Exchange Rate Management and the External Debt Burden: The Case of the Philippines

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Abstract

The paper develops a simple macroeconomic model which is then estimated for the Philippines. Econometric evidence shows that Philippines monetary authorities have been reluctant to allow a real devaluation, because of a large public external debt and for the fear of fueling inflation. Simulations show that, while an overvalued exchange rate may bring some benefits in the form of lower inflation and improved budgetary performance, its current account costs may be significant. Brady-like deals can reduce fiscal imbalances, limit the sensitivity of fiscal aggregates to the exchange rate, and increase the benefits of a more aggressive exchange rate policy.

1. Introduction

Management of exchange rates in developing countries has long been a controversial issue both in the theoretical and the policy literature. The debt crisis of the 1980s brought to the forefront the need for developing countries to improve their current account positions and correct misalignments of their exchange rates. Devaluation came to be seen, in the context of the so-called growth-oriented adjustment programs, as an essential step to favor the shift toward the traded goods sector and avoid an excessive reliance on expenditure-reducing policies (Corbo et al., 1987; Faini and de Melo, 1990). Orthodox analysis also pointed to the destabilizing effects of overvalued exchange rates, which, it was argued, fostered speculative capital flights, discouraged export growth and induced severe misallocations in both production and consumption (Edwards, 1989). The structuralist critique, however, drew a gloomier picture, arguing that devaluation may have a contractionary effect, both on the supply side, because of higher imported input prices, higher real product wage in the context of widespread indexation, and falling real credit availability (van Wijnbergen, 1986) and on the demand side, by shifting income distribution in favor of high-saving groups (Krugman and Taylor, 1978).

A further argument against devaluation was that it would have induced a deterioration in the terms of trade and raised the burden of external debt repayments. In a situation where foreign debt was mostly in the hands of the public sector, this would have aggravated fiscal imbalances. Even in a small country, where the terms of trade are by definition exogenous, a real depreciation could have an adverse impact on the budget whenever the government relied heavily on the nontraded goods sector as a source of revenues (Rodrik, 1990). However, for a developing country, it seemed more plausible to presume that exchange rate overvaluation would be detrimental to public finances given the crucial contribution to overall taxation of import duties and export taxes (Tanzi, 1989).
Yet, the fact remains that many developing countries have been and sometimes still are reluctant to let their exchange rate depreciate. There are several explanations for this behavior. First, as noted earlier, policymakers may fear that in the presence of a large stock of public external debt a real depreciation may aggravate the public finance situation. Second, in many countries particularly in Latin America, monetary authorities have used the exchange rate as a nominal anchor to boost the credibility of their anti-inflationary policy and are therefore weary to let it depreciate.

In this paper, we take a closer look at the role of exchange rate policy in developing countries. To this purpose, we develop a simple macroeconomic model which is then estimated for the Philippines prior to the implementation (in 1990 and 1993) of two restructuring operations that resulted in a significant reduction of the external debt burden. The Philippines is an interesting case in that, as will be shown later, the monetary authorities have been reluctant to allow a real devaluation, both because of the very large stock of public external debt and, to a lesser extent, for the fear of fueling inflation.

We model the behavior of domestic policymakers by specifying a Central Bank loss function which includes among its arguments inflation, the gap between actual and desired foreign exchange reserves, and the stock of public foreign debt. Optimizing behavior by the Central Bank will then imply that a larger level of reserves, a more depreciated real exchange rate, and a higher stock of public external debt will be associated with a lower propensity to devalue. We find that these predictions are strongly supported by econometric evidence. We also show, through theoretical analysis and counterfactual simulations, that even if an overvalued exchange rate may bring some short-run benefits in the form of lower inflation and improved budgetary performance, the medium-run costs may be overwhelming. Our results suggest indeed that the deterioration in the current account and the consequent loss in reserves will force monetary authorities to undertake belated and more massive devaluations.

We thus conclude that attempts at maintaining an overvalued exchange rate can be very costly and short-lived even in a country where a large stock of public external debt raises the costs of devaluation. We also argue, however, that a more aggressive exchange rate policy may require, in order to be sustainable, a reduction of fiscal imbalances and in the sensitivity of fiscal aggregates to changes in the exchange rate. Reducing the foreign debt burden can thus make an important contribution, beyond its impact on net external transfers, in facilitating fiscal adjustment and improving the effectiveness of exchange rate policies.

The paper is organized as follows. In the next section, we present a stylized macroeconomic model to assess the impact of a shift in the monetary authority’s exchange rate reaction function. After a brief account of the main developments in exchange rate and macroeconomic policy in the Philippines during the 1980s, we discuss the results of our simulations. A brief description of the model is left to the Appendix. The last section presents some conclusions.

2. The Macroeconomics of Managed Exchange Rates

In this section, we study the impact of exchange rate policy in the context of a simple macroeconomic model. The framework is designed to describe some stylized aspects of the more complex econometric model which will be used for simulation purposes. Consider the following model:

\[ y = \bar{y} + \delta(e - p) - \sigma(r - \dot{p}^E), \]  
\[ (1) \]
\[ \dot{p} = \gamma(y - \bar{y}) + g_m, \]  
\[ m = \phi y + p - \lambda r, \]  
\[ \dot{R} = \theta(e - p) - \varepsilon y, \]  
\[ e = p + \beta(R - \bar{R}). \]  

All variables are in logs, except the interest rate \( r \). The symbols \( y, \bar{y}, p, \) and \( e \) stand respectively for output, capacity, the price level and the nominal exchange rate. \( R \) and \( m \) denote, respectively, foreign exchange reserves and the money supply, while \( g_m \) represents nominal money growth. Equation (1) describes demand behavior in the economy, as a function of the real exchange rate, the nominal interest rate, and expected inflation (\( \hat{p}^E \)). Actual inflation (\( \dot{p} \)) is modeled in equation (2) as a function of excess demand over long-run output and (discretionary) money growth (\( g_m \)).

We assume expectations to be rational, that is \( \hat{p} = \hat{p}^E \). This assumption greatly simplifies the model, as it does not require us to specify a separate equation to describe the process of expectations formation. Equilibrium in the money market is described in a standard fashion in equation (3). Equation (4) is a reduced form for the current account. A real depreciation or a fall in income (and therefore in import levels) will lead to an improvement in the current account and to an accumulation in reserves. Finally, equation (5) describes the reaction function of the Central Bank.

The exchange rate is assumed to depend on the price level (with a unit elasticity) and on the level of reserves. The coefficient \( \beta \) is negative, to indicate that a loss in reserves will prompt the Central Bank to follow a more aggressive exchange rate policy.

To solve the model, we need to establish the link between \( R \) and \( m \). We assume that changes in \( R \) are partly reflected in changes in \( m \), namely that the Central Bank does not fully sterilize the effect on the money stock of changing reserves. However, capital gains or losses of the Central Bank induced by changes in the exchange rate are assumed not to affect the money supply. Therefore we have that

\[ \dot{m} = \alpha \dot{R} + g_m, \alpha \leq 1, \]  

where \( \alpha = 1 \) implies no sterilization.

The steady-state equilibrium can be easily characterized. Suppose that capacity output is normalized to 1, so that \( \bar{y} = 0 \). In the steady state, we have \( y = 0 \) and, given \( \dot{R} = 0, p = e \). It follows that \( R = \bar{R} \). Finally, both steady-state inflation and the long-run equilibrium value of the nominal interest rate are equal to \( g_m \).

We can solve for the dynamic behavior of the economy. In the short-run, both \( p \) and \( R \) are given and determine the level of output. Consider equations (1), (3), and (5). Solving for the equilibrium level of \( y \), we find that

\[ y = \left( \frac{\beta \delta(R - \bar{R}) + \sigma / \lambda(m - p + \lambda g_m)}{\Delta} \right), \]  

where \( \Delta = 1 - \sigma g + \sigma \phi / \lambda \). Dynamic stability requires that \( \Delta \) be greater than zero. If we then substitute equations (5) and (7) in equation (4), we find that the change in reserves is equal to

\[ \dot{R} = \beta(\theta - \varepsilon \delta / \Delta)(R - \bar{R}) - \varepsilon \sigma (m - p + \lambda g_m) / (\Delta \lambda). \]  

Consider now the dynamic behavior of real balances. From equations (6) and (2), we know that

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\[ \dot{m} - \dot{p} = \alpha \dot{R} - \gamma y. \]  

(9)

If we substitute (7) and (8) in (9), we find that real balances growth is equal to

\[ \dot{m} - \dot{p} = \beta \left[ \alpha \theta - \left( \alpha \varepsilon + \gamma \right) \delta / \Delta \right] (R - \bar{R}) - \left( \alpha \varepsilon + \gamma \right) \sigma \left( m - p + \lambda g_m \right) / (\Delta \lambda). \]  

(10)

Figure 1. Macroeconomic Equilibrium

The pair of differential equations can be analyzed graphically in the \((m - p) - R\) space (Figure 1). There are several possible cases, depending on the actual parameter values. Rather than following a taxonomic approach, we focus on one case and briefly outline what happens under different assumptions. Consider first the \(\dot{R} = 0\) schedule. This curve is negatively sloped provided that

\[ \beta (\theta - \varepsilon \delta / \Delta) < 0. \]  

(11)

This condition is easy to interpret. Suppose that the level of reserves, \(R\), falls. This prompts monetary authorities to depreciate the exchange rate. A depreciating exchange rate in turn has two opposite effects. First, it improves the current account, by an amount \(q\). Second, it leads to higher output that in turn induces a current account deterioration, equal to \(-\varepsilon d\). Equation (11) is equivalent to assuming that the former (direct) effect of a real depreciation dominates the latter (indirect) effect. In other terms, the (favorable) current account impact of real depreciation is assumed to be stronger than the (indirect) effect working through output changes. A fall in \(R\) is therefore associated with an improved current account \((\dot{R} > 0)\). To re-establish the external equilibrium, we then need real balances to increase, leading, through standard LM channels, to higher output and a current account deterioration. The \(\dot{R} = 0\) schedule is therefore negatively sloped.

Consider now the \(\dot{m} - \dot{p} = 0\) schedule. It will be positively sloped provided that
\[ \beta \left( \alpha \theta - \delta (\alpha \varepsilon + \gamma) / \Delta \right) > 0. \] (12)

Again, this condition is easy to interpret. Consider for simplicity the case where \( \alpha = 1 \). Suppose that reserves fall. The exchange rate will depreciate, improving the current account and boosting both reserves and money supply growth. At the same time, however, a depreciating exchange rate will increase output, leading both to faster inflation and falling reserves \((\dot{R} < 0)\). Growth in real money supply will then be negative. Equation (12) assumes this latter effect to dominate, so that a fall in reserves is associated with a negative growth in real balances. For equilibrium, we need the level of real balances to fall, inducing a fall in output and thereby a positive growth in real balances. The schedule \( \dot{m} - \dot{p} = 0 \) is therefore positively sloped. Figure 1 traces the dynamic behavior of the system. Long-run equilibrium is at point E.\(^3\) Figure 1 also shows the \( \dot{p} = g_m \) schedule, which is positively sloped: an increase in real balances boosts output above its equilibrium level, thereby fueling inflation, whereas an increase in reserves induces a real appreciation with a depressing effect on output and on inflation. The schedule is, however, less steep than the \( \dot{m} - \dot{p} = 0 \) curve.\(^4\)

We can now trace the effects of policy shocks. Consider, for instance, a shift toward a more conservative exchange rate policy brought, say, by an increase in the stock of publicly held external debt that makes the Central Bank more wary about devaluation. In our setup, this shock can be simply modeled as a decline in \( \dot{R} \).\(^5\) For current account equilibrium and stable real balances, \( R \) must also fall. The decline in the desired level of reserves leads therefore to a downward shift in the \( \dot{m} - \dot{p} = 0 \), the \( \dot{R} = 0 \) and the \( \dot{p} = g_m \) schedules (Figure 2). The new equilibrium is at E’. Initially, real money balances and foreign exchange reserves are unchanged. Starting from the initial equilibrium at E, however, the fall in \( \dot{R} \) brings, for a given level of \( R \), a real appreciation (equation (5)). Output falls, bringing a decline in inflation and an increase in the growth

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**Figure 2. The Effect of a More Conservative Exchange Rate Policy**
rate of real balances. Prices also fall but the real exchange rate is still appreciated, causing a current account deficit and a loss of reserves, i.e., $R < 0$. The loss in reserves in turn prompts a real depreciation, which, together with the increase in real balances, has a favorable impact on output. After the economy has reached point C, output is above its long-run equilibrium level and inflation increases above its long-run value, i.e., $g_m$. We see, therefore, that a more conservative exchange rate policy will in the medium run force monetary authorities to try to counter the loss in reserves by pursuing a somewhat belated devaluation. Hence, there will be a period where inflation is above its long-run value.\textsuperscript{6}

Overall, the model suggests that a shift toward a more conservative exchange rate policy will lead to a loss of reserves and to lower prices. Interestingly enough, after the initial fall in prices, inflation may increase.\textsuperscript{7} The anti-inflationary benefits of a more cautious exchange rate policy are short-lived in this case. The possibility of a higher inflation following a real appreciation will be strengthened if we consider the case where the Central Bank tries to sterilize the impact of falling reserves on the money supply.

3. The Philippine Economy Before the Debt Workouts

After the shocks of the early 1980s—the increase in oil prices, the rise of international interest rates, and the foreclosing of foreign lending—and the adjustment period that followed, the Philippines experienced a period of economic recovery and low inflation (Table 1) that set it apart from the other highly indebted countries. The success of the Philippines in the mid-1980s was, however, short-lived; by the end of the decade growth was declining and inflation on the rise, just as other highly indebted countries—most notably, Mexico and Chile—were coming back. The Philippines had experienced a temporary recovery but had not found a high growth path.

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<tr>
<th>Table 1. Key Macroeconomic Indicators</th>
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<td>GDP growth rate (%)</td>
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<td>Private investment (%)\textsuperscript{b}</td>
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<td>Manufactured exports (%)\textsuperscript{b}</td>
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<td>Imports of goods and NFS (%)\textsuperscript{b}</td>
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<td>Domestic public debt (%)\textsuperscript{b}</td>
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<td>External public debt (%)\textsuperscript{b}</td>
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<tr>
<td>GDP growth rate (%)</td>
<td>−7.3</td>
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<td>4.3</td>
<td>6.8</td>
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<td>Inflation rate (%)</td>
<td>17.6</td>
<td>3.0</td>
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<td>9.0</td>
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<td>Nominal interest rate (%)</td>
<td>27.0</td>
<td>16.0</td>
<td>12.9</td>
<td>15.5</td>
<td>19.7</td>
<td>24.7</td>
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<td>Cost of capital (%)</td>
<td>5.7</td>
<td>0.0</td>
<td>1.8</td>
<td>4.5</td>
<td>7.0</td>
<td>15.9</td>
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<tr>
<td>Devaluation rate (%)</td>
<td>11.4</td>
<td>9.6</td>
<td>0.9</td>
<td>2.5</td>
<td>3.1</td>
<td>11.8</td>
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<tr>
<td>Real effective exchange rate\textsuperscript{a}</td>
<td>100.0</td>
<td>77.6</td>
<td>71.4</td>
<td>69.4</td>
<td>73.5</td>
<td>70.4</td>
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<tr>
<td>Private investment (%)\textsuperscript{b}</td>
<td>11.6</td>
<td>13.2</td>
<td>14.7</td>
<td>15.8</td>
<td>19.9</td>
<td>16.1</td>
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<tr>
<td>Manufactured exports (%)\textsuperscript{b}</td>
<td>8.3</td>
<td>8.9</td>
<td>10.3</td>
<td>11.5</td>
<td>12.2</td>
<td>12.9</td>
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<tr>
<td>Imports of goods and NFS (%)\textsuperscript{b}</td>
<td>21.9</td>
<td>22.4</td>
<td>26.2</td>
<td>26.9</td>
<td>30.3</td>
<td>33.3</td>
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<tr>
<td>Current account balance\textsuperscript{c}</td>
<td>−35.0</td>
<td>954</td>
<td>−444</td>
<td>−390</td>
<td>−1,458</td>
<td>−2,695</td>
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<tr>
<td>Domestic public debt (%)\textsuperscript{b}</td>
<td>20.3</td>
<td>23.7</td>
<td>23.6</td>
<td>25.9</td>
<td>25.6</td>
<td>23.6</td>
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<tr>
<td>External public debt (%)\textsuperscript{b}</td>
<td>59.5</td>
<td>69.6</td>
<td>67.1</td>
<td>58.8</td>
<td>51.0</td>
<td>50.6</td>
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\textsuperscript{a} Value in 1985 = 100; a decline indicates a depreciation.

\textsuperscript{b} Percentage of GDP.

\textsuperscript{c} US$ million.

\textit{Source}: National Statistical Coordination Board (1985-based national income accounts), Central Bank of the Philippines (monetary and external data), and own calculations (derived indicators).
In the wake of the debt crisis, the Philippines succeeded at preventing the entrenchment of inflation—and inflationary expectations—through a drastic orthodox monetary contraction; at the same time, the nominal exchange rate was also quickly stabilized. Thus, the need to rely on the nominal exchange rate as a nominal anchor to facilitate macroeconomic stabilization was not an overwhelming concern for Philippine policymakers. The Philippines, however, had a very high share of public debt in total external debt; this made fiscal balances very vulnerable to a real depreciation, and constrained the management of the exchange rate.

The recovery of the mid-1980s was stimulated by the establishment of a democratic regime and by favorable external events, most importantly the drop in oil prices. In addition, the existence of large spare capacity in the economy—GDP had declined by 15% between 1983 and 1985—allowed output to grow while exercising only limited pressures on prices and the balance of payments. The sizeable real devaluation of the exchange rate in 1985–86 contributed to keeping imports under control, and sustained the growth of manufactured exports.

As growth gained momentum, higher investment demand caused a sharp increase in imports starting in 1987. The unwillingness to devalue in the presence of large foreign-currency denominated public expenditures led to an appreciating real exchange rate, which further worsened external balances. Inflationary pressures also increased, mainly because of growing strains on existing capacity, leading to the adoption of more restrictive monetary policy. Rising interest rates in turn contributed to worsening of the deficits of the consolidated public sector. Both the government and the Central Bank increased their domestic borrowing. This combination of high domestic public sector borrowing and restrictive monetary policy amounted to a transformation of external debt into domestic debt—rather than into inflation, as had been the case in other highly indebted countries.

While avoiding the entrenchment of inflation came at the cost of overvalued exchange rates and high real interest rates, the latter remained much lower than in high-inflation, high-debt countries. Nevertheless these factors, together with a number of exogenous shocks, played a crucial role in bringing the economic recovery to an end.

These developments posed the question of what needed to be done in the Philippines for growth to become sustainable. Two views took form on this issue, which can be characterized, respectively, as pro-growth and anti-inflation. The former held that a weak current account position represented the main constraint to a sustained recovery and argued therefore that, after a period of intense macroeconomic adjustment, structural reforms and a more aggressive exchange rate policy were necessary to stimulate an export-led recovery. In the latter view the possible resurgence of inflation was instead perceived as the main danger that a recovery would face. The implication was that macroeconomic adjustment remained necessary, in the form of further reduction of fiscal imbalances. Moreover, a conservative management of the exchange rate would contribute to containing inflationary pressures, whereas a depreciating exchange rate would fuel inflation and aggravate fiscal imbalances.

These two views clearly led to opposite prescriptions regarding the management of the exchange rate. They were discussed in the report of an economic mission that visited the Philippines in 1990 (Krugman et al., 1992). The report concluded that while macroeconomic constraints to growth—high internal and external debt—remained important, the essential problem was changing the structure of the economy towards exportables, which in turn required changing trade, industrial, and exchange rate policies. These changes were necessary to provide incentives for the expansion of nontraditional exports and to reduce the high import content of domestic output.
In what follows we will argue, first, that the concerns of the anti-inflation view about the need for further macroeconomic adjustment were not misplaced, to the extent that a more aggressive management of the exchange rate would lead to a deterioration in the fiscal accounts. We shall, however, argue that the concerns of the pro-growth view about the sustainability and the costs of overvalued exchange rates were also well founded. This in turn bears the conclusion that even for a country—like the Philippines—with a large external debt held by the public sector, maintaining an overvalued exchange rate is very costly, and that a combination of policies—aimed simultaneously at improving fiscal balances, reducing the burden of external debt, and increasing competitiveness—is necessary to sustain growth.

4. An Econometric Model of the Philippine Economy

In order to quantify the tradeoffs that are crucial to the question of what should be the policy stance in the Philippines, we estimated a small econometric model, whose basic properties were discussed in section 2. Table A2 in the Appendix reports the econometric estimates of the behavioural equations of the model. Specification, estimation and statistical properties are fully discussed in a companion paper (Faini and Gressani, 1997). In this section, we provide a brief description of the model’s structure.

The model includes a supply block where installed productive capacity—potential output—is a function of private and public infrastructure investment and the wage rate. Private investment in turns depends on (expected) output, through a standard accelerator mechanism, on public investment and on the cost of capital. In the short run, output is determined on the demand side, as the sum of consumption, investment, government expenditures, and net exports. Firms are assumed to set prices as a function of capacity utilization, measured as the ratio of actual to potential output. Prices are also found to depend on the evolution of the exchange rate and money supply. Finally the exchange rate is set by the monetary authorities as a function of the macroeconomic environment. In this model, an exogenous increase in demand will lead to higher capacity utilization, thereby fuelling inflation and prompting a nominal devaluation.

The public sector is described in some detail, with a distinction being made between government, Central Bank, and public corporations. A separate budget identity is specified for each of these entities. To capture the impact of exchange rate movements on the budget, both public revenues and public expenditures are broken into a domestic and a foreign component. Budgetary balances determine the evolution of outstanding stocks of domestic public debt and thereby affect the interest rate on Treasury bills. The equilibrium in the money market, therefore, depends both on monetary policy—which sets the evolution of high-power money—and fiscal policy, through its effects on domestic public debt. The equilibrium interest rate in turn affects, through its impact on the cost of capital, the behavior of private investment.

The estimation of the behavioral equations yields some interesting insights into the workings of the Philippine economy. First, the behavior of monetary authorities in setting the nominal exchange rate is fairly accurately described by a simple reaction function which includes among its arguments the price level, the level of gross international reserves of the Central Bank, and the stock of external debt. This implies that monetary authorities are more willing to let the real exchange rate depreciate, the lower the level of reserves and the lower the level of external debt. That is, lower reserves as well as lower external debt result in a more aggressive exchange rate policy. These findings confirm that the monetary authorities have been concerned that, in the
presence of a large stock of external debt, a devaluation may lead to a significant deterioration of fiscal balances, and thus have followed a more conservative exchange rate policy than otherwise. Second, the foreign exchange constraint to growth is less binding than previously asserted, for instance by Krugman et al. (1992). It is true that an acceleration of growth leads to a larger increase in imports, presumably because of lags in the response of domestic supply. The short-run elasticity is equal to 1.97. But this is mostly a short-run effect given that in the long run the output elasticity of imports falls to 1.35. The current account constraint, therefore, is likely to be relatively severe mainly in the short run. Moreover, both imports and manufacturing exports are found to respond significantly to the real exchange rate. The long-run price elasticities are −0.8 and 0.7 respectively. Exchange rate management therefore plays a crucial role in determining external balance. Structural and policy weaknesses in the Philippines economy, as documented by Krugman et al., do not therefore eliminate the effectiveness of exchange rate policies.

Finally, expectations about future exchange rates are found to play a significant role in influencing the behavior of interest rates. More specifically, the return on foreign assets—measured by the sum of LIBOR and expected devaluation, as predicted by the estimated reaction function—was a statistically significant determinant of the interest rate on Treasury Bills. Notice that, owing to the presence of widespread capital controls during both the estimation and simulation periods, we did not impose an interest-parity condition between the Philippines and the rest of the world. Still, our results indicate that interest rates in the Philippines are not fully independent from events in the rest of the world and highlight the link between exchange rate policy and domestic interest rates that appears to have characterized recent developments in the Philippines.

5. Simulation of Pro-Growth Policies

The model was used to simulate the effect on growth and inflation of a more aggressive exchange rate management. Monetary policy—the evolution of high-power money—was maintained unchanged in this exercise. This assumption is equivalent to the sterilization of the impact of changes in gross reserves on money supply, and was made to allow the simulations to be conducted given monetary policy. Net flows of external debt are also maintained unchanged, so that the impact of the simulated policy changes is fully reflected on the net international reserves of the Central Bank. Finally, the policy changes take place in 1985, and the model is simulated for the period 1986–90 (i.e., until the implementation of the first debt reduction operation).

The simulation results will also be compared with the predictions of the macroeconomic model of section 2. In doing so, however, some caution is necessary. First, the model in section 2 provides only a fairly stylized description of the macroeconomic framework. For instance, the menu of assets is much more limited in the former model than in the latter. Also, capacity is taken to be fixed in the model of section 2, but varies endogenously in the econometric model. Second, the econometric estimates allow for lagged responses in agents’ behavior. This may affect significantly the (short-run) simulation results. For instance, a more aggressive exchange rate policy is found to lead on impact to a deterioration in the current account, because of low short-run price elasticities. It takes one year for a positive current account effect to prevail. Third, expectations are treated consistently in the theoretical model (by relying on the hypothesis of rational expectations), but are dealt with in a somewhat less systematic way in the econometric model. However, whenever possible, we have attempted to
specify and estimate a stochastic equation to model the process of expectations formation. This is, for instance, the procedure we use to model expectations about future devaluation (which affect asset demands) and about future output (which influence the investment choice).

We model a more “aggressive” exchange rate management by assuming that exchange rate policy does not depend on the stock of external debt. A comparison between the base-run simulation—where the exchange rate policy is endogenized on the basis of the estimated reaction function—and a simulation based on the modified reaction function is shown in Table 2.

The results of this exercise are quite revealing. The larger propensity to devalue of the monetary authorities implies a more aggressive exchange rate policy and higher inflation. In turn, both the faster rate of inflation and devaluation feed back on the budget. On the one hand, foreign-currency denominated expenditures rise, when measured in local currency; on the other, higher prices with an unchanged monetary stance push up interest rates and the interest bill of the public sector.

The overall effect on fiscal balances is negative. As a share of GDP, the public sector’s financing requirements increase cumulatively by 3 percentage points of GDP, over the five-year period. The negative effects of higher expenditures on the budget are moderated by higher revenues, caused by the expansionary effects on output and tax receipts owing to the faster rate of devaluation. The balance between these effects is critical to the sustainability of the more aggressive exchange rate policy. Similarly, the balance between the effects of the devaluation on investment caused by the faster output growth and the higher cost of capital are also critical to sustainability, as they determine to what extent investment will increase and thus support the recovery. If, as in our simulation, the two effects balance—leading to an increase in GDP with an unchanged level of investment and thus to new strains on existing capacity— inflationary pressures would be rekindled.

The shift in the exchange rate reaction function has a significant impact on the current account. The less conservative exchange rate policy in Table 2 is associated with

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<tr>
<td>GDP (%)</td>
<td>0.0</td>
<td>0.2</td>
<td>0.2</td>
<td>0.7</td>
<td>1.0</td>
<td>1.0</td>
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<tr>
<td>Inflation rate (%)</td>
<td>0.0</td>
<td>0.6</td>
<td>0.4</td>
<td>1.8</td>
<td>1.5</td>
<td>0.3</td>
</tr>
<tr>
<td>Nominal interest rate (%)</td>
<td>0.0</td>
<td>0.4</td>
<td>0.4</td>
<td>1.4</td>
<td>1.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Cost of capital (%)</td>
<td>0.0</td>
<td>0.4</td>
<td>0.2</td>
<td>1.0</td>
<td>1.2</td>
<td>1.0</td>
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<tr>
<td>Devaluation rate (%)</td>
<td>0.0</td>
<td>1.4</td>
<td>0.2</td>
<td>3.2</td>
<td>1.9</td>
<td>–2.0</td>
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<tr>
<td>Real exchange rate index (%)</td>
<td>0.0</td>
<td>0.8</td>
<td>0.6</td>
<td>2.0</td>
<td>2.4</td>
<td>0.5</td>
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<tr>
<td>Private investment (%)</td>
<td>0.0</td>
<td>0.0</td>
<td>–0.1</td>
<td>–0.0</td>
<td>–0.3</td>
<td>–0.6</td>
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<tr>
<td>Manufactured exports (%)</td>
<td>0.0</td>
<td>0.5</td>
<td>0.4</td>
<td>1.4</td>
<td>1.8</td>
<td>0.4</td>
</tr>
<tr>
<td>Imports of goods and NFS (%)</td>
<td>0.0</td>
<td>0.2</td>
<td>–0.0</td>
<td>0.4</td>
<td>0.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Current account balance</td>
<td>0</td>
<td>–12</td>
<td>13</td>
<td>1</td>
<td>99</td>
<td>139</td>
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<tr>
<td>Domestic public debt (%)</td>
<td>0.0</td>
<td>0.1</td>
<td>0.2</td>
<td>0.5</td>
<td>1.3</td>
<td>3.0</td>
</tr>
</tbody>
</table>

a Value in 1985 = 100.
b Difference expressed as percentage points of simulated GDP.
c Difference expressed in US$ million.
Source: Own calculations.
both faster devaluation and higher inflation. The former effect is stronger, so that the real exchange rate tends to depreciate. Because of a J-curve effect (price elasticities are smaller in the short run than in the long run), the initial effect on the current account is negative. Over the next few years, however, the current account improves steadily and by 1990 net reserves are significantly higher, by approximately US$240 million. In turn, this larger stock of reserves reduces the incentive to devalue. As a matter of fact, the rate of devaluation in 1990 is lower in the simulation than in the base run.

The simulation can be interpreted to show that a policy supportive of an overvalued exchange rate may bring some initial benefits, in the form of lower inflation and improved budgetary performance. The costs would come mostly in the form of a deterioration of the current account. The benefits, however, would be short-lived. The loss in reserves would soon force monetary authorities to devalue, so that after only five years—in 1990—the rate of devaluation would be, quite paradoxically, larger with the more conservative exchange rate management.

Yet, even a more aggressive exchange rate policy is not costless. Our simulation provides support to the view that, at least in the presence of high external debt stocks, letting the exchange rate depreciate may have a negative impact on the budget. Clearly, the controversy between the pro-growth and the anti-inflation views reflects a real dilemma between the need to contain inflation and preserve budgetary equilibria through prudent exchange rate policies and the desire to boost export and growth through aggressive exchange rate management. One way out of this dilemma is to engineer a reduction in the sensitivity of fiscal balances to exchange rate changes. Debt workouts are the obvious candidates. They reduce the resource transfer abroad and strengthen the current account position. They also improve the budgetary outlook by reducing the amount of foreign-currency denominated public spending.

In Table 3, we simulate the impact of a Brady-like plan under the assumption that debt reduction would have been implemented starting in 1986. We consider the case where exchange rate policy has become more aggressive. In our simulation, the debt relief is gradual, with a reduction in the amount of outstanding debt equal to US$1,500 million in 1985 and to a further US$3,000 million in 1986. We also assume that lower foreign interest payments are channelled into further external debt reduction (through debt retirement) rather than in reserves accumulation. The results in Table 3 support the view that debt relief can reconcile the conflicting claims on exchange rate policy. Compared with the base simulation, nominal interest rates show only very modest variations. More crucially, the budgetary situation improves markedly: the domestic debt to GDP ratio is 4.8% lower than in the base simulation. Recall that with no debt relief (Table 2) a more aggressive stance in the exchange rate management led to a deterioration in the fiscal balances. The Brady plan is also associated with a marked improvement in the current account, whose surplus in 1990 is equal to US$670 million against US$139 million in Table 2. Perhaps surprisingly, the impact on output is very limited, with 1990 GDP being only marginally higher than in the base case. The explanation is simple. Interest payments on domestic debt represent a non-negligible share of disposable income. The reduction in the level of interest rates attendant on the Brady plan leads then to a significant fall in both disposable income and private consumption, that almost offsets the expansionary impact of devaluation. Notice also that the decline in private consumption is to some extent offset by a rise in investment. Output growth is therefore less inflationary than in the previous simulation, given that it does not put as much strain on productive capacity.
6. Conclusions

The main result of the paper is that, even in the presence of high external debt, holding the exchange rate at overvalued levels can be very costly. Admittedly, in the case of the Philippines, our simulations show that a devaluation would worsen the public sector deficit, given the structure of public revenues and expenditures prevailing during 1985–90. The short-run benefits brought about by an overvalued exchange rate would, however, disappear in the medium term, because of the potentially destabilizing effects on the current account, which would eventually result in a larger devaluation.

These results also shed light, therefore, on the importance of reducing external debt even in the absence of a foreign exchange constraint. Debt workouts that reduce the budgetary burden of interest payments on external debt reduce the sensitivity of fiscal balances to changes in the exchange rate even in the short run, and thus can make a combination of anti-inflation and pro-growth policies substantially more effective.

The conclusion that reducing the external debt burden has significant effects through the impact on fiscal balances—in addition to the impact on external balances—appears to be supported by the developments in the Philippines in the 1990s. The two commercial debt restructuring operations concluded by the Philippines in 1990 and 1993 have in fact led to a steady improvement in the consolidated public sector deficit and, beginning in 1993, a resumption of growth.

Appendix

The exchange rate reaction function plays a crucial role in the model. It can be derived as follows. We assume that monetary authorities try to minimize the following loss function:

\[
\frac{1}{2}(R - \bar{R})^2 + \left( \frac{\beta}{2} \right) \pi^2 + \gamma e B^0, \tag{A1}
\]
where \( R \) and \( \bar{R} \) denote, respectively, the actual and the desired level of foreign exchange reserves, \( B^* \) stands for public external debt, and \( e \) is the (log of) the nominal exchange rate. \( \Delta e \) is equal to the rate of nominal devaluation. As mentioned earlier, the Central Bank is reluctant to devalue in the presence of a large stock of public external debt for the fear of inflicting substantial capital losses to the Treasury. An overvalued exchange rate will, on the other hand, prompt a loss of reserves and force monetary authorities to devalue. Changes in \( R \) are assumed to depend on the current account, which is turn a function of the real exchange rate, \( e - p \). Formally:

\[
R = R_{-1} + \theta(e - p). \tag{A2}
\]

Finally, it is assumed that inflation can be simply described as

\[
\pi = \alpha + \varepsilon \Delta e, \tag{A3}
\]

where \( \alpha \) denotes base inflation and \( \varepsilon \) is the pass-through coefficient from the exchange rate to prices. It can be shown that the optimal level of devaluation is then equal to

\[
\Delta e = \left[ (\bar{R} - R)\theta(1 - \varepsilon) - \theta^2(1 - \varepsilon)(e - p) + \left[ \theta^2(1 - \varepsilon) - \beta e \right] \alpha - \gamma B^* \right] / \Xi, \tag{A4}
\]

where \( \Xi = \theta^2 (1 - \varepsilon)^2 + \beta e^2 \). Equation (A4) predicts that a larger level of reserves, a more depreciated real exchange rate, and a higher stock of public external debt will be associated with a lower propensity to devalue. The impact of base inflation, \( \alpha \), is instead ambiguous. On the one hand, more inflation would prompt the Central Bank to devalue less because of the fear of further adding to inflationary pressures; at the same time, though, it would lead to an undesired real appreciation. If the impact of a real depreciation on the current account (as measured by the coefficient \( \theta \)) is sufficiently large, then the Central Bank will respond to an exogenous inflationary shocks by increasing the rate of devaluation.

Estimation results for equation (A4) are reported in Table A1. Both foreign exchange reserves and external public debt have been normalized by GDP. As expected, dwindling reserves lead to more devaluation. Remarkably, the coefficient on \( B^* \) is negative, suggesting that, as predicted by the model, the Central Bank will be less

\begin{table}[h]
\centering
\caption{The Exchange Rate Reaction Function}
\label{tab:exchange_rate_reaction}
\begin{tabular}{lcc}
\hline
 & Coefficient & \textit{t}-statistic \\
\hline
Constant & 0.08071 & 0.502 \\
\text{ln} (R/Y) & -0.1679 & 4.16 \\
\text{ln} (rer) & 0.2093 & 2.91 \\
\Delta \ln p & 0.4965 & 3.30 \\
\text{ln} (B^*/Y) & -0.1035 & 2.19 \\
\text{DW} & 1.87 & \\
\text{LM} (\chi^2(1)) & 0.122 & \\
\text{Hendry} (\chi^2(1)) & 0.0007 & \\
\text{Chow} (F_{19,1}) & 0.0006 & \\
\hline
\end{tabular}
\end{table}

\textit{a} The dependent variable is \( \Delta \ln e \) and the sample period is 1970–90. \\
\textit{b} The LM, the Hendry, and the Chow procedures are tests for serial correlation, predictive power, and stability, respectively.

\( R = \) foreign exchange reserves, \( e = \) nominal exchange rate, \( rer = \) real exchange rate (\( \text{p/ep}^* \)), \( p = \) price level, \( Y = \) GDP, \( B^* = \) public external debt.
Table A2. Estimation Results

1. **SUPPLY FUNCTION**
   \[
   \ln(Y) = 6.4549 - 0.1108*\ln(W) + 0.28*\ln(W(-1)) + 0.1765*\ln(IPriv) 
   \]
   \[
   (9.52) \quad (-2.26) \quad \text{(CONSTR)} \quad (6.60) 
   \]
   \[
   + 0.25*\ln(Y(-1)) + 0.04163*\ln(IPubInf) + 0.01777*\text{TIME} 
   \]
   \[
   (7.87) \quad (2.80) \quad (8.46) 
   \]
   **SMPL**  | **SE**  | **AR2** | **DW** | **LM** | **HENDRY** | **CHOW**
   -------- | ------ | ------ | ------ | ------ | ---------- | ------
   1975–90  | 0.0130 | 0.989  | 1.39   | 0.49   | 2.50       | 2.68   

2. **PRIVATE INVESTMENT**
   \[
   DL(IPriv) = -2.8507 + 2.0510*DL(Y) - 0.7647*(\ln(IPriv(-1)) - \ln(Y(-1))) 
   \]
   \[
   (-4.25) \quad (1.62) \quad \text{(CONSTR)} \quad (-4.47) 
   \]
   \[
   + 0.1738*\ln(IPubInf(-1)) - 1.6351*\ln(CostK(-1)) - 1.2263*\ln(CostK(-2)) 
   \]
   \[
   (3.31) \quad (-3.37) \quad (-3.77) 
   \]
   \[
   - 0.8176*\ln(CostK(-3)) - 0.4088*\ln(CostK(-4)) 
   \]
   \[
   (-3.37) \quad (-3.37) 
   \]
   **SMPL**  | **SE**  | **AR2** | **DW** | **LM** | **HENDRY** | **CHOW**
   -------- | ------ | ------ | ------ | ------ | ---------- | ------
   1956–90  | 0.1112 | 0.5031 | 2.22   |        |            |        

3. **PRIVATE CONSUMPTION**
   \[
   DL(Rcon) = 1.4164*DL(Yperm) + 0.9952*(\ln(Yperm(-1)) - \ln(Rcon(-1))) 
   \]
   \[
   (5.36) \quad (3.31) 
   \]
   \[
   + 0.1028*(\ln(we(-1) - tb(-1)) - \ln(Yperm(-1))) - 0.001546*Tot(-1) 
   \]
   \[
   (3.12) \quad (-3.25) 
   \]
   \[
   + 1.071E-07*\text{EXTD} 
   \]
   \[
   (2.43) 
   \]
   **SMPL**  | **SE**  | **AR2** | **DW** | **LM** | **HENDRY** | **CHOW**
   -------- | ------ | ------ | ------ | ------ | ---------- | ------
   1968–90  | 0.0227 | 0.5791 | 1.82   |        |            |        

4. **IMPORTS OF GOODS AND NONFACTOR SERVICES**
   \[
   \ln(MNFS) = -3.2485 - 0.4006*\ln(Pm/P) + 1.9618*DL(Y) + 0.6760*\ln(Y(-1)) 
   \]
   \[
   (-2.94) \quad (-2.30) \quad (4.84) \quad (4.03) 
   \]
   \[
   + 0.4983*\ln(MNFS(-1)) + 0.8744*\ln(Forex/Y) 
   \]
   \[
   (3.89) \quad (2.59) 
   \]
   **SMPL**  | **SE**  | **AR2** | **DW** | **LM** | **HENDRY** | **CHOW**
   -------- | ------ | ------ | ------ | ------ | ---------- | ------
   1971–90  | 0.0555 | 0.959  | 2.26   | 0.536  | 0.351       | 0.243  

5. **MANUFACTURED EXPORTS**
   \[
   \ln(Xmanuf) = -1.7446 + 0.6602*\ln(Px/P) - 0.604*\ln(Px(-1)/P(-1)) 
   \]
   \[
   (-1.19) \quad (2.090) \quad \text{(CONSTR)} 
   \]
   \[
   + 0.3189*\ln(GDCF(-1)) + 0.9151*\ln(Xmanuf(-1)) 
   \]
   \[
   (2.05) \quad (25.17) 
   \]

   **Instrumental variables:** C, \ln(Px(-1)), \ln(P(-1)), \ln(GDCF(-1)), \ln(Xmanuf(-1)),
   WORLD DEMAND, FOREIGN COMPETITORS’ PRICE, CAPACITY OUTPUT

   **SMPL**  | **SE**  | **AR2** | **DW** | **SARGAN** | **GODFREY**
   -------- | ------ | ------ | ------ | ----------- | ----------
   1971–90  | 0.165  | 0.980  | 2.55   | 13.02       | 1.21      

6. **CURRENCY DEMAND**
   \[
   DL(Cur) = -1.5249 + 0.03448*\ln(we) + 0.4457*(\ln(Y) - \ln(Cur(-1))) - 0.7047*DL(p) 
   \]
   \[
   (-2.48) \quad (0.714) \quad (2.71) \quad (-2.42) 
   \]
   \[
   - 1.1836*\text{RSD} 
   \]
   \[
   (-1.50) 
   \]

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### Table A2. Estimation Results (cont.)

<table>
<thead>
<tr>
<th></th>
<th>SMPL</th>
<th>SE</th>
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<th>LM</th>
<th>HENDRY</th>
<th>CHOW</th>
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<tr>
<td></td>
<td>1970–90</td>
<td>0.0874</td>
<td>0.626</td>
<td>2.41</td>
<td>1.69</td>
<td>0.105</td>
<td>0.0766</td>
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</table>

#### 7. DEMAND DEPOSITS

\[ DL(\text{DD}) = -0.9376 + 0.4357*(\ln(\text{Y}) - \ln(\text{DD}(-1))) - 4.123*\text{RSD} - 0.5349*DL(\text{P}) \]

\[ (-1.94) \quad (2.74) \quad (-4.00) \quad (-1.63) \]

\[ - 0.3597*DL84 \]

\[ (-2.95) \]

<table>
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<th>DW</th>
<th>LM</th>
<th>HENDRY</th>
<th>CHOW</th>
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<tr>
<td></td>
<td>1970–90</td>
<td>0.0812</td>
<td>0.746</td>
<td>2.02</td>
<td>0.0342</td>
<td>1.089</td>
<td>0.870</td>
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</table>

#### 8. TIME DEPOSITS

\[ DL(\text{TD}) = 2.9998 + 0.6147*(\ln(\text{WE}) - \ln(\text{TD}(-1))) - 0.2813*\ln(\text{Y}) + 1.864*RTD \]

\[ (1.65) \quad (4.87) \quad (-1.96) \quad (2.88) \]

\[ - 0.2009*DL(\text{P}) + 0.1661*D76 - 0.007100*RTB84 \]

\[ (-0.927) \quad (2.98) \quad (-4.00) \]

<table>
<thead>
<tr>
<th></th>
<th>SMPL</th>
<th>SE</th>
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<th>HENDRY</th>
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<tr>
<td></td>
<td>1970–90</td>
<td>0.0511</td>
<td>0.837</td>
<td>2.30</td>
<td>0.749</td>
<td>0.661</td>
<td>0.409</td>
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</tbody>
</table>

#### 9. TREASURY BILL RATE

\[ \text{RTB} = 0.5 - 0.6847*\ln(\text{WE}) + 0.3192*\ln(\text{TB}) + 1.1051*\text{RTD} + 0.1839*(\text{DEV} + \text{LIBOR}) \]

\[ (2.18) \quad (2.65) \quad (2.29) \quad (3.73) \quad (1.44) \]

*Instrumental variables: C, LN(WE), LN(WE(-1)), LN(TB(-1)), RTD, DEV(FITTED)*

<table>
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<tr>
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<td>1971–90</td>
<td>2.30</td>
<td>0.913</td>
<td>0.946</td>
<td>0.00102</td>
<td>0.00136</td>
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#### 10. PRICING FUNCTION

\[ DL(\text{P}) = -4.61 + 0.283*DL(\text{NER}) + 0.767*DL(MTWO) + 0.319*\ln(MTWO/P)(-1) \]

\[ (-3.16) \quad (2.44) \quad (3.087) \quad (3.05) \]

\[ + 0.267*\ln(\text{NER/P})(-1) - 1.48*\text{UY} \]

\[ (3.42) \quad (-3.55) \]

<table>
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<th>DW</th>
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<th>HENDRY</th>
<th>CHOW</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>1968–90</td>
<td>0.0536</td>
<td>0.592</td>
<td>1.71</td>
<td>0.875</td>
<td>0.00169</td>
<td>0.00119</td>
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**Notes:** The dynamic specification used for most equations follows an error-correction mechanism. All equations have been tested for autocorrelation, predictive power, and stability, using the Lagrange multiplier, the Hendry and the Chow tests, respectively. When the equation is estimated with an instrumental variable method, we rely on the Godfrey and the Sargan procedures to test respectively for serial autocorrelation and overidentifying restrictions.

**Legends:** LN: natural log; DL: first log-difference; D76: dummy variable (=1 from 1976, =0 otherwise); D84: dummy variable (=1 from 1984, =0 otherwise); SMPL: sample period; SE: standard error of regression; AR2: adjusted $R^2$; DW: Durbin-Watson; LM: Lagrange multiplier.

**Variable list:** Y: gross domestic product; UY: capacity utilization rate; W: wage rate; COSTK: cost of capital; IPRIV: private investment; IPUBINF: public investment in infrastructure; RCON: consumption; YPERM: permanent income; EXTD: external debt; TOT: agricultural terms of trade lagged; MNFS: imports of goods and nonfactor services; XMANUF: manufacturing exports; CUR: currency; DD: demand deposits; TD: time deposits; RTB: interest rate on treasury bills; RTD: interest rate on time deposits; RSD: interest rate on saving deposits; TB: treasury bills; MTWO: money supply; WE: total financial wealth; P: domestic price; NER: nominal exchange rate; DEV: nominal devaluation; PM: import price; PX: export price; GDCF: gross capital formation; FOREX: foreign exchange availability.

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willing to devalue in the presence of a large stock of public external debt. Finally, inflation is found to exert a positive impact on the actual rate of devaluation.

References


Notes

1. As in Dornbusch (1981), we choose this specification so as to have positive steady-state inflation.

2. See Branson et al. (1977) for an early attempt to model the Central Bank exchange rate reaction function in an industrial country case. For developing countries, the literature is more limited. See, however, Cumby and Obstfield (1983) which models Mexico’s Central Bank money supply rule as a function of foreign exchange reserves, the budget deficit, the real exchange rate, and output growth. This specification closely resembles the one used in this paper. It does not allow, however, for the role that a large stock of publicly held foreign debt plays in discouraging a nominal devaluation. As noted earlier, this effect is likely to be important in the presence of a large external debt.

3. The steady-state equilibrium at E is stable. It is easy to check that, given equation (11), the trace of the system is negative. The condition ∆ > 0 yields a positive determinant. Global stability is not surprising once we consider that in this model both state variables, i.e., foreign exchange reserves and prices, cannot “jump.” Under mild conditions, convergence can be shown to be monotonic.

4. Starting from point E, a given increase in $m - p$ leads to higher inflation and thus lower real balance growth. The negative impact on $m - p$ is strengthened by the loss in reserves ($R < 0$) induced by higher output. To re-establish equilibrium on the $\dot{p} = g_m$ and the $m - \dot{p} = 0$ schedules, we need an increase in foreign exchange reserves, so as to generate a real appreciation, a fall in
output, and a lower inflation. Foreign exchange reserves, however, must increase relatively more to re-establish equilibrium on the \( \dot{m} - \dot{p} = 0 \) than on the \( \dot{p} = g_m \) schedule, for two reasons: first, the initial disequilibrium was larger; second, while a fall in output has a direct negative impact on inflation, its effect on real money supply growth is dampened because of the current account improvement and the consequent increase in \( \dot{R} \).

5. Alternatively, we could have focused on the effects of a change in \( \beta \). However, changes in \( \beta \) do not correspond to shifts of the exchange rate reaction function (as would happen following an increase in public external debt) but rather to a rotation of that curve. Moreover, changes in \( \beta \) have no impact on the steady-state solution, while changes in \( \dot{R} \) have long-run effects.

6. If equation (11) holds with a positive sign, the \( \dot{R} = 0 \) schedule is now positively sloped: the direct current account effect of a depreciation is weaker than the effect working though income changes. As a result, an increase in \( R \) leads to an improved current account and reserves accumulation. The dynamic impact of a fall in \( \dot{R} \) is somewhat more complex to trace. Following the shift in the Central Bank’s reaction function, the exchange rate appreciates. Foreign exchange reserves, however, increase, bringing a further appreciation of the exchange rate. Output also increases because of the steady increase in real balances, leading after a while to a deterioration of the current account and a decline in foreign exchange reserves. In the end, inflation will be above its long-run value.

7. Inflation will be below its long-run value throughout the adjustment path only if both the \( \dot{m} - \dot{p} = 0 \) and the \( \dot{R} = 0 \) schedules are negatively sloped.

8. Between end-1989 and end-1990, the Philippines experienced a serious coup attempt, a severe earthquake, the impact of the Gulf crisis on oil prices and contract workers’ remittances, and a typhoon that killed 4,000 people.

9. In terms of the model described in section 1, this would be equivalent to an increase in the desired level of reserves, \( \dot{R} \).

10. We do not report, for the sake of brevity, the results of the simulation with a more conservative exchange rate policy. These results do not differ in any significant way (except of course for a change in sign) from those of Table 2.

11. Moreover, this simulation may portray conservative exchange rate management in a more favorable light than in reality. The model does not fully capture the effects of devaluation expectations on inflation and interest rates. In particular, unwillingness to devalue in the presence of widening current account deficits may contribute—and there is evidence that it has contributed—to raising the premium required by investors to hold Treasury Bills, and thus the cost of capital. Thus, a more aggressive exchange rate management may have more beneficial effects on interest rates and, through investment, on GDP growth than shown by the simulation.

12. The improvement in the Treasury accounts should, however, allow domestic policymakers to adopt a more permissive fiscal stance and offset the recessionary effect of lower interest payments without jeopardizing the budgetary equilibria.