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Default, Electoral Uncertainty and the Choice of Exchange Regime

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ABSTRACT

The paper explores the interaction between debt crises and devaluation. Since the optimal level of devaluation in a crisis depends on the level of debt that has to be serviced, a default makes a devaluation less likely. Expected devaluation depends thus on expectations about default which is also a function of the type of policymaker. Therefore, the decision to devalue can be forced upon the government by adverse expectations about default and the type of policymaker in office. I also explore how these uncertainties affect the policymaker's choice of exchange rate regime.

Keywords: debt crisis, currency crisis, exchange rate regime

JEL-Classification: F 33, F 34.

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1. Introduction

Currency crises and debt crises often occur jointly. If a debt default is expected, investors pull out short term capital from the country which puts the exchange under pressure, forcing the government, after foreign reserves are exhausted, to devalue. Raising the interest rate to defend the exchange rate is usually not attractive because this could additionally worsen the debt situation, making the government even more vulnerable and prone to default later. In other cases, currency crises might trigger debt crises as a devaluation increases foreign currency denominated debt, forcing the government or firms to default on part or all of their debt. Recent examples for both sequences are currency crises and defaults in Russia, Ukraine, Argentina, Mexico and some East-Asian countries (see Sturzenegger 2003 a detailed chronology of these episodes).[1] The conclusion from these examples is that debt and currency crises can be mutually reinforcing in their negative consequences.

There is another relation between debt default and currency crises, however, that is often disregarded in the literature. Since debt service has to be tax financed if issuing new debt is not possible, it has a negative output effect. Consequently, a devaluation aimed at raising the output in case of negative shocks has to be proportionally higher to account for the negative influence of debt service. The decision to devalue and by how much will thus, inter alia, be determined by the debt obligations of a country, particularly in a crisis situation. Contrary to what the stylized sequence described above would suggest, it is thus not clear that a debt default will actually make a currency crises more likely. In fact, as Edwards (2002) discusses for the Argentine example, some observers suggested before the December 2001 crisis that Argentina default on part of its debt in order to defend the currency board.

[1] A similar sequence can be observed with private banks or large enterprises that have short-term foreign currency debt, as the Asian crisis has demonstrated.

Since currency and debt crises are to a large extent driven by expectations, the expected devaluation is a function of how likely the private sector perceives the chances that the government will default: the more likely is a default the less likely is a devaluation. However, the probability of default and devaluation depend also on the type of policymaker in office. Some governments place more value on stabilizing output than on exchange rates stability, and some are more averse to defaults than others. If the preferences of the policymakers are not known, the private sector has to form expectations about the policymaker's "type" which in turn influences the private sector's expectations of default and devaluation.

The uncertainty about the policymaker's preferences is even increased if elections are close. The private sector has to take into account that the policymaker could behave differently after the election because of a change of government. The crises in Mexico and Argentina for instance have occurred around election time and may have been influenced by an expected change of government. The importance of this factor has also become clear in the case of Brazil case where the increasing likelihood that a more conservative incumbent (Cardoso) would be replaced by a left-leaning candidate (Lula da Silva) led to a strong market reaction (see Williamson 2003).

In that sense, electoral uncertainty is another important influence on the expected exchange rate policy and therefore on the government's actual decision. Assuming that a conservative government is less likely to default than a left leaning government, the private sector might actually expect the right to devalue earlier than the left, even if the right is more adverse to devaluation than the left, simply because not defaulting may have negative output effects and thus force an earlier and stronger devaluation. Since the private sector's expectations in turn influence the actual decision of governments, electoral uncertainty might lead left-leaning government to devalue later, while conservative government are forced to devalue earlier than they would do without electoral uncertainty. Hence, default probabilities

and electoral uncertainty can influence government policies in an interesting way and contribute to explaining why not all currency crises and default episodes have the same course of events and outcome.

Because of the influence of the uncertainties about a possible default and a possible change in government, a ruling governments might aim to reduce the uncertainty concerning a devaluation by adopting a currency regime that rules out a devaluation. By adopting a currency board, joining a monetary union or dollarizing the economy, a government in power could tie the hands of a successor government, thereby influencing the expectations of the private sector, and make electoral uncertainty in the limit inconsequential for exchange rate expectations. It is shown that the choice of exchange rate regime, like the decision to devalue or not, is therefore systematically influenced by the existence of electoral uncertainty.

The present paper is related to and draws on several approaches in the literature. One obvious relation is to the voluminous literature on currency and debt crises, surveyed by Jeanne (2000). The so-called third generation type of currency crises models has acknowledged that currency crises have a strong influence on debt and default because of balance sheet effects. A change in the exchange rate influences the real value of debt, most obviously if debt is denominated in foreign currency (see, for instance, Chang and Velasco 2003, Corsetti et al. 1999).[2] This makes economies vulnerable to exchange rate swings and if crises occur they often lead to debt crises as well. The influence of so-called self-fulfilling expectations in these currency and debt crises has often been stressed, by Obstfeld (1994, 1996) and Calvo (1988) and Cole and Kehoe (2000) respectively.

While the reasons, including political uncertainty, for currency crises are widely discussed, relatively little attention has been paid to the fact that uncertainty about the type of

[2] This is usually the case for "emerging markets" and developing countries. It is well documented by IMF (2004).

policymakers may play a role as well, although Masson (1995) has shown this for the ERM crisis of 1992, and the Mexican peso-crisis of 1994 (Agenor and Masson 1999). Chang (2002a, 2002b) argues that a default depends on the type of policymaker and that electoral uncertainty can lead to debt crises, and that policy decisions by incumbents may also be driven by their interest to manipulate their electoral chances. Neut and Velasco (2003) and Drazen and Masson (1994) also focus on different types of policymakers but stress that being "tough" does not necessarily raise the private sector's credibility in a declared policy because of the negative consequences of the restrictive policy in the longer run.

Turning to the choice of exchange rate regime, Milesi-Feretti (1995) shows that different types of policymakers may have different incentives to choose a particular currency regime and how their choice is influenced by electoral considerations, in addition to the standard influences such as fiscal shocks and output considerations (De Kock and Grilli 1993, Berger et al. 2001). Finally, that policy regime choices can be made in order to influence the behavior of a succeeding government has been argued in a different context by Persson and Svensson (1989).

2. The Model

The model is in the spirit of recent models of speculative attacks and debt crises, such as used by Obstfeld (1994, 1996), Masson (1995) or Miller (2003) among others.

The budget constraint of the government is given as

$$g + (1-\mu)[\lambda b_D + (1-\lambda)b_F] = t - z \qquad (1)$$

where b is the real debt service for the current period, to be paid by the government, with subscript D denoting domestically held debt and F foreign held debt, and λ being the relative

share of domestic debt (Jahjah and Montiel 2003; Neut and Velasco 2003). Government expenditure g is fixed and given, t is the tax rate and z is a fiscal shock. The exogenous shock z is stochastic with $E[z]=0$ and $E[z^2]=\sigma_z^2$. Notice that the budget constraint is measured in real units so that a possible exchange rate change does not affect the real value of debt.

The government has the possibility to renege on part of its debt service where μ is the share of debt repudiated. For simplicity I assume that this applies to domestic and foreign debt in the same way.[3] Therefore, $\mu[\lambda b_D + (1-\lambda)b_F] \equiv \mu b$ is the share of debt that is not paid back with $\mu \in [0,1]$. This can either be a unilateral decision to default or the outcome of a process of negotiation between lender and debtor (see Bulow and Rogoff 1989a). I assume that the share of debt repudiated or wrote down is exogenous and not subject to government optimization. A government usually can not optimize but is often is constrained by its capacity to pay. Moreover, the costs of default will imply that not more is defaulted upon than absolutely necessary. Finally, a partial default is often the outcome of negotiations with lenders which will ensure that the government cannot unilaterally decide about the share of debt paid back.

If the government decides to default, there are costs μsb of a default affecting output negatively. The cost per unit debt rejected is s, which captures for instance sanctions applied to a country if the government reneges on its debt obligations (Bulow and Rogoff 1989b, Rose 2004, Rose and Spiegel 2002) or the cut-off from further credits and capital flows.[4] I assume throughout s<1, because otherwise reneging would never be chosen by the government.

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[3] It is also possible to assume that the government defaults only on foreign or domestic debt. The model would become more complicated but without changing the main results of the analysis.

[4] Rose (2004) reports these costs could amount to the worth of one year of exports, stretched over 15 years, thus equaling about eight percent of annual exports.

Then output follows

$$y = \bar{y} + \alpha(\Delta e - E[\Delta e]) - (t - g) - \mu sb \tag{2}$$

where $\bar{y}$ is the given output level, so that $y^* - \bar{y} = \hat{y}$ is the output gap between the given level of output (possibly connected with high unemployment or with a recession) and production capacity. Δe is the change of the exchange rate, with an increase denoting a devaluation of the domestic currency; $E[\Delta e]$ is the rationally expected devaluation, so that an expected devaluation increases output. The strength of an unexpected devaluation on output is measured with α, and $t - g$ is taxation minus government expenditure.

By using (1), output can be rewritten as

$$y = \bar{y} + \alpha(\Delta e - E[\Delta e]) - b - z + \kappa \tag{2a}$$

where $\kappa = (\mu b(1 - s)) > 0$ is the positive output effect of a default.

The government's objective function (a loss function) is given as

$$L^i = (y - y^*)^2 + \theta^i(\Delta e)^2 + C^i(\mu). \tag{3}$$

There are two types of policymaker: a more conservative one (the "right") and a more liberal one (the "left") and thus i=R,L. Both are adverse to deviations of actual output from a target output and to a devaluation.[5] $C^i(\mu)$ are the costs the government has to bear if it

[5] For simplicity, I assume that output gap and outstanding debt are always high enough to rule out revaluation.

reneges on its debt; since μ is exogenous, the costs of default are fixed. In contrast to the output costs, these are mainly reputational or other personal costs that could differ for governments of different types, whereas the output costs are independent from the type of government in power. Thus, costs of default are separated in an economy wide component μbs and a personal component for the policymaker C^i. Without loss of generality, I assume that type R is more averse to devaluation, while L cares more for minimizing the output gap, and that the conservative policymaker has higher personal costs from defaulting. Therefore, $\theta^R > \theta^L$ and $C^R(\mu) > C^L(\mu)$.

A crucial assumption is that the preferences of policymakers are common knowledge but that the personal costs they would have from defaulting are private information. Thus, the private sector and the other policymaker are informed about θ^i but not about C^i. While θ^i might characterize the respective party of the policymaker and its platform, changes in the party leader or some personal interest in finding a job after being voted out of government may imply that the personal cost C^i change over time or with the person heading the party.

The preferences and the personal costs of a policymaker will decide about his decision to devalue and by how much and whether to default. Since expectations will play a crucial role in these decisions, it is important to clarify the time structure of the model: (i) the private sector forms expectations about the behavior of the government and, under electoral uncertainty, the type of government being in office after the election, (ii) elections occur, (iii) the spending shock z might be realized, (iv) the government in office decides whether to default and whether to devalue, (v) output is realized.

3. Default, Devaluation and Electoral Uncertainty

3.1. The Decision to Default

To derive the expectations of the private sector concerning the likelihood of default, I use backward induction and first consider the government's decision to default. The government would default if the costs of reneging on its obligations are lower than serving the debt. Formally, this implies that the government will default if

$$L^i\Big|_{\mu>0} + C^i(\mu) < L^i\Big|_{\mu=0}$$

which can be calculated, by using (2) and (3), and ruling out the negative solution, as

$$\tilde{C}^i < \underline{c} \equiv \mu b(1-s). \tag{4}$$

Thus, for costs of default below the critical level $\underline{c}$, the government will default. The costs of default are given as $\tilde{C}^i = \sqrt{C^i(\alpha^2 + \theta^i)/\theta^i}$, which is increasing in the reputational costs of default and the aversion to devaluation. Therefore, $\tilde{C}^R > \tilde{C}^L$.

Because the private costs of default for the respective government type are private knowledge, the private sector form expectations about these costs. For simplicity, I assume that $\tilde{C}^i$ is distributed uniformly on the interval $[0, c^i]$. It is common knowledge that $c^R > c^L$.

It is important to stress that, in contrast to much of the literature, a default is not driven by expectations and thus not self-fulfilling (Calvo 1988, Cole and Kehoe 2000, or Chamon 2004). Here, a government will default whenever the costs are lower than the benefits, independent of shocks or other stochastic elements. Instead, a change in the type of policymaker, or an exogenous change in his personal costs could trigger the default.

3.2. The Decision to Devalue

This section considers how the government's decision to devalue is affected by its decision to default on (part of) its debt service, and by the expectations of the private sector about the private default costs of the policymakers. The next section will then look at the additional uncertainty that elections bring to exchange rate expectations.

I begin from a situation where the exchange rate of the country is tied to the currency of some other economy. This assumption is based on the evidence that only very few emerging market economies have really floating exchange rates, independent of whether they report a floating or a fixed exchange rate regime (Calvo and Reinhart 2002, Levy-Yeyati and Sturzenegger 2003, Reinhart and Rogoff 2004, Shambaugh 2004). However, although many emerging markets and most developing countries pursue some kind of declared or non-declared fixed exchange rate, most of these pegs are rather loose in the sense that it is relatively easy for them to devalue if considered appropriate.

Since, other than the case of being member of a monetary union or having officially dollarized the economy, there is no institutional commitment to a "loose" peg, the private sector is well aware that devaluation is possible and forms its expectations accordingly. The government in turn has to decide whether to fulfill the expectation of devaluation or whether to stick to the peg.[6] For this, the government simply compares its losses in either regime, choosing the one with lower losses.

[6] Because of a positive expected devaluation, the government has an incentive to devalue because a devaluation lower than expected has negative output effects. One reason for not doing so nevertheless could be the desire to build up reputation for being tough.

If the government sticks to the peg there will be no devaluation and the country adopts the monetary policy of the anchor currency. In case of breaking the peg and reverting to a float, the government can set the exchange rate optimally. Optimizing the government's objective function with respect to the exchange rate, the optimal level under floating, depending on whether the government decides to default as well $(\mu > 0)$ or not $(\mu = 0)$, is respectively

$$\Delta e^i\big|_{\mu=0} = \frac{\alpha}{\alpha^2 + \theta^i}\left[\hat{y} + \alpha E\left[\Delta e^i\right] + b + z\right] \tag{5a}$$

$$\Delta e^i\big|_{\mu>0} = \frac{\alpha}{\alpha^2 + \theta^i}\left[\hat{y} + \alpha E\left[\Delta e^i\right] + b - \kappa + z\right]. \tag{5b}$$

The government will thus devalue more strongly if the output gap is large, if the spending shock is large, and if the expected devaluation is large because only a devaluation above the expected devaluation has positive output effects. Moreover, the devaluation will be large if the debt service is high minus the gain some debt is refused $(b - \kappa)$. If $\kappa = 0$, the exchange rate change is pushed up because the entire debt due will be serviced. The larger is the share of default μ the more the government would gain from a default in terms of positive output effect, corrected for the negative output effect from sanctions.

To derive the equilibrium devaluation, one has to calculate the expected devaluation which, as the next section will show, is a function of the expected decision to default.[7] In order to demonstrate, however, that expectations about default play a role in the devaluation

[7] Due to the nature of the default decision, there is an asymmetry in the sense that the amount of devaluation depends on whether a default has occurred while the default is independent from the decision to devalue.

decision as well, this section will first focus on how expectations about exchange rate levels influence the actual decision to devalue.

We first look at the government's loss in case of reverting to a free float. For the case with and without default this is respectively

$$L^i_{Fl}\big|_{\mu=0} = \left[-\left(\hat{y} + b + z\right) + \alpha\left(\Delta e^i - E\left[\Delta e\right]\right)\right]^2 + \theta^i\left(\Delta e^i\right)^2 \tag{6a}$$

$$L^i_{Fl}\big|_{\mu>0} = \left[-\left(\hat{y} + b + z\right) + \kappa + \alpha\left(\Delta e^i - E\left[\Delta e\right]\right)\right]^2 + \theta^i\left(\Delta e^i\right)^2 + C^i\left(\mu\right) \tag{6b}$$

whereas if the peg is defended it is

$$L^i_{P}\big|_{\mu=0} = \left[-\left(\hat{y} + b + z\right) - \alpha E\left[\Delta e^i\right]\right]^2 \tag{7a}$$

$$L^i_{P}\big|_{\mu>0} = \left[-\left(\hat{y} + b + z\right) + \kappa - \alpha E\left[\Delta e^i\right]\right]^2 + C^i\left(\mu\right). \tag{7b}$$

Comparing the two values, one finds that the critical value for expectation above which the government will devalue is, respectively

$$E\left[\Delta e^i\right]_{\mu=0} - \frac{1}{\alpha}\left[\hat{y} + b + z\right] \geq 0 \tag{8a}$$

$$E\left[\Delta e^i\right]_{\mu>0} + \frac{1}{\alpha}\left[\kappa - \left(\hat{y} + b + z\right)\right] \geq 0\,. \tag{8b}$$

The higher the expected exchange rate is the earlier the government will indeed decide to devalue, simply because a higher expected exchange rate value depresses the output level (see eq. (2)). The stronger this effect, the earlier the government would decide to devalue to

compensate for this negative effect. There is hence a circularity here because unfavorable expectations can force the government into devaluing earlier.

To derive the expected exchange rate level, it has to be taken into account that it is a function of whether government has simultaneously decided to default on its debt service. The expected rate of devaluation thus depends on the probability of default times the exchange rate after default, and the probability of non-default times the exchange rate in that case: $E[\Delta e^i] = \text{Prob}(c^i < \underline{c}) \cdot E[\Delta e^i|_{\mu>0}] + \text{Prob}(c^i \geq \underline{c}) E[\Delta e^i|_{\mu=0}]$.

With the uniform distribution assumed for c^i, and taking into account that $E[z] = 0$, this becomes

$$E[\Delta e^i] = \left(\frac{\underline{c}}{c^i}\right)\left[\frac{\alpha}{\alpha^2 + \theta^i}\left(\hat{y} + \alpha E[\Delta e^i] + b - \kappa\right)\right] + \left(\frac{c^i - \underline{c}}{c^i}\right)\left[\frac{\alpha}{\alpha^2 + \theta^i}\left(\hat{y} + \alpha E[\Delta e^i] + b\right)\right].$$

By using the critical value $\underline{c}$ and solving for the expected exchange rate, this is

$$E[\Delta e^i] = \frac{\alpha(\hat{y} + b) - \kappa^2 / c^i}{\theta^i}. \tag{9}$$

The expected devaluation is increasing in output gap and debt service and decreasing in the positive output effect from devaluation κ weighted with the probability of default κ / c^i. It is clearly decreasing in the policymakers aversion to devaluation θ^i but increasing in the policymaker's cost c^i because this lowers the probability of default.

Using (9) in equations (5), the equilibrium exchange rates under float is

$$\Delta e^i\Big|_{\mu=0} = \frac{\alpha}{\theta^i}\left(\hat{y} + b - \frac{\alpha\kappa^2}{c^i\left(\alpha^2 + \theta^i\right)}\right) + \frac{\alpha z}{\alpha^2 + \theta^i} \tag{10a}$$

$$\Delta e^i\Big|_{\mu>0} = \frac{\alpha}{\theta^i}\left(\hat{y} + b - \frac{\alpha\kappa^2}{c^i\left(\alpha^2 + \theta^i\right)}\right) + \frac{\alpha}{\alpha^2 + \theta^i}\left(z - \kappa\right). \tag{10b}$$

Thus, the optimal exchange rate for a government of type i is increasing in the fiscal shock and the negative influence of output gap and debt service, but decreasing in the amount of default, κ, and the government's aversion to devaluation. The positive influence of default enters twice because it affects the expected exchange rate (and the lower this rate is, the lower the actual exchange rate would be), as in (5), and it directly affects the output positively.

Using (10) in (8), the critical values for the decision to devalue are

$$\left(1 + \theta^i\right)\left(\hat{y} + b\right) + \theta^i z \geq \alpha\kappa^2 / c^i \tag{11a}$$

$$\left(1 + \theta^i\right)\left(\hat{y} + b\right) + \theta^i\left(z - \kappa\right) \geq \alpha\kappa^2 / c^i. \tag{11b}$$

Clearly, the critical shock for which the incumbent government decides to devalue is higher for the conservative government than for the left-leaning government. The critical value will be increasing in the government's aversion to devaluation θ^i and the strength of a positive output effect from a surprise devaluation α. Because default is an alternative to devaluation, the factors affecting default also affect the decision to devalue.

3.3. Electoral Uncertainty and Devaluation

The preceding section has derived the government's decision to devalue, to a large extent driven by expectations about the government's preferences. It is therefore clear that electoral uncertainty about what type of government will be in office after elections influences the expected exchange rate. A new (or confirmed) government in turn has to decide whether to validate expectations. Consequently, the evidence shows that devaluation (and defaults) often occur immediately before or after elections. Thus, private expectations about devaluation can be one additional reason, besides the fact that a new government might have different preferences, why governments are forced to adjust the exchange rate after elections. Therefore, electoral uncertainty itself might influence governments' exchange rate policy.

Assume that the private sector forms its expectations before elections are held. Therefore, the public will rationally assume that exchange rate policy after elections is a weighted average of the policy set by the left party and the right's policy $E[\Delta e] = q \cdot E[\Delta e^L] + (1-q) \cdot E[\Delta e^R]$, where the ex-ante probability that the left party will be voted into office is q, while that for the right party is 1-q. Under this assumption and disregarding given shocks it is clear that de-facto devaluation of the left party will always be higher than the expected devaluation, whereas that of the right is always smaller than the expected devaluation, because $e^L > E[\Delta e]$ and $e^R < E[\Delta e]$, whenever $e^L > e^R$.

Rewriting equations (8), it follows that under electoral uncertainty the government will devalue, respectively without or with default, whenever

$$q \cdot E[e^L] + (1-q) \cdot E[e^R] - \frac{1}{\alpha}[\hat{y} + b + z] \geq 0 \qquad (12a)$$

$$q \cdot E[e^L] + (1-q) \cdot E[e^R] + \frac{1}{\alpha}[\kappa - (\hat{y} + b + z)] \geq 0\,. \qquad (12b)$$

To see the influence of electoral uncertainty on the decision of the government to devalue, I simply compare the decision to devalue with and without electoral uncertainty. If equations (12) are larger than equations (8), this implies that electoral uncertainty leads a government to devalue earlier than it would do otherwise. Because the respective expressions only differ with respect to the expected exchange rate, it follows immediately that the left party will devalue later, since the expected exchange is lower with electoral uncertainty than under certainty. The right party instead, because now the expected exchange rate is higher, will devalue earlier than it would do without electoral uncertainty. Thus, electoral uncertainty "distorts" the choice of devaluation, depending on the type of government that is affected by the electoral uncertainty.

From this distortion, it also follows that a government not willing to devalue, given the situation of shocks, output gap and debt stock, would clearly be better off if its exchange rate peg could be made more credible. This would lower the expected rate of devaluation ideally to zero and thus reduce the danger of pushing the government into a devaluation that it would not consider otherwise.

4. The Choice of Exchange Rate Regime

Expectations can force governments into devaluing possibly even in situations where more favorable expectations would not have required this. In addition, this decision can be influenced by the mere existence of electoral uncertainty, again an influence on the government's decision not rooted in the development of "fundamentals". This perspective

reflects arguments that intermediate exchange rate regimes are vulnerable to crises and that only extreme regimes, like completely free floats and extremely hard pegs are stable regimes.[8]

Adopting this view the question is, under what circumstances would it be attractive for a government to make such an extreme choice and to either choose freely floating rates or adopt a hard peg which rules devaluation entirely. Introducing a foreign currency as domestic means of payment ("dollarization"), a solution adopted by some smaller economies in Latin America (Panama or Ecuador) and Europe (Montenegro), joining a monetary union unilaterally, or adopting a currency board, a government can rule out devaluation completely.[9] Again, I begin with the case without electoral uncertainty and introduce electoral uncertainty in the next section.

The expected losses under a fully credible exchange rate peg, denoted MU, are

$$E\left[L^i_{MU}\big|_{\mu=0}\right] = (\hat{y}+b)^2 + \sigma_z^2 \tag{13a}$$

$$E\left[L^i_{MU}\big|_{\mu>0}\right] = (\hat{y}+b)^2 + \sigma_z^2 + \kappa^2 + C^i(\mu) \tag{13b}$$

respectively, where σ_z^2 is the variance of the fiscal spending shock z.

The expected losses for the floating regime are

$$E\left[L^i\big|_{\mu=0}\right] = \frac{\alpha^2+\theta^i}{\theta^i}\cdot\left[(\hat{y}+b) - \frac{\alpha\kappa^2/c^i}{\alpha^2+\theta^i} + \frac{\theta^i z}{\alpha^2+\theta^i}\right]^2 \tag{14a}$$

[8] The debate is summarized in Fischer (1999) and Frankel (1999). Mixed empirical evidence for this view is provided by Bubula and Otker-Robe (2003) and Duttagupta and Otker-Robe(2003).

[9] It is not clear how credible a currency board would really be. While usually taken as being completely credible, the Argentine example has cast some doubts about this. I assume that a currency board is as credible as dollarization or monetary union.

$$E\left[L^i\big|_{\mu>0}\right]=\frac{\alpha^2+\theta^i}{\theta^i}\cdot\left[\left(\hat{y}+b\right)-\frac{\alpha\kappa^2/c^i}{\alpha^2+\theta^i}-\frac{c^i\kappa}{\alpha^2+\theta^i}+\frac{\theta^i z}{\alpha^2+\theta^i}\right]^2+C^i(\mu). \tag{14b}$$

Losses under floating are increasing in output gap, debt service and the size of the fiscal shock. Losses are decreasing in the amount of the expected devaluation, because this lowers the expected rate of devaluation. In case of actual default (14b), there is in addition the positive output effect from lower debt service.

It is straightforward to compare losses from fixed rates without escape clause and a free float. The government will choose the hard peg if $E\left[L^i_{Fl}\right]-E\left[L^i_{MU}\right]\equiv E\left[\Delta L^i\right]$ is positive. This is the case respectively if the following conditions are fulfilled

$$E\left[\Delta L^i\big|_{\mu=0}\right]=\alpha^2\left[\left(\hat{y}+b\right)^2-\frac{\theta^i}{\alpha^2+\theta^i}\sigma_z^2\right]-\frac{\alpha\kappa^2}{c^i}\left(2\left(\hat{y}+b\right)-\frac{\alpha\kappa^2}{c^i\left(\alpha^2+\theta^i\right)}\right)>0 \tag{15a}$$

$$E\left[\Delta L^i\big|_{\mu=0}\right]+\frac{\theta^i}{\alpha^2+\theta^i}\cdot\frac{\alpha\kappa^2}{c^i}\left(2\kappa-\alpha c^i\right)>0\,. \tag{15b}$$

Governments who do not default will choose the hard peg if condition (15a) is fulfilled. This is the case if the output gap and the debt stock are relatively high because these are the rationally foreseen incentives for the government to use active monetary policy, therefore pushing up expectations of inflation. On the other hand, a high variance of fiscal spending shocks increases the value of monetary autonomy, as documented in the literature on exchange rate regime choice (De Kock and Grilli 1993, Milesi-Feretti 1995, Berger et al. 2001). Another reason for having independent monetary policy are the expectations about the positive effects of a debt default on output minus the negative output effects from the expected default. Since the private sector assigns a certain probability to a debt default this affects the exchange rate expectations under the float positively, making the float relatively

more attractive if a high probability of default is expected. Only if the systematic and known incentives to use exchange rate policy ($\hat{y}$ and b) are high will the fixed exchange rate regime be more attractive for the government.

Turning to the situation with debt default (15b), the condition is similar to that without default but with the additional term κ. Since κ is the critical value for default and α is likely to be smaller than one, this expression is positive, unless the costs of default c^i get extraordinarily large. This implies that with default the hard peg becomes more attractive than otherwise. The reason is that default has a beneficial influence on output, thus making the use of devaluation to stabilize output relatively less important.

5. The Influence of Electoral Uncertainty on Regime Choice

This section shows that electoral uncertainty not only influences the decision when to devalue but the parties' choice for choosing floating or the credible peg. Like above, it is common knowledge before the elections that the probability of the left being voted into office is q with the opposite probability for the right being voted into office. The two parties know their own type but are not informed about whether they will be in power if the decision to default has to be taken. Therefore, expected losses under floating are $E\left[L^i_{Fl}\right] = q \cdot E\left[L^i_{Fl}\big|_{Left}\right] + (1-q) \cdot E\left[L^i_{Fl}\big|_{Right}\right]$.

To sharpen the results, I make the simplifying assumptions that the right party knows that it will never default, given b, s and μ. It is uncertain, however, about the costs of government L and can thus not be sure how the left party would behave if in power. The opposite is true for the left party: it knows that it costs are so small that it will default when in power, but cannot be sure how the right will behave if in power. Both parties, like the public, are thus uncertain about the behavior of the other party.

Then, the respective incumbent government can calculate its expected loss under either regime as

$$E\left[L^R\right] = q \cdot \left[Prob\left(c^L < \underline{c}\right) \cdot L^R\Big|_{\mu>0} + Prob\left(c^L > \underline{c}\right) \cdot L^R\Big|_{\mu=0}\right] + (1-q) \cdot \left[L^R\Big|_{\mu=0}\right] \tag{16a}$$

$$E\left[L^L\right] = q \cdot \left[L^L\Big|_{\mu>0} + C^L(\mu)\right] + (1-q) \cdot \left[Prob\left(c^R < \underline{c}\right) \cdot L^L\Big|_{\mu>0} + Prob\left(c^R > \underline{c}\right) \cdot L^L\Big|_{\mu=0}\right], \tag{16b}$$

where the personal costs of default $C^i(\mu)$ have to be borne only by the left if in power, given the assumption that the conservative government never defaults.

Under electoral uncertainty losses are twofold. Parties have to decide under which exchange rate regime they are better off, like before, but in addition the possible change in government is connected with a default decision that the respective party would not have taken itself. It is therefore useful to separate the two aspects and to derive first the losses arising from the default decision due to the electoral uncertainty. They can be clearly seen under monetary union because in this case there can be no losses related to exchange rate changes.

The losses under electoral uncertainty are contained in the Appendix (eq. A 1 and A 2). Comparing them with eq. 13 a and 13b, it follows respectively that

$$E\left[\Delta L^L_{MU}\Big|_{q=1}\right] - E\left[\Delta L^L_{MU}\Big|_{q<1}\right] = -(1-q) \cdot \kappa\left[2(\hat{y}+b) - \kappa\right]\frac{c^R - \kappa}{c^R} \tag{17a}$$

$$E\left[\Delta L^R_{MU}\Big|_{q=0}\right] - E\left[\Delta L^R_{MU}\Big|_{q>0}\right] = q \cdot \kappa\left[2(\hat{y}+b) - \kappa\right]\frac{\kappa}{c^L}. \tag{17b}$$

The comparisons show that the left party would actually lose from electoral uncertainty since $c^R > \kappa$. The reason is that the left would actually prefer to default on the debt while it

is not clear that the right would as well default. From the perspective of the left, there is too little default when the right is in power and therefore the possibility of government change leads to higher expected losses.

The reverse is true for the conservative government that could actually benefit from a default because it is output increasing. Since the left, if in office, would do this "dirty job" for the right with a certain probability, the conservative policymaker could benefit from not being in power while expecting an output increasing default without carrying the personal losses.

Calculating the losses with and without uncertainty for the case of floating rates results in lengthy but straightforward expressions that are contained in the appendix (eq. A 3 and A 4). These expressions show that the losses under the float do no longer only depend on the own preference but on how the other party would set exchange rates if in power. The appendix shows that the left party benefits from electoral uncertainty because $E\left[e^{L}\right] > qE\left[e^{L}\right] + (1-q)E\left[e^{R}\right]$. The higher the output gap and the debt service, the more the left would benefit from this effect.[10] With electoral uncertainty instead it has to fear that a possible conservative government would stabilize less than itself would do. Therefore, a high variance of shocks makes electoral uncertainty less attractive. Moreover, given that a conservative government would be less likely to default, positive output effects from a default can be realized only with probability κ / c^{R}. Again, this makes uncertainty less attractive for the left party. Hence, uncertainty makes floating more or less attractive depending mainly on the size of the structural incentives for using exchange rate policy, the variance of shocks, and how the positive output effects from a default interact with exchange rate policy.

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[10] This is akin to the standard argument why countries (or governments) with a high incentive to use active monetary (or, in this case, exchange rate) policy benefit from delegation. With electoral uncertainty there is therefore a "partial delegation" because the right will enter office with probability (1-q) and therefore expectations are mixed, benefiting the left party.

The same factors work in the opposite direction for the conservative government. It can clearly benefit from certainty if the structural incentives for using exchange rate policy are large because it must fear that the left would only worsen this problem and devalue too early by too much. On the other hand, the right would benefit from uncertainty because there is a certain chance that the left would default which will have positive output effects. The relative importance of these factors will determine whether floating is more or less attractive for the conservative government under electoral uncertainty.

To make these trade-offs for the parties more clear, I consider next two extreme cases in what follows. A strong polarization between the two parties could be achieved by letting $\theta^L \to 0$, thereby concentrating on differences in parties' aversion to devaluation. The alternative case would be one where both parties have the same preferences, $\theta^L = \theta^R = \theta$, concentrating on the different personal costs from a default.[11]

Example 1: Polarization of Preferences ($\theta^L \to 0$)

A polarization of preferences means the left is hardly (in the limit not at all) concerned about devaluation, focusing its interest only on the stabilization of output around its potential level. This would also imply that the left has hardly any reason to choose the fixed regime, other than lowering the expectations about devaluation, which have negative output effects. The right in turn is also averse to devaluation and would suffer from floating even more if the left is in power.

For the left party, it follows that floating is more attractive under uncertainty if

[11] This can be seen from using eq. A 5 and A 6 and setting $\theta^L \to 0$ and $\theta^R = \theta^L$ respectively.

$$\alpha^2\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^L\left(\alpha^2+\theta^L\right)}\right)^2+\frac{\kappa}{c^R}\frac{\theta^R\kappa}{\alpha^2+\theta^R}\left[2\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^R\left(\alpha^2+\theta^R\right)}\right)-\frac{\theta^R\kappa}{\alpha^2+\theta^R}\right]+C^L> \tag{18a}$$

$$\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^R\left(\alpha^2+\theta^R\right)}\right)^2+\left(\frac{\theta^R}{\alpha^2+\theta^R}\right)^2\sigma_z^2$$

which is likely to be the case because the first term on the LHS is divided by a term close to zero and hence approaches infinity. Thus, electoral uncertainty makes the floating regime relatively more attractive for the left party. The simple reason is that uncertainty lowers the expected rate of inflation under float for the left government, making this regime relatively more attractive than otherwise.

For the right party the condition for uncertainty to make floating more attractive is

$$\frac{\alpha^2+\theta^R}{\theta^R}\cdot\left\{\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^R\left(\alpha^2+\theta^R\right)}\right)^2+\left(\frac{\alpha^2+\theta^R}{\theta^R}\right)^2\sigma_z^2\right\}>\alpha^2\theta^R\cdot\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^L\left(\alpha^2+\theta^L\right)}\right)^2 \tag{18b}$$

which is certainly not fulfilled because $\alpha^2\theta^R\to\infty$ as $\theta^L\to 0$.

Here the opposite logic applies, meaning that the right has a tendency to choose the fixed regime earlier under uncertainty than it would do otherwise. It aims to tie the hands of its successor and to avoid that the left will devalue too early by putting a hard peg in place.

Example 2: Identical Preferences ($\theta^L=\theta^R=\theta$)

In case of identical preference, the incentive for either party to manipulate the choice of regime to tie the hands of its successor disappears because both of them have similar preferences. The only difference remaining between the parties is their propensity to default

which is independent of the exchange rate regime in this model but has consequences for its choice.

For the left, floating is more attractive under uncertainty if

$$\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^L\left(\alpha^2+\theta\right)}\right)^2-\frac{\theta\kappa}{\alpha^2+\theta}\left[2\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^L\left(\alpha^2+\theta\right)}\right)-\frac{\theta\kappa}{\alpha^2+\theta}\right]+C^L(\mu)> \tag{19a}$$

$$\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^R\left(\alpha^2+\theta\right)}\right)^2-\frac{\kappa}{c^R}\frac{\theta\kappa}{\alpha^2+\theta}\left[2\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^R\left(\alpha^2+\theta\right)}\right)-\frac{\theta\kappa}{\alpha^2+\theta}\right]$$

Again, if this condition is fulfilled uncertainty makes the choice of floating exchange rates more attractive for the left. High personal costs of default make uncertainty attractive because the probability of the right being in power would imply that the left policymakers would not have to incur these personal costs. Since $\kappa/c^R<1$ and $c^R>c^L$ however, a comparison of the other terms suggests that the RHS of the inequality is larger than the LHS. It is therefore not clear whether uncertainty makes floating more attractive for the left. Since the left can not be sure that the right would also default if in power, uncertainty carries the danger than the output effect from a default will not be realized if the right is in power.

For the right party the condition that floating becomes more attractive under uncertainty is

$$\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^R\left(\alpha^2+\theta\right)}\right)^2>\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^L\left(\alpha^2+\theta\right)}\right)^2-\frac{\kappa}{c^L}\frac{\theta\kappa}{\alpha^2+\theta}\left[2\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^L\left(\alpha^2+\theta\right)}\right)-\frac{\theta\kappa}{\alpha^2+\theta}\right] \tag{19b}$$

which again tends to be fulfilled if κ / c^L is sufficiently large.[12] Therefore, uncertainty makes floating relatively more attractive for the right party. This is because the right has no longer an interest to tie the hands of the left government. Uncertainty in turn is attractive because it implies that the left might default which would have a positive output effect without implying personal costs for the conservative policymaker.

Considering the two extreme examples of complete polarization and similar preferences, it becomes clear the that introduction of electoral uncertainty has an influence on the optimal exchange regime choice of governments. The closer the preferences of the two possible governments are, the less incentive there is to choose the credible peg to tie the hands of the possible successor government. The starker the contrast is, the more this consideration is important. Likewise, the difference between the propensities of both parties to default (measured as the difference between c^L and c^R) is important. A low propensity to default of the other party makes electoral uncertainty less attractive for both.

6. Conclusion

This paper has started from the observation that not only currency crises and debt often go together, but that they are frequently surrounded by political uncertainty. It has explored in detail how expectations about a possible default influence the expected exchange rate, because a high probability of default implies that the expected devaluation will be lower, implying that debt and currency crises need not necessarily be mutually reinforcing. Since a de-facto devaluation is a positive function of expected devaluation, an expected default makes fixed exchange rates easier to defend for a government. The decision to devalue can therefore also be affected if the private sector is uncertain about the critical value of debt that brings the

[12] Although this expression is less than unity, that fact that $c^L < c^R$ makes it possible that it is close to unity.

government to default. In addition, if different parties are perceived to have different costs of default, electoral uncertainty can influence the decision to devalue. The actual decision can thus be distorted in a systematic way through this uncertainty.

Governments could hence have an incentive to consider choosing a "credible" exchange rate peg, that is, they might choose to irrevocably tie their monetary policy to that of another country by adopting a currency board, by introducing another country's currency, or by dollarizing their economy. The incentive to do so is also affected by electoral uncertainty. Private expectations affect the governments choice for regime, and there is the additional influence that governments aim to tie the hands of their successors. This is particularly relevant for more conservative governments that wishes to avoid that its more "liberal" successor devalues too often and too aggressively.

A more general result of the paper is that exchange and debt crises need not necessarily always go together. Under certain circumstances, the possibility of a default might actually lower expected devaluation. If a default has a (at least short-term) positive output effects there is a low incentive for a government to devalue. In this respect, a government prone to default might enjoy relatively beneficial expectations concerning devaluation. This relation could be one explanation why there is such a variety of relations between exchange and debt crises.

One important qualification to the applicability of the present setup is its static character. A model that incorporates several periods might imply different dynamics between default and exchange crises, as rollover problems arise for a government expected to default. This aspect has been ignored here and should be addressed in future work.

Appendix 1: Comparison of Exchange Regimes under Certainty and Uncertainty

The losses for the left and right parties respectively for uncertainty and the peg can be calculated as

$$E\left[L_{MU}^{L}\right]=\left(\hat{y}+b\right)^{2}+\sigma_{z}^{2}-\kappa\left(q+\left(1-q\right)\frac{\kappa}{c^{R}}\right)\left[2\left(\hat{y}+b\right)-\kappa\right]+q\cdot C^{L}\left(\mu\right) \tag{A1}$$

$$E\left[L_{MU}^{R}\right]=\left(\hat{y}+b\right)^{2}+\sigma_{z}^{2}-q\cdot\frac{\kappa^{2}}{c^{L}}\left[2\left(\hat{y}+b\right)-\kappa\right] \tag{A2}$$

whereas for the case of floating the expected losses follow as

$$\begin{aligned}E\left[L_{FI}^{L}\right]&=q\cdot\frac{\alpha^{2}+\theta^{L}}{\theta^{L}}\times\\&\left\{\left(\hat{y}+b-\frac{\alpha\kappa^{2}}{c^{L}\left(\alpha^{2}+\theta^{L}\right)}\right)^{2}+\left(\frac{\theta^{L}}{\alpha^{2}+\theta^{L}}\right)^{2}\sigma_{z}^{2}-\frac{\theta^{L}\kappa}{\alpha^{2}+\theta^{L}}\left[2\left(\hat{y}+b-\frac{\alpha\kappa^{2}}{c^{i}\left(\alpha^{2}+\theta^{L}\right)}\right)-\frac{\theta^{L}\kappa}{\alpha^{2}+\theta^{L}}\right]\right\}\\&\qquad+q\cdot C^{L}\left(\mu\right)\\&+\left(1-q\right)\cdot\frac{\alpha^{2}\theta^{L}+\theta^{R^{2}}}{\theta^{R^{2}}}\times\\&\left\{\left(\hat{y}+b-\frac{\alpha\kappa^{2}}{c^{R}\left(\alpha^{2}+\theta^{R}\right)}\right)^{2}+\left(\frac{\theta^{R}}{\alpha^{2}+\theta^{R}}\right)^{2}\sigma_{z}^{2}-\frac{\kappa}{c^{R}}\frac{\theta^{R}\kappa}{\alpha^{2}+\theta^{R}}\left[2\left(\hat{y}+b-\frac{\alpha\kappa^{2}}{c^{R}\left(\alpha^{2}+\theta^{R}\right)}\right)-\frac{\theta^{R}\kappa}{\alpha^{2}+\theta^{R}}\right]\right\}\end{aligned} \tag{A3}$$

$$\begin{aligned}E\left[L_{FI}^{R}\right]&=\left(1-q\right)\cdot\frac{\alpha^{2}+\theta^{R}}{\theta^{R}}\times\left\{\left(\hat{y}+b-\frac{\alpha\kappa^{2}}{c^{R}\left(\alpha^{2}+\theta^{R}\right)}\right)^{2}+\left(\frac{\theta^{R}}{\alpha^{2}+\theta^{R}}\right)^{2}\sigma_{z}^{2}\right\}+q\cdot\frac{\alpha^{2}\theta^{R}+\theta^{L^{2}}}{\theta^{L^{2}}}\times\\&\left\{\left(\hat{y}+b-\frac{\alpha\kappa^{2}}{c^{L}\left(\alpha^{2}+\theta^{L}\right)}\right)^{2}+\left(\frac{\theta^{L}}{\alpha^{2}+\theta^{L}}\right)^{2}\sigma_{z}^{2}-\frac{\kappa}{c^{L}}\frac{\theta^{L}\kappa}{\alpha^{2}+\theta^{L}}\left[2\left(\hat{y}+b-\frac{\alpha\kappa^{2}}{c^{L}\left(\alpha^{2}+\theta^{L}\right)}\right)-\frac{\theta^{L}\kappa}{\alpha^{2}+\theta^{L}}\right]\right\}\end{aligned} \tag{A4}$$

Note that $\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^L\left(\alpha^2+\theta^L\right)}\right)<\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^R\left(\alpha^2+\theta^R\right)}\right)$ as long as the expressions in brackets are positive. Moreover, $\frac{\alpha^2+\theta^L}{\theta^L}>\frac{\alpha^2\theta^L+\theta^{R^2}}{\theta^{R^2}}$ but $\frac{\alpha^2+\theta^R}{\theta^R}<\frac{\alpha^2\theta^R+\theta^{L^2}}{\theta^{L^2}}$.

It therefore follows that (from comparing A 3 and 14b), for the left party, the losses under floating are higher for the case without uncertainty if the following expression is positive

$$\begin{aligned}&(1-q)\cdot\frac{\alpha^2+\theta^L}{\theta^L}\times\\&\left\{\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^L\left(\alpha^2+\theta^L\right)}\right)^2+\left(\frac{\theta^L}{\alpha^2+\theta^L}\right)^2\sigma_z^2-\frac{\theta^L\kappa}{\alpha^2+\theta^L}\left[2\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^i\left(\alpha^2+\theta^L\right)}\right)-\frac{\theta^L\kappa}{\alpha^2+\theta^L}\right]\right\}\\&+(1-q)\cdot C^L(\mu)\end{aligned}\tag{A5}$$

$$\begin{aligned}&-(1-q)\cdot\frac{\alpha^2\theta^L+\theta^{R^2}}{\theta^{R^2}}\times\\&\left\{\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^R\left(\alpha^2+\theta^R\right)}\right)^2+\left(\frac{\theta^R}{\alpha^2+\theta^R}\right)^2\sigma_z^2-\frac{\kappa}{c^R}\frac{\theta^R\kappa}{\alpha^2+\theta^R}\left[2\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^R\left(\alpha^2+\theta^R\right)}\right)-\frac{\theta^R\kappa}{\alpha^2+\theta^R}\right]\right\}\end{aligned}$$

whereas for the right, a comparison of A 4 and 14a shows that the same is true if

$$\begin{aligned}&q\cdot\frac{\alpha^2+\theta^R}{\theta^R}\times\left\{\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^R\left(\alpha^2+\theta^R\right)}\right)^2+\left(\frac{\theta^R}{\alpha^2+\theta^R}\right)^2\sigma_z^2\right\}\\&-q\cdot\frac{\alpha^2\theta^R+\theta^{L^2}}{\theta^{L^2}}\times\\&\left\{\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^L\left(\alpha^2+\theta^L\right)}\right)^2+\left(\frac{\theta^L}{\alpha^2+\theta^L}\right)^2\sigma_z^2-\frac{\kappa}{c^L}\frac{\theta^L\kappa}{\alpha^2+\theta^L}\left[2\left(\hat{y}+b-\frac{\alpha\kappa^2}{c^L\left(\alpha^2+\theta^L\right)}\right)-\frac{\theta^L\kappa}{\alpha^2+\theta^L}\right]\right\}\end{aligned}\tag{A6}$$

is positive.

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