt overhang, and the perils associated with external debt in countries with limited fiscal capacity. The questionable record of World Bank loans to poor countries led to soul searching process regarding the wisdom of providing credit to developing countries. Some argue for sweeping remedies, including minimizing the role of IFIs due to the resultant moral hazard, as well as channeling help to poor countries as grants instead of loans (see Meltzer (2000) and Easterly (2003)). A more radical view argues that the deeper financial globalization nullifies the beneficial role of IFIs, intensifying the residual moral hazard associated with the IFIs, and questioning the legitimacy of these organizations.

This paper cautions "Don't throw the baby out with the bath water" -- there is a risk of going overboard with the criticism of the IFIs. Specifically, IFIs may be instrumental in facilitating reforms and in adopting better management schemes in circumstances where political economy factors inhibit the governance capacity of the country. While accomplishing governance reform is harder than providing unconditional credit lines, there are situations where the IFIs retain an important role that could not be replaced by private financial markets. The limited ability to help developing countries in a crisis [ex post], should shift the focus of IFIs to involvement aimed ex-ante at reducing

the probability of a crisis. Such steps would also be beneficial in alleviating, ex-post, the depths of a crisis. We illustrate this with the help of two examples. The first focuses on managing escrow accounts of buffer funds by the IFIs, needed in order to deal with governance problems that may inhibit the formation of these funds in some developing countries. The second studies the IFIs role as "the lender of last resort" to support fiscal restructuring.

In section 1 we discuss the possible role of IFIs in facilitating escrow accounts of international reserves. As the experience of Chile, Korea and other countries vividly illustrate, international reserves may be used as a buffer fund, providing useful self insurance. This self insurance is valuable even if agents are risk neutral, in circumstances where the cost of public funds is high in recessions, and low in economic expansions [see Aizenman and Marion (2004)]. The buffer fund may be financed by both past fiscal savings and external borrowing. Yet, political polarization and political instability may curtail drastically the usefulness and optimal size of the buffer fund, as it is a convenient target for future opportunistic policy makers. Extending Aizenman and Marion (2004), we illustrate that some of the obstacles inhibiting the use of buffer funds may be overcome if these funds are run as escrow accounts managed by the IFIs. By offering above market yields on such accounts, IFIs may have the leverage encouraging developing countries to tame external borrowing, and to increase their fiscal savings. Such a policy would be welfare enhancing in circumstances where decentralized external borrowing leads to over borrowing, as the case tends to be when partial default entails deadweight losses due to enforcement costs, bank runs, etc. Our model can be extended to allow for investment, illustrating that political instability and polarization reduce investment. The proposed escrow account may alleviate some of the costs associated with low saving and investment.

The practical purpose of the proposed scheme is to deal with the challenges facing resource rich developing countries. In the absence of internal management problems, efficiency calls for increasing savings in "good times," augmenting the resources available in future "bad times." Examples of these concerns are oil producing countries in Sub-Saharan Africa. While one hope that the recent spike in oil prices would induce higher saving, political economy considerations and civil wars inhibit savings. The

Chad-Cameroon Petroleum Development & Pipeline Project provides an interesting case study of an escrow account plan, designed to deal with some of these issues. The plan was designed with the help and partially financed by the World Bank. The news release "*Payment From Chad's First Oil Sale Deposited in Escrow Account*" summarizes the scheme:

> " … The payment was made on the first sale of oil shipped from the Kribi terminal off the coast of Cameroon in October. The Doba oil field and the 1,070-kilometer pipeline through Cameroon to the Kribi facility were completed a year ahead of schedule and oil began flowing in July. The project is expected to generate $2.0 billion over 25 years for Chad, and the government is committed to using most of these revenues for poverty reduction, as set out in a revenue management law passed by parliament in 1999. In addition to financing Chad's participation in the Doba oil field project, the World Bank also advised the government on a transparent revenue management structure to direct the proceeds of oil sales to poverty reduction efforts. Under the oil revenue management law, the proceeds of oil sales, after payment of administrative fees and debt service, are then transferred to commercial banks in Chad and allocated as follows:
> Ten percent of royalties and dividends are placed in a Future Generations Fund, and the remaining 90% are allocated as follows:
> · Five percent is earmarked for regional development in the Doba oil field area.
> · Eighty percent are to be directed to education, health and social services, rural development, infrastructure and water management projects.
> · Fifteen percent are allocated to the Treasury current account
> Withdrawals from these accounts can only be authorized by an oversight committee, which comprises members of civil society, parliament, the Supreme Court and government. The account is to be audited annually and the results regularly published…"
>
> World Bank News Release No: 2004/166/AFR

Our model suggests that such schemes may alleviate agency problems, and in some cases may be useful in encouraging the external financing and the technical help needed to facilitate the success of investment projects.

Section 2 illustrates the role of IFIs in supporting fiscal restructuring in a modified Cukierman, Edwards and Tabellini (1992) model. Specifically, they considered an economy where there is greater inertia in reforming the overall efficiency of the tax system, than in changing the fiscal policy. They showed that even if changing the efficiency of the tax system is costless, high enough polarization and political instability induces the present administration to choose an inefficient tax system, left as a legacy to tie the hands of future administrations. Cukierman, Edwards and Tabellini's (1992) outcome reflects a competitive design of policies: each policy maker is setting the fiscal efficiency for the next period, ignoring any strategic interaction in the future. We show that even with a high degree of polarization, there are conditions under which tacit cooperation may be supported. This is accomplished by a trigger strategy, where the threat to revert to a highly inefficient fiscal system may induce all administrations to support a greater fiscal efficiency than the one outlined in Cuikerman at. al. (1992). Yet,

this rosy scenario may be unattainable in circumstances where changing the fiscal capacity is costly -- the limited present fiscal capacity implies that the cost of public funds may be prohibitive. In these cases, the IFIs may have an important role in alleviating this financing trap, facilitating the investment in improving fiscal capacities. Section 4 concludes the paper with interpretive remarks.

1. International reserves escrow accounts

We consider a two-period model of an emerging-market economy. The economy experiences productivity shocks that create a volatile tax base. It faces inelastic fiscal outlays and finds it costly to collect taxes. The economy can borrow internationally in the first period, but because there is some chance it will default in the second period, it may face a credit ceiling.

1.1. *Output*

Suppose that productivity shocks occur only in the second period. Then GDP in period i (i = 1, 2) is

$$\begin{aligned} Y_1 &= 1 \\ Y_2 &= 1+\varepsilon \end{aligned} \tag{1.1}$$

where ε is a productivity shock defined in the range $-\overline{\delta} \le \varepsilon \le \overline{\delta}$; $0 \le \overline{\delta}$, with a corresponding density function $f(\varepsilon)$.

1.2. *International Borrowing*

The emerging market can borrow in international capital markets. Suppose it borrows B in period 1 at a contractual rate r, so it owes $(1+r)B$ in period 2. If it faces a bad enough productivity shock in the second period, it defaults. International creditors can confiscate some of the emerging market's export revenues or other resources equal to a share α of its output. We assume that the defaulting country's international reserve holdings are beyond the reach of creditors.[1]

[1] This is a realistic assumption. For example, on January 5, 2002, *The Economist* reported "[President Duhalde] confirmed that Argentina will formally default on its debt, an overdue admission of an inescapable reality. The government has not had access to international credit (except from the IMF) since July. It had already repatriated nearly all of its liquid foreign assets to avoid their seizure by creditors." (*The Economist*, p. 29). Our main results will hold even if creditors can confiscate a fraction of the reserves, as long as this fraction is below α.

In the second period, the country repays its international obligations if repayment is less costly than the default penalty. The country ends up transferring S_2 real resources to international creditors in the second period, where:

$$S_2 = MIN\left[(1+r)B; \alpha Y_2\right], \qquad 0 < \alpha < 1 \qquad (1.2)$$

Let $\varepsilon*$ be the value of the shock that causes the emerging market to switch from repayment to the default regime:[2]

$$(1+r)B = \alpha(1+\varepsilon^*) \qquad (1.3)$$

Thus the future net resource transfer to international creditors will be:

$$S_2 = \begin{cases} (1+r)B & if \quad \varepsilon > \varepsilon^* \\ \\ \alpha(1+\varepsilon) & if \quad \varepsilon \le \varepsilon^* \end{cases} \qquad (1.4)$$

Suppose the risk-free interest rate is r_f. The international credit market is risk neutral, characterized by competition among banks that are fully informed regarding the debt exposure of the country. Partial default by the emerging market requires that banks should spend real resources μ in order to verify the productivity shock and to enforce the repayment according to (1.4).[3]

The interest rate attached to the country's acquired debt, r, is determined by the condition that the expected return on the debt, net of enforcement costs, is equal to the risk-free return:

$$\int_{-\bar{\delta}}^{\varepsilon^*} \left[\alpha(1+\varepsilon) - \mu\right] f(\varepsilon) d\varepsilon + \int_{\varepsilon^*}^{\bar{\delta}} (1+r) B f(\varepsilon) d\varepsilon = (1+r_f)B \qquad (1.5)$$

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[2] If the worst possible shock ($\varepsilon = -\bar{\delta}$) still makes repayment preferable to default, then ε^* is set equal to $-\bar{\delta}$.

[3] To simplify, we lump these costs together and ignore the possibility of randomized monitoring [see Towsend (1979) for a model where a debt contract is optimal in the presence of state verification costs]. As was shown by Boyd and Smith (1994), random monitoring adds significant complexity to the financial contract, without generating first order welfare effects.

Differentiating (1.5) with respect to *B*, we find that:

$$\frac{d[(1+r)B]}{dB} = \frac{1+r_f}{Q - \frac{\mu}{\alpha} f(\varepsilon^*)}, \tag{1.6}$$

where $Q = \int_{\varepsilon^*}^{\bar{\delta}} f(\varepsilon) d\varepsilon$ is the probability of full repayment. If there is no chance of default, $Q = 1$ and the country is charged the risk-free rate. But when there is some chance of default, the country is forced to pay a risk premium, since $0 < Q < 1$ implies $r > r_f$.

1.3 *The Fiscal Story*

The demand for public goods, such as health, pensions, and defense, is assumed to be completely inelastic and set at $\overline{G}$. Public goods expenditures are financed, in part, by tax revenues. Collecting taxes is assumed to be costly. Costs include direct collection and enforcement costs as well as indirect deadweight losses associated with the distortions induced by taxes. Like Barro (1979), we model these costs as a non-linear share of output and let them depend positively on the tax rate. Thus a tax at rate *t* yields net tax revenue of

$$T(t) = Y[t - \Gamma(t)]; \quad \Gamma' \geq 0, \Gamma'' \geq 0. \tag{1.7}$$

The term $\Gamma(t)$ measures the fraction of output lost due to of inefficiencies in the tax collection system. $\Gamma(t)$ is assumed to increase at an increasing rate as the tax rate rises.

It is convenient to specify the fiscal demand for net tax revenue as a share of GDP:

$$\xi_i = \frac{T_i}{Y_i}; \quad i = 1, 2 \tag{1.8}$$

Combining (1.7) and (1.8), we can express the tax rate as a function of the share of net tax revenue in GDP:

$$t_i(\xi_i); \quad t' > 0 \tag{1.9}$$

For example, if the collection cost is quadratic in the tax rate, so that $\Gamma(t) = 0.5\lambda t^2$ where λ measures the relative inefficiency of the tax system, then

$$T(t) = Y[t - 0.5\lambda t^2] \tag{1.10}$$

and

$$t_i = \frac{1 - \sqrt{1 - 2\lambda\xi_i}}{\lambda}. \tag{1.11}$$

1.4 ***Reserves***

The government can acquire international reserves in the first period, let them earn the risk-free rate, and spend them in the second period. One way of acquiring reserves is through sovereign borrowing. Even if reserves are acquired as the counterpart of private-sector borrowing, full sterilization by the central bank implies an ultimate swap of sovereign debt for reserves.[4] Another way of accumulating reserves is through taxation. Higher taxes depress domestic absorption and generate a bigger current-account surplus in the first period. In the second period, reserves may be spent to finance repayment of the international debt and government expenditures. In a two-period model, there is no need to hold reserves beyond the second period. Thus the terminal demand for reserves is zero.

The government faces the following budget constraints:

$$\begin{aligned} T_1 &= \overline{G} + R - B; \\ T_2 &= \overline{G} + S_2 - (1 + r_f)R \end{aligned} \tag{1.12}$$

In the first period, spending on public goods and reserve accumulation must be financed by taxes and foreign borrowing. In the second period, spending on public goods and debt repayments must be financed by taxes and available reserves.

[4] The central bank actively targets the stock of reserves. Even so, a variety of exchange-rate arrangements are possible, such as a fixed exchange rate or a managed float, because the balance sheets of the central bank and treasury are consolidated and the net taxes paid by consumers are determined as a residual. This structure would also apply to the operation of export stabilization funds, such as Chile's cooper fund.

Consumer preferences are characterized by a conventional time-separable utility function, where ρ is the discount rate:

$$\mathrm{u}(\mathrm{C}_1) + \frac{u(C_2)}{1+\rho} \tag{1.13}$$

Consumer spending in each period is merely output net of taxes, where taxes include collection costs:

$$C_i = Y_i[1 - \xi_i - \Gamma(t(\xi_i))]; \qquad i = 1,2^{5} \tag{1.14}$$

Given the definition of output in (1.1), consumer spending in period 1 is $C_1 = [1 - \xi_1 - \Gamma(t(\xi_1))]$ while consumer spending in period 2 is $C_2 = [1 - \xi_2 - \Gamma(t(\xi_2))]\ (1+\varepsilon)$. For future reference, it is useful to note that the marginal cost of public funds, $-\partial C_i / \partial T_i$, can be inferred from (1.14) to be:

$$1 + \Gamma'(\xi) \qquad \text{where } \Gamma'(\xi) = \frac{d\Gamma}{dt}\frac{dt}{d\xi}. \tag{1.15}$$

while from (1.8) and (1.12) we know that:

$$\xi_1 = \frac{T_1}{Y_1} = \overline{G} + R - B; \qquad \xi_2 = \frac{T_2}{Y_2} = \frac{\overline{G} + S_2 - (1+r_f)R}{1+\varepsilon} \tag{1.16}$$

and S_2 is given by (1.4).

If a bad enough shock reduces future output so much that the country defaults (i.e., if Q < 1), then the country services the eternal debt by paying the default penalty. In the absence of sufficient international reserve holdings to finance second-period public expenditures, the country also needs to raise taxes.

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[5] Applying (7) and the definition of ξ, we know $\xi Y_i = T_i = [t_i - \Gamma]Y_i$. Thus $t_i = \xi_i + \Gamma_i$, and $C_i = Y_i(1 - t_i) = Y_i(1 - \xi_i - \Gamma_i)$.

1.5 ***The political economy story***

We consider an economy where interest groups compete for additional fiscal resources to support their specific agendas. Realized fiscal expenditure is the outcome of this competition. Interest groups may be represented by cabinet ministers or, in a federal system, by various state or provincial governors. Such will be the case if interest groups pursue narrow agendas, and their marginal spending does not directly impact the representative consumer's welfare. However, the tax consequences of successful lobbying efforts will have the usual adverse effect on the consumer's utility.

The Treasury Minister (TM) is assumed to determine the ultimate fiscal allocation. We assume two types of Treasury Ministers—soft and tough. A soft one accommodates all the fiscal demands of the various interest groups up to the limit imposed by the contemporaneous budget constraint. A tough one forces the interest groups to adhere to the planned allocation, $\overline{G}$. There is uncertainty in period one about the type of Treasury Minister that will serve in period two. With probability ϕ the future Treasury Minister will be tough.

The sequence of events is as follows. In period one, the interest groups determine their desired second-period demand for fiscal resources. At the beginning of the second period, the productivity shock and the Treasury Minister's type are revealed. A soft TM in the second period will divide the maximum available fiscal resources, net of foreign debt repayments, among all the interest groups. In that case, aggregate fiscal expenditure and consumption in the second period will be:

$$\begin{aligned} G_{|\text{Soft 2nd period}} &= (1+\varepsilon)\{t_m - \Gamma(t_m)\} + R(1+r_f) - S_2; \\ C_{|\text{Soft 2nd period}} &= (1+\varepsilon)\{1 - t_m\} \end{aligned} \tag{1.17}$$

where t_m is the tax rate that maximizes net tax revenue and is obtained by solving $MAX\{t - \Gamma(t)\}$. For example, with quadratic collection costs,

$$\begin{cases} t_m = 1/\lambda; \quad T_m = Y/2\lambda & \text{if} \quad \lambda > 1 \\ 1 \quad ; \quad T_m = Y[1 - 0.5\lambda] & \text{if} \quad \lambda \le 1 \end{cases} \tag{1.18}$$

where T_m is the maximum net tax revenue attainable [i.e. $T_m = Y\{t_m - \Gamma(t_m)\}$].

If the TM is also soft in the first period, fiscal expenditure in period one will equal the maximum contemporaneous resources available. This outcome is the result of assuming interest groups have high discount rates and prefer maximizing first-period fiscal expenditure. A soft TM will therefore have no incentive to acquire international reserves and carry them over to the future period. Moreover, a soft TM will borrow in the first period up to the external credit ceiling, $[\alpha - (1-Q)\mu]/(1+r_f)$. Consequently, first-period fiscal expenditure and consumption observed with a soft TM are:

$$\begin{aligned} G_{|\text{Soft 1st period}} &= 1\{t_m - \Gamma(t_m)\} + \frac{\alpha - (1-Q)\mu}{1+r_f}; \\ C_{|\text{Soft 1st period}} &= 1\{1 - t_m\} \end{aligned} \qquad (1.19)$$

.

The public finance problem solved by the soft TM has a trivial solution: maximize the fiscal outlay in period one. To do so, the first-period TM sets the tax rate at the peak of the tax Laffer Curve, borrows up to the external credit ceiling, and accumulates no international reserves.

We turn now to the more complex case, where a tough TM in the first period must determine the amount of international reserves and foreign debt to acquire in order to maximize the expected utility of the representative agent. The tough TM does not know the second-period productivity shock or TM-type, only the distribution of the productivity shock and the probability of having a particular TM-type. The tough TM's objective is to maximize:

$$\begin{aligned} V_{|\text{Tough 1st period}} &= u[1 - \xi_1 - \Gamma(t(\xi_1))] + \\ &\frac{\phi}{1+\rho}\int_{-\bar{\delta}}^{\bar{\delta}} u[(1+\varepsilon)\left[1 - \frac{S_2 + \bar{G} - R(1+r_f)}{1+\varepsilon} - \Gamma(t(\frac{S_2 + \bar{G} - R(1+r_f)}{1+\varepsilon})\right]]f(\varepsilon)d\varepsilon \\ &\frac{1-\phi}{1+\rho}\int_{-\bar{\delta}}^{\bar{\delta}} u[(1+\varepsilon)(1-t_m)]f(\varepsilon)d\varepsilon \end{aligned} \qquad (1.20)$$

Inspection of (1.20) reveals that whatever choice the tough TM makes about first-period external debt and reserve holdings, it will not affect expected future utility should the soft TM be in office next period (the last term in (1.20)). The tough TM in the initial period set policies satisfying the following first-order conditions:

$$\int_{\varepsilon^*}^{\bar{\delta}} \left\{u'(c_1)\{1+\Gamma'(\xi_1)\}\right\} f(\varepsilon)d\varepsilon = \int_{\varepsilon^*}^{\bar{\delta}} [\frac{1}{1-\frac{\mu f(\varepsilon^*)}{\alpha Q}} \frac{\phi(1+r_f)}{1+\rho} u'(c_2)\{1+\Gamma'(\xi_2)\}] f(\varepsilon)d\varepsilon \quad (1.21)$$

.

$$u'(c_1)\{1+\Gamma'(\xi_1)\} = \int_{-\bar{\delta}}^{\bar{\delta}} [\frac{\phi(1+r_f)}{1+\rho} u'(c_2)\{1+\Gamma'(\xi_2)\}] f(\varepsilon)d\varepsilon \quad (1.22)$$

Inspection of (1.21) and (1.22) reveals that political uncertainty about whether the future Treasury Minister will be soft or tough induces today's tough TM to reduce the shadow real interest rate on borrowing and international reserves from $1+r_f$ to $\phi(1+r_f)$. If the country operates in the range where saving increases with the real interest rate and borrowing depends negatively on its expected cost, the higher probability of a soft future governor will lead to higher borrowing and lower international reserves accumulation in period 1.

The rationale for holding reserves is to increase tomorrow's buying power, shifting fiscal resources from period one to period two. The greater the probability of having a soft TM in the future (a small ϕ), the smaller the weight attached to the benefit of having high reserves in the future to increase purchasing power. With probability $(1-\phi)$ the reserves will be appropriated—or looted-- by a soft TM who will distribute them to various interest groups via higher fiscal expenditure.

Similarly, the greater the probability of having a soft TM in the future, the more borrowing a tough TM will undertake today. Greater borrowing today increases future debt service and reduces the resources left for the soft TM to distribute.

The political instability leads to a second best environment, where the tough TM scales back the precautionary demand for reserves to reduce future looting. This situation

can be partially alleviated if a third party, say the IFIs, would manage some of the international reserves for the developing country, in escrow accounts that can be used only if preset conditions apply. These conditions may specify that the international reserves should supplement the regular taxes to finance fiscal expenditure G, but would be reimbursed to the tax payer if the authorities were to finance a new set of opportunistic activities which were not part of pre-set fiscal expenditure.[6]

To illustrate the impact of the scheme, we turn to the simplest case of two states of nature, quadratic cost of tax collection, and the absence of verification costs, $\mu = 0$. Specifically, assume that future output will either be high $(1 + \delta)$, or low $(1-\delta)$, with probability one-half of each event. Suppose that a fraction ω of reserves is to be held in an escrow account. The first order condition for optimal hoarding of reserves and borrowing in an internal equilibrium with borrowing is:

$$\frac{1}{\sqrt{1-2\lambda(G-B+R)}} = \phi\frac{1+r_f}{1+\rho}\frac{1}{\sqrt{1-2\lambda\dfrac{G+B(1+r)-R(1+r_f)}{1+\delta}}}. \qquad (1.21')$$

(1.22')

$$\frac{1}{\sqrt{1-2\lambda(G-B+R)}} = 0.5\phi\frac{1+r_f}{1+\rho}\left[\frac{1}{\sqrt{1-2\lambda\dfrac{G+B(1+r)-R(1+r_f)}{1+\delta}}} + \frac{1}{\sqrt{1-2\lambda\dfrac{G+\alpha(1-\delta)-R(1+r_f)}{1-\delta}}}\right] + \omega(1-\phi)\frac{1+r_f}{1+\rho}$$

Figure 1 plots the optimal international reserves as a function of the probability of reappointment of the tough TM. Figure 2 plots the optimal external borrowing as a function of the probability of reappointment of the tough TM. In both figures, the

[6] Similar results would apply if instead of reimbursement, the funds would be used to finance directly services targeting the tax payer.

higher curves correspond to the case where a fraction 0.1 of the international reserves is put into the escrow account, and the lower curves correspond to no escrow account. In the absence of political risk, the precautionary demand for reserves is sizable, and it matches the external borrowing in our base example. Political risk, in the form of higher probability of the soft TM reduces the demand for international reserves, and increases external borrowing. Political risk impacts the precautionary saving of IR much more than external borrowing – precautionary saving is more subject to the future abuse of opportunistic behavior, as it shifts resources to the future. The introduction of a modest escrow account mitigates the drop in the demand for international reserves, and increases the external borrowing. Deeper provision to the escrow account [higher ω] shifts both curves up, mitigating the drop in the precautionary savings of IR, and increasing the external borrowing.

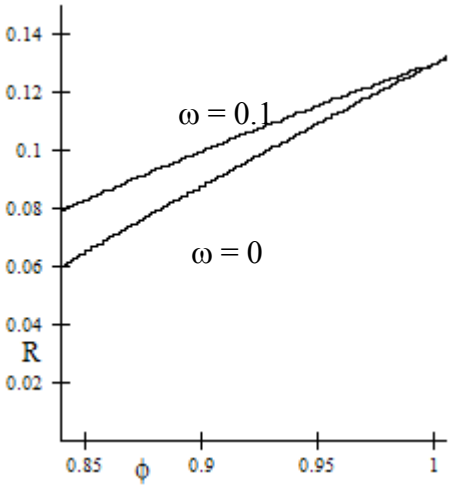

Figure 1

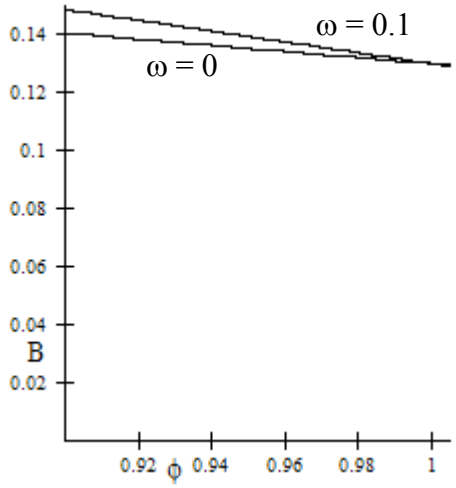

Figure 2

The demand for International reserves [R, Figure 1], external borrowing [B, Figure 2], and political risk, ϕ.

The simulations correspond to $\lambda = 0.9$; $\alpha = 0.15$; $r_f = 0.02$; $\rho = 0.02$; $\alpha = 0.15$; $\delta = 0.2$.

Table 1 reports comparative statics of a simulation where future GDP follows a normal distribution, truncated at $\pm 2 *$standard deviation. The δ_n parameter reported in Table 1 is the distance from the center of the distribution to the truncation, and it equals twice the standard deviation if the distribution were normal, not truncated. Greater openness, higher volatility, higher fiscal expenditure and lower enforcement costs increase the optimal international reserves and borrowing. More costly tax collection and lower political risk increase the optimal self insurance (i.e., higher international reserves), and lower borrowing.

x	dB/dx	dR/dx
α	0.78	0.73
r_f	-0.19	-0.01
μ	-3.59	-2.42
δ_n	0.057	0.06
G	0.26	0.83
λ	-0.005	0.07
ϕ	-0.13	0.09
ρ	0.04	0.03

Table 1

Estimates of Derivatives

The comparative statics are conducted around an initial equilibrium characterized by output shocks that follow a normal distribution, symmetrically truncated at $\pm 2 *$s.d.; $\lambda = 2; \alpha = 0.2; r_f = 0.03; \rho = 0.03; \alpha = 0.15; \delta = 0.5; G = 0.06; \mu = 0.01; \phi = 0.5$, and the variance of the second period output is 0.0484.

The optimal design of policies is more complex when default on the external debt would entail monitoring costs, $\mu > 0$. In these circumstances, the competitive equilibrium is associated with over-borrowing. This can be seen in equation (1.21), indicating that the expected social cost of borrowing is $\frac{1+r_f}{1-\frac{\mu f(\varepsilon^*)}{\alpha Q}}$, exceeding the creditors' expected

return on sovereign debt $1+r_f$, by $1/[1-\frac{\mu f(\varepsilon^*)}{\alpha Q}]$. Under these circumstances, the developing country would benefit by taxing external borrowing, inducing the private sector there to internalize the marginal impact of sovereign borrowing on the probability of partial default [see Aizenman and Turnovsky (2002)]. [7] Inducing the developing country to follow this policy may be accomplished if the IFIs would subsidize the return on the escrow account of countries reducing their reliance of external borrowing (e.g., taking external borrowing). Such a policy would increase the international reserves portion funded by domestic savings, instead of costly external borrowing.

2. **Designing and financing fiscal reforms**

The base model is taken from Cukierman, Edwards and Tabellini (1992), which explains the obstacles to tax reforms in polarized countries, characterized by political instability. The economy at time t is described by two budget constraints: the government, (2.1) and the private sector, (2.2):

$$g_t + f_t \le \tau_t(1-\theta_{t-1}) + s_t \qquad (2.1)$$

$$c_t \le 1-\tau_t - s_t - \delta(\tau_t) - \gamma(s_t)\,. \qquad (2.2)$$

Each individual is endowed with one unit of output in each period. The variables g_t; f_t represent two different public goods [say guns and butter] in per capita terms, and c_t is per-capita private consumption. The government collects from each individual an amount s_t, in the form of seigniorage and an amount τ_t of tax revenue. A fraction of the tax revenue is wasted due to tax-collection costs, whereas seigniorage carries no

[7] We assume that the sovereign default decision is centralized [e.g., done by the government], and that the partial debt service following the default decision is done by the governmental agency using taxes. In these circumstances, the competitive equilibrium leads to over borrowing due to the presence of a distortion akin to a congestion externality. Each agent is price taker, ignoring the impact of marginal borrowing on increasing the probability of default, and thereby increasing the deadweight loss associated with the expected enforcement cost, $\mu[1-Q]$. It can be shown that, for $\mu > 0$, the optimal policy is external borrowing tax at a rate proportionate to the elasticity of supply of credit facing the economy [for further details, see Aizenman and Turnovskey (2002)].

administrative costs. Both taxes and seigniorage impose convex deadweight losses on the private sector, equal to $\delta(\tau_t)$; $\gamma(s_t)$, satisfying $\delta' > 0, \quad \delta'' > 0, \gamma' > 0, \quad \gamma'' > 0$.

The efficiency of the tax system is measured by θ_{t-1}. A lower value of θ_{t-1} implies a more efficient tax system. To capture the greater inertia in reforming the tax system than in changing fiscal policy, Cukierman et. al (1992) assume that the tax efficiency, θ, but not the other policy variables (τ_t; s_t ; g_t; f_t), must be chosen one period in advance. Thus, θ_{t-1} was chosen at time t-1, but exerts an influence on tax-collection costs only at time t. In order to focus on the strategic role of tax inefficiency, the authors assume that the cost of a fiscal reform, setting θ_t, is zero. There are two possible policymaker types, L and R, who randomly alternate in office. The policy maker of type i, i = L, R maximizes welfare:

$$w_i^t = E_t\left\{\sum_{k=0}^{\infty}\beta^k\left[U(c_{t+k}) + H^i(g_{t+k}, f_{t+k})\right]\right\};\ 1 > \beta > 0, \qquad (2.3)$$

where E_t denotes the expectation operator, U is concave utility function. The utility from consuming g and f, H^i, is defined as follows,

$$H^L(g,f) = \left(\frac{1}{\alpha(1-\alpha)}\right)\min[\alpha g, (1-\alpha)f];$$

$$1 > \alpha > 0. \qquad (2.3')$$

$$H^R(g,f) = \left(\frac{1}{\alpha(1-\alpha)}\right)\min[(1-\alpha)g, \alpha f];$$

Thus, the two policy makers differ only in the desired composition of the public good, with their disagreement is parameterized by $|\alpha - 0.5|$. By construction, the overall weight given to private versus public consumption does not depend on the disagreement parameter, α.

The political system is described as a Markov process with transition probabilities π and $1 - \pi$: the government in office at time t has a fixed probability $1 - \pi$ of being

reappointed next period. With probability π, it is thrown out of office and the other policymaker type is appointed.

Let $x \equiv g + f$ denote the total amount of government spending. For concreteness, we assume $\alpha > 0.5$. Proposition 1 in Cuikierman at. al. (1992) shows that the optimal choices of consumption, aggregate public good, seigniorage and taxes are all a function of the efficiency of the tax system:

$$c^* = C(\theta);\ x^* = X(\theta);\ s^* = S(\theta);\ \tau^* = T(\theta); \tag{2.4}$$

satisfying $C'(\theta) > 0;\ X'(\theta) < 0;\ S'(\theta) > 0;\ T'(\theta) < 0$, where z^* denote the optimal value of z. The equilibrium value of the tax rate chosen, θ, is shown to satisfies the first order condition:

$$U'(C(\theta))C'(\theta) + \left[1 - \pi + \pi\frac{1-\alpha}{\alpha}\right]X'(\theta) \le 0 \tag{2.5}$$

which holds with equality if $\theta > 0$. The main results of the model are summarized in proposition 2 in Cuikerman at. al (1992), stating that

I. If the current government is certain of being reappointed or if there is no polarization, than it always brings about the most efficient tax system (if $\pi = 0$ or $\alpha = 0.5$, then $\theta = 0$).

II. With a sufficient degree of political instability or polarization, a more inefficient system would be preferred. Above a threshold of political instability or of polarization, the lower the probability that the current government will remain in office and the greater the polarization, the more inefficient is the tax system left as a legacy to future administration.

The equilibrium characterized above reflects competitive setting of policies: each policy maker is setting the fiscal efficiency for the next period, ignoring any strategic interaction in the future. We extend the above model by allowing for potential gains

from 'tacit collusion' among L and R, supported by a trigger strategy. This possibility is summarized in the following Claim:

Claim 1

Consider an economy characterized by a sufficient degree of political instability or polarization, inducing an inefficient tax system in the competitive equilibrium outlined above, $\theta^* > 0$. If regimes persist ($\pi < 0.5$), there exists a trigger strategy equilibrium associated with $\tilde{\theta}$; $\theta^* > \tilde{\theta}$. In this equilibrium the time t policy maker sets $\theta_{t+1} = \tilde{\theta}$; any future deviation from $\theta_{t+1} = \tilde{\theta}$ will trigger reverting to the competitive equilibrium, $\theta = \theta^*$. The new equilibrium increases the expected utility of the policy maker in charge at time t.

Proof

If L is setting policies today, the competitive setting of fiscal reform in Cuikerman et. al. (1992) is obtained by choosing the fiscal regime that would maximize the expected utility of policy maker L next period, $U(C(\theta)) + \left[1 - \pi + \pi \frac{1-\alpha}{\alpha}\right] X(\theta)$, leading to (2.5).

Implied in the strategic choice, is the recognition that if the fiscal regime chosen today would be supported by all future policy makers, the optimal choice of the present policy maker entails optimizing the discounted expected utility of the entire future, and not only the next period. We denote by $W_{i,j}$ the expected utility of policy maker i (i = L, R) in a period where the policy maker holds the legislative power (j = P), or is out of office (j = O), evaluated for an arbitrary θ set for the indefinite future. Applying the Markov nature of the model, it follows that

$$W_{L,P}(\theta) = U(C(\theta)) + X(\theta) + \beta\left[(1-\pi)W_{L,P}(\theta) + \pi W_{L,O}(\theta)\right] \qquad (2.6)$$

$$W_{L,O} = U(C(\theta)) + \frac{1-\alpha}{\alpha} X(\theta) + \beta\left[(1-\pi)W_{L,O} + \pi W_{L,P}\right]. \qquad (2.7)$$

Similar equations applies for *i = R.* Solving the above system we infer that

$$W_{L,P}(\theta) = \frac{U(C(\theta))}{1-\beta} + \frac{0.5}{\alpha} X(\theta)\left[\frac{1}{1-\beta} + \frac{2\alpha - 1}{1-\beta(1-2\pi)}\right];$$
$$W_{L,O}(\theta) = \frac{U(C(\theta))}{1-\beta} + \frac{0.5}{\alpha} X(\theta)\left[\frac{1}{1-\beta} - \frac{2\alpha - 1}{1-\beta(1-2\pi)}\right] \qquad (2.8)$$

The optimal strategic choice of the present policy maker entails optimizing $W_{L,P}(\theta)$ with respect to the tax efficiently [see equation (2.8)]. We denote the optimal tax by $\tilde{\theta}$. It would be in the self interest of all future policy makers to adhere to $\tilde{\theta}$ instead of the competitive θ^* if for i = L, R the expected utility associated with $\tilde{\theta}$ exceeds that of θ^*

$$U(C(\theta_{-1})) + X(\theta_{-1}) + \beta\begin{bmatrix}(1-\pi)W_{i,P}(\theta^*) + \\ \pi W_{i,O}(\theta^*)\end{bmatrix} < U(C(\theta_{-1})) + X(\theta_{-1}) + \beta\begin{bmatrix}(1-\pi)W_{i,P}(\tilde{\theta}) + \\ \pi W_{i,O}(\tilde{\theta})\end{bmatrix} \qquad (2.9)$$

Equivalently, the strategic choice of fiscal regime is sustainable if the gain associated with switching from the competitive outcome [where $\theta = \theta^*$] to $\theta = \tilde{\theta}$ is positive. Denoting the gain by G, the condition is:

$$G = (1-\pi)\left\{W_{L,P}(\tilde{\theta}) - W_{L,P}(\theta^*)\right\} + \pi\left\{W_{L,O}(\tilde{\theta}) - W_{L,O}(\theta^*)\right\} > 0\,. \qquad (2.9')$$

Applying (2.8) and (2.9'), the above condition is equivalent to

$$G = \frac{U(C(\tilde{\theta})) - U(C(\theta^*))}{1-\beta} + \frac{X(\tilde{\theta}) - X(\theta^*)}{2\alpha}\left[\frac{1}{1-\beta} + \frac{(1-2\pi)(2\alpha-1)}{1-\beta(1-2\pi)}\right] > 0\,. \qquad (2.9'')$$

Around the competitive equilibrium, a marginal improvement in fiscal efficiency would impact the policy maker's welfare by

$$-\frac{dG}{d\tilde{\theta}}_{|\tilde{\theta}=\theta^*} = -\frac{U'(C(\theta^*))C'(\theta^*)}{1-\beta} - \frac{X'(\theta^*)}{2\alpha}\left[\frac{1}{1-\beta} + \frac{(1-2\pi)(2\alpha-1)}{1-\beta(1-2\pi)}\right]. \qquad (2.10)$$

Applying the first order condition for an internal competitive equilibrium, (2.5), to (2.10), we infer:

$$-\frac{dG}{d\tilde{\theta}}_{|\tilde{\theta}=\theta^*} / X'(\theta^*) = \frac{1}{1-\beta}\left[1-\pi+\pi\frac{1-\alpha}{\alpha}\right]-\frac{1}{2\alpha}\left[\frac{1}{1-\beta}+\frac{(1-2\pi)(2\alpha-1)}{1-\beta(1-2\pi)}\right]\geq 0. \quad (2.10')$$

We conclude the proof of Claim 1 by noting that with no polarization ($\alpha = 0.5$), or no persistence ($\pi = 0.5$), $\frac{dG}{d\tilde{\theta}}_{|\tilde{\theta}=\theta} = 0$. Regime persistence and polarization ($\pi < 0.5$ and $\alpha > 0.5$) imply $-\frac{dG}{d\tilde{\theta}}_{|\tilde{\theta}=\theta} > 0$. Hence, the policy marker at time t would gain by adopting a more efficient tax regime than the one supported by the competitive equilibrium. The condition characterizing the optimal tax regime supported by trigger strategy is:

$$\frac{dG}{d\tilde{\theta}} = 0 \quad (2.11)$$

Figure 3 plots the RHS of (2.10') as a function of polarization. Higher polarization and greater regime persistence increase the gains from adopting a trigger strategy equilibrium associated with greater fiscal efficiency.

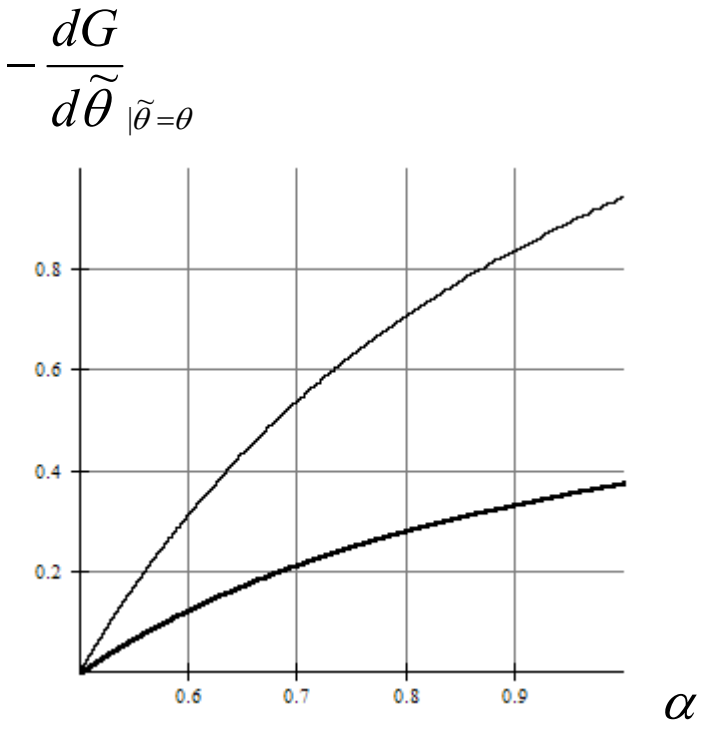

Figure 3

Polarization and the marginal welfare gains from greater fiscal efficiency.

The simulation plots $-\frac{dG}{d\tilde{\theta}}_{|\tilde{\theta}=\theta}$ as a function of polarization (α), for $\beta = 0.95$. The solid (bold) line corresponds to $\pi = 0.45$ ($\pi = 0.48$), respectively

Discussion

- Claim 1 implies that, under the assumptions of Cuikerman et. al. (1992), polarized countries characterized by regime persistence will benefit by fiscal reforms that would adopt fiscal efficiency above the one predicted by the competitive solution [i.e, where $\theta = \theta^*$]. The higher fiscal efficiency is supported by the trigger strategy associated with a permanent switch to the inefficient fiscal regime.

- One should qualify this result by noting that Cukierman et. al. (1992) conveniently assumed that the cost of the fiscal reform is zero. In practice, one expects the set up cost of the reform to be significant, involving both a fixed cost, and a cost that increases with the depth of the fiscal reform. Reform costs imply that, in circumstances where the deadweight losses of segniorage and taxes were high, the fiscal reform would not be implemented. This would be the case even if the direct fiscal cost of the reform, say RC, were small enough such that a modified cost benefit condition continued to hold:

(2.9")

$$U(C(\theta_{-1})) + X(\theta_{-1}) + \beta\begin{bmatrix}(1-\pi)W_{i,P}(\theta^*) + \\ \pi W_{i,O}(\theta^*)\end{bmatrix} < U(C(\theta_{-1})) + X(\theta_{-1}) + \beta\begin{bmatrix}(1-\pi)W_{i,P}(\tilde{\theta}) + \\ \pi W_{i,O}(\tilde{\theta})\end{bmatrix} - RC$$

In these circumstances, if the existing fiscal inefficiencies were high enough, the total cost of raising RC (inclusive of the deadweight loses associated with collecting RC) would reverse the above inequality. Thus, the fiscal inefficiency imposes a financing trap: starting with an inefficient fiscal system, implementing a costly fiscal reform may be equivalent to the Baron Munchausen's attempt to rescue himself out the swamp by pulling his own hair… Short of being able to borrow externally, the reform is prohibitively costly in the short run. Yet, the political polarization and instability frequently imply that private creditors would shy away from lending to the country. This suggests that IFIs may have a constructive role in supplying the seed resources needed to

support the fiscal reform. Since the private capital market would shy away from such a country, IFIs are practically the lenders of last resort to finance fiscal reform.[8]

Our analysis deals with the case where regime persistency implies that the present policy maker expects to benefit in his tenure from any fiscal reform he undertakes. The analysis is more involved in the absence of persistence. If the probability of remaining in power is less than half, each policy maker is in the "lame duck" position. The above model suggests that the strategic behavior of each policy maker would increase the fiscal inefficiency above that of the competitive outcome. When the distortions associated with seigniorage and the income tax are large, and the policy maker is a "lame duck", the equilibrium entails high fiscal inefficiency and relative low provision of aggregate public good [high $\widetilde{\theta}$ and low x]. [9] Even in these unfavorable circumstances, the message of our analysis holds; though deeper fiscal reform would be needed. Specifically, it can be shown that an administration that would adopt *both* efficient fiscal regime [low θ] *and* lower fiscal expenditure bias [i.e., reducing $|f-g|$] would increase its expected utility, and the new outcome would be supported by the next administration. As before, this option would not be viable if fiscal reforms were costly, short of IFIs involvement.

[8] Implicitly, this argument hinges on the superior capacity of IFIs relative to the private creditors to prevent abusing this financing to meet opportunistic expenditure instead of financing the fiscal reforms, and the capacity to provide technical help in implementing the reform.

[9] This follows from the observation that the sign of (2.10') is reversed for $\pi < 0.5$, hence the strategic design of policies would induce adopting $\widetilde{\theta} > \theta^*$.

3. Concluding remarks

This paper argues that developing countries characterized by polarization and policy instability opt to adopt policies leading to an inefficient tax system, over borrowing, and under saving. In these circumstances, easy access of the developing country to credit lines would backfire, and IFIs would have limited capacity in mitigating ex-post the adverse implications of financial crises triggered by over borrowing and under saving. Yet, there may be an important role for IFIs involvement in ameliorating the ex-ante fiscal exposure of the developing country. The IFIs may provide escrow account services to the central bank of the developing country, in order to reduce the prospect that buffer funds (including international reserves) may be used opportunistically by future policy makers. This role is akin to Liabson (1998)'s proposal of setting saving programs (like 401k) as a mechanism dealing with the under saving bias. The IFIs may also help by financing and helping in implementing fiscal reforms at times when the risk characteristics of the country induce private lenders to minimize their exposure. All these suggestions reflect the second best nature of the environment, and have a lesser role in countries characterized by better functioning institutions. However, such institutions may be harder to implement precisely when they are needed: when the country is polarized and subject to political instability. Hence, the above suggestions may help as a imperfect substitute for the missing institutions, or for the inability of the present institutional set up to cope with the political pressure induced by polarization and policy instability.

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