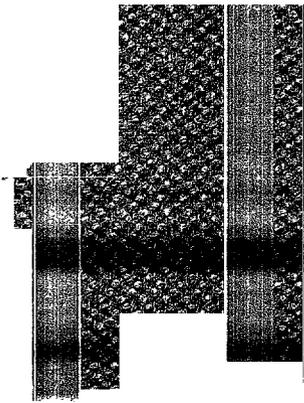
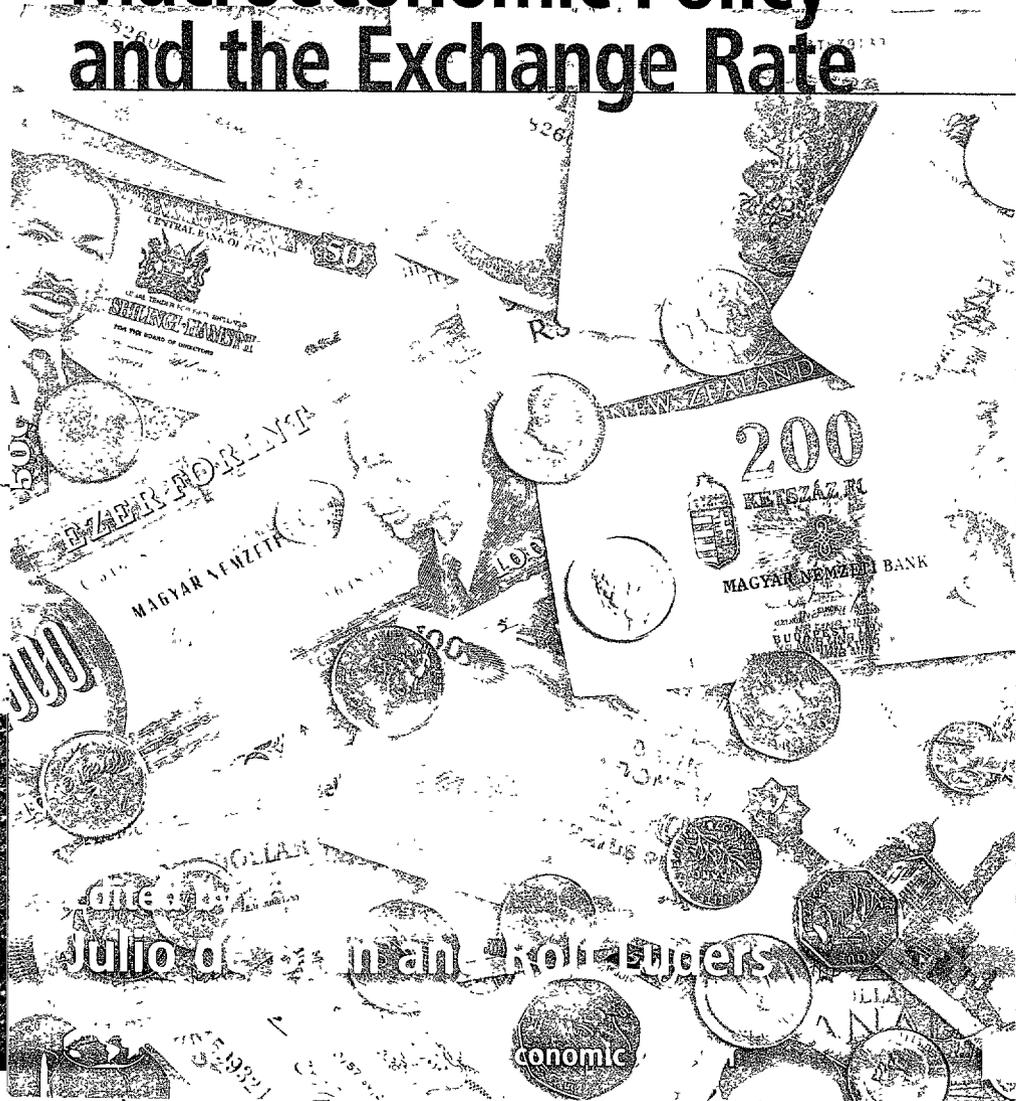


Macroeconomic Policy and the Exchange Rate



Julio de la Fuente - Kofu - Eufers

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*Edited by
Julio de Brun
and
Rolf Lüders*



International Center for Economic Growth
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Preface

The world is in the midst of financial turmoil, this time triggered by the Asian crisis and followed by balance of payments problems in Russia and then in Brazil. At the heart of these problems are speculative attacks against local currencies, which many experts relate—directly or indirectly—to exchange rate regimes.

In late 1994, the Mexican crisis also affected a large number of countries, especially some in the Western region and, in particular, Argentina. As happened to Brazil early in 1999, Mexico's currency became subject to a speculative attack and the country was forced to devalue. Initially this devaluation took, in both cases, the form of an exchange rate band expansion, but that only increased the intensity of the speculative attack. Soon Mexico had to, as Brazil did recently, allow its currency to float.

Going back in time, it is possible to find other instances of speculative attacks, but the number and severity seem to be increasing together with the rapid expansion of international capital movements. Up until the Mexican crisis, the problems were blamed on the policies of the affected countries, which, it was argued, violated the basic macroeconomic equilibria and therefore the countries suffered the attacks. Mexico, however, seemed to have followed perfectly sound macroeconomic policies. "It seemed to have the fundamentals right," and it nevertheless suffered a speculative attack. Was, perhaps, the fixed exchange rate regime, used for stabilization purposes, to be blamed for the problem? Could the problem have been avoided with a different exchange rate

or monetary policy? What has been the international experience in relationship to these questions? Is there an “ideal” exchange rate regime for countries wanting to reduce their inflation rates?

These are the kind of questions posed in this volume, which includes the edited papers and some of the comments presented at a workshop organized by the International Center for Economic Growth (ICEG) and sponsored by the U.S. Agency for International Development (USAID) in Washington, D.C., September 27–28, 1996. The meeting was organized on the basis of the initial presentation of a survey of the literature on the relationship between macroeconomic policies and exchange rate management, prepared by Professor Peter J. Montiel. Thereafter, six country experiences were studied, to draw lessons from them. Three of these were Latin American: Chile and Mexico analyzed by Professor Vittorio Corbo; and Peru, by Dr. Edgardo Favaro. The remaining three cases were chosen to gather the experiences of other regions: Indonesia for Asia, by Professor Iwan J. Azis; Kenya for Africa, by professors Njuguna S. Ndung’u and Francis M. Mweya; and Hungary for Central Europe, by Pál Gáspár. The workshop ended with a roundtable, in which Robert Mundell, Elaine Grigsby and Larry Sjaastad participated. Comments by Colin I. Bradford, Jr., James Elliott, Jerre Manarolla and Richard Greene are included in this volume also. An introductory chapter by the editors summarizes the workshop discussions.

The book is timely, because the present financial crisis has raised many of the issues which are discussed in it. Perhaps, with the Mexican crisis, the relationship between sound macroeconomic policies, financial liberalization, foreign capital flows, speculative attacks and financial sector insolvency has just begun to be understood by economists. Nevertheless, many of the lessons learned from the analysis carried-out during the workshop—the need for strong exchange rate regime commitments; the relevance of macroeconomic fundamentals; the advantages of flexible input markets, no matter which exchange rate regime is adopted; and so on—are also extremely relevant at present. This volume will, most likely, add value for the reader interested in exchange rate regimes and their crisis.

Robert H. Hodam
Chief Executive Officer
International Center for Economic Growth
May 1999

CHAPTER 1

Introduction

Julio de Brun

Rolf Lüders

As the world witnessed another episode in the long history of the “peso problem” on December 20, 1994, dark memories from the debt crisis of 1982 came to the mind of most developing countries, especially the Latin American ones. The Central Bank of Mexico devalued the Mexican peso against the U.S. dollar by 15 percent, after an initial correction on the weak side of the currency band that had operated since late 1991. On December 22, the currency band system was replaced by a floating exchange rate; and a new 18 percent devaluation followed, under strong capital outflow pressures.

Until 1994, Mexico was a new leader in stabilization and structural reforms in Latin America, as Chile had been during the 1980s. In addition, the Mexican stabilization plan of December 1987 learned from the problems Chile had to face in the late 1970s with its own program; it avoided the risks of wage and price indexation by introducing an arrangement between the government, entrepreneurs and workers known as the *Pacto*. Nevertheless, many of the well-known outcomes of exchange rate-based stabilizations were observed: expansion of aggregate demand, appreciation of the local currency, deterioration of the current account, remonetization and capital inflows.

The current account deficit and the real appreciation of the local currency were considered unsustainable by some analysts and were blamed as the main cause of the Mexican crisis. But there are other explanations as well for the crisis. The Mexican economy confronted large adverse external and internal shocks during 1994, some related to the growth acceleration in the industrialized countries and the rise

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of interest rates in the United States and other countries originating in domestic political problems. All of these factors brought, as a consequence, a reduction in the demand for money and a reversal of the capital flows. Interpreting these phenomena as transitory, the Central Bank responded by implementing an accommodating monetary policy, with the final depletion of international reserves.

The Mexican crisis again placed the problem of exchange rate management and its relationship with other economic policies in the forefront of economic discussion. This book deals with that topic. Whatever explanation is accepted on the origins of the Mexican crisis, as in other currency crises, the following problems are always present: (a) How is the exchange rate system to be designed, and (b) How should the exchange rate policy be combined with other instruments to (1) achieve stabilization or improvement of competitiveness goals, (2) confront capital flows, and (3) influence the political and economic decision-making process, that is, inducing fiscal discipline.

The papers in this book discuss from a theoretical point of view and on the basis of specific country cases the lessons learned about exchange rate management. In Chapter 2, Peter Montiel makes a selective survey on exchange rate policy issues, analyzing the role of the exchange rate as a nominal anchor and the management of the exchange rate to confront large capital flows. In the following chapters, Pál Gáspár, Vittorio Corbo, Edgardo Favaro, Iwan Azis, and Njuguna Ndung'u and Francis Mwegu examine exchange rate policies in Hungary, Chile, Mexico, Peru, Indonesia and Kenya respectively. All these papers were presented at a seminar organized by the U.S. Agency for International Development and the International Center for Economic Growth, held in Washington, D.C., in September 1996. The final chapter includes the statements made by Robert Mundell, Elaine Grigsby and Larry Sjaastad that closed the seminar.

Money or the Exchange Rate as a Nominal Anchor

As Mundell points out, a century ago there was little discussion about managing exchange rates. A system of fixed exchange rates prevailed, in terms of the gold standard since 1873 or a bimetallic system before that. Now, a variety of models of exchange rate determination have weighed the relative merits of fixed and flexible rates in the presence of monetary, goods-demand or supply shocks.

If we concentrate our attention on the extreme cases of fixed rates or free float, the main issue is the selection of a nominal anchor. Then we can take into consideration the well-known result that a flexible rate eliminates the effects of goods-demand shocks while a fixed exchange rate eliminates the effects of monetary shocks. Or we can pay attention to the different dynamic paths associated with the implementation either of a money-based or an exchange rate-based stabilization, according to the results documented by Kiguel and Liviatan (1992) and Végh (1992). Or we can consider the political economy results related with how to achieve credibility and confront time inconsistency problems.

Montiel discusses in his survey the problem of the nominal anchor in both the political economy and stabilization issues. Analyzing the relationship between fixed exchange rates and fiscal discipline, he shows that the path of the nominal exchange rate is tightly linked to that of the public sector's primary surplus through the intertemporal budget constraint. Given the seignorage revenue and the real exchange rate, the sustainable path of exchange rate depreciation is obtained. However, this result does not imply that the announcement of a specific path for the nominal exchange rate (or the money supply) will induce fiscal discipline (to achieve the public sector solvency) in the absence of an adequate institutional framework (an independent central bank or an arrangement with a monetary union strongly opposed to inflation).

So unless a strong commitment with a monetary union or an independent currency board is in place, nothing will ensure that an exchange rate or monetary path announcement will be credible and will impose fiscal discipline. Moreover, an exchange rate commitment can result in a higher budget deficit if the government tries to control not only the inflation but also the activity level (Agell, Calmfors and Jonsson, 1994). The same can be said for other instruments of economic policy. For example, as the Argentinian government "tied its hands" in terms of monetary policy by implementing the Convertibility Plan, the pressures for devaluation were channeled in 1992 to some kind of fiscal equivalent for devaluation, through higher tariffs and nontariff barriers and subsidies for exports.

Concerning the design of stabilization programs, a good case can be made for fixed exchange rates. Montiel quotes some empirical results based on a sacrifice-ratio criterion that reveal larger appreciation of the real exchange rate and real output costs under a money-based stabilization than under exchange rate-based stabilizations. But Montiel also points out that in the presence of high capital mobility countries

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adopting an exchange rate-based stabilization program must use one of the three following alternative strategies: (1) the introduction of a “fiscal overshooting,” that is, a tighter fiscal policy than required to achieve the targeted steady-state inflation rate; (2) the imposition of temporal restrictions on international capital movements; or (3) the quick move toward the so-called flexibilization stage of stabilization. If none of these alternatives are followed, the stabilization program will eventually fail.

Montiel’s argument is related to that of “recession now versus recession later” that arises from models of exchange rate-based and money-based stabilizations, developed by, among others, Calvo and Végh (1990, 1991). In this literature, the emphasis is that in exchange rate-based stabilizations an initial expansion will be followed by a later contraction, while in money-based stabilizations the reverse will be true. If stabilization is credible, money-based stabilization will carry output losses not found with the exchange rate-based stabilizations.

However, Easterly (1996), who examines output behavior during all episodes of stabilization from high inflations between 1960 and 1994 meeting a predefined criterion, observes widespread cases of short-run output expansion during disinflation. When controlling for the adoption of an exchange rate or a monetary anchor, he does not find a significant difference in the pattern of contraction during the year before the stabilization starts and expansion after the year of stabilization.

In most of the experiences presented in this book, countries adopted exchange rate-based stabilization programs, with a variety of success. But the Peruvian case, analyzed by Edgardo Favaro in Chapter 5, gives a good example of a money-based stabilization program. This effort began in August 1990 with the adoption of an aggressive package of measures directed to reestablishing the tax base, reducing the fiscal deficit and stopping inflation. Precisely, a characteristic of the Peruvian stabilization program was that it undertook simultaneously some measures directed to stop inflation together with others concerning the adoption of significant structural reforms. As Favaro recognizes, there are some differences between the path for economic variables following stabilization in Peru and in the countries included in the Rebelo and Végh (1995) sample of exchange rate-based stabilizations. Particularly, in the Peruvian case, the expansion of economic activity started two years after and the consumption boom three years after the stabilization began. But there was not an initial contraction in the economic activity either. On the contrary, congruent with Easterly’s results, the Peruvian economy

faced a strong recession in the two years before the implementation of the stabilization plan and growth resumed (slowly, at the beginning) with the slowdown of the inflation rate.

So there is not a clear case for the adoption of a nominal exchange rate anchor in terms of stabilization goals. Neither is there a case from a credibility point of view, if the fixing of the exchange rate is not accompanied by a strong institutional commitment. Maybe the stronger argument favoring the adoption of a nominal exchange rate anchor is its simplicity, as is suggested by Mundell. Comparing three alternative nominal anchors, he defends the idea that the monetary rule is weaker than an exchange rate or a price level rule, because there are too many different definitions of money, its measure is not easily obtainable on a day-to-day basis, the meaning of money is constantly changing with innovation, and the demand for money is quasi-random in the short run. By contrast, a nominal exchange rate anchor is easily observed and interpreted by nonspecialists and influences directly the expectations of the economic agents. As Montiel shows in the following chapter, given the devaluation rate, a path for money creation can be obtained.

Nevertheless, the adoption of a fixed exchange rate system is more difficult to apply in some special cases, like in the postsocialist economies. In Chapter 3, Gáspar points out that the use of flexible exchange rates removes the need to determine, at the beginning of the stabilization process, the equilibrium value at which the exchange rate should be fixed. This is due to the fact that in these economies in transition the initial exchange rate was highly distorted and the factors affecting its equilibrium value changed rapidly as the economic reforms began to evolve. Gáspar explains why Hungary did not need to introduce an initial steep devaluation to correct overvaluation of the currency, as other economies in transition had to do. The main difference here is that Hungary began a gradual market-oriented program of reforms in the late 1960s and then the exchange rate played a more important role in this economy before 1989 than was the case in other socialist countries.

Exchange Rate Flexibility

But even in the case where the exchange rate is chosen as the nominal anchor, developing countries prefer using an adjustable peg rather than a fixed rate. As Aghelvi and Montiel (1991) noted, there is a clear trend among developing countries to move from pegged arrangements, before

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1973, to flexible arrangements, after 1973, whereby the exchange rate is fixed by the authorities but is adjusted more frequently.

This move toward greater exchange rate flexibility (where “flexibility” means a discretionary adjustable peg and not a “free float”) reflects an increased concern with protecting competitiveness, using this instrument not as a nominal anchor but as a way to achieve current account balance or promote export growth. Since competitiveness depends not on the nominal but on the real exchange rate, the greater flexibility on exchange rate arrangements reflects the intention to maintain the real exchange rate at competitive levels.

So it is very common to observe countries that adjust their nominal exchange rate in accordance with the evolution of domestic prices, in some kind of purchasing power parity rule (PPP). The consequences of this type of arrangement on macroeconomic stability are well known. In particular, the adoption of a real exchange target may leave a small open economy without a nominal anchor for the domestic price level, leading to a possible scenario of increasing devaluation and eventually hyperinflation when the economy faces an adverse external shock. For example, in many countries of Latin America, the adoption of this kind of rule introduced a big inertia in the inflationary process, leading to relatively long periods of a fairly stable but high inflation rate.

The analysis of different country cases shows that exchange rate misalignments usually come from inconsistent policy mixes. For example, after a first period of depreciating the real exchange rate between 1989 and 1991, the Hungarian government moved to greater nominal exchange rate stability, as Gáspár documents in Chapter 3. This move reflected the greater weight the government agenda gave to stabilization goals relative to trade balance ones. But this policy was not consistent with the use of other instruments. The fiscal deficit rose to 5 percent of gross domestic product (GDP) in 1991 and 1992, and the initially tight income policies were relaxed. Moreover, the Central Bank also changed its initial restrictive monetary policy and tried to help the recovery from poststabilization recession by reducing the interest rates. After the end of 1993, some macroeconomic problems became apparent; and in 1994 the fiscal deficit reached 7 percent of GDP and the current account deficit, 10 percent. The macroeconomic problems were left uncorrected during the first quarter of 1995, leading to the collapse of the adjustable peg regime.

In the case of Chile, Corbo defends in Chapter 4 the idea that it was the inconsistency between the forward-looking indexing of the exchange

rate at a decreasing rate, implemented since February 1978, and the backward-looking indexing of nominal wages that was put forth by legislation in 1979 that contributed much to the real appreciation and the ultimate crisis that exploded in 1982. Besides, the deregulation of the financial system led to a credit expansion inconsistent with the exchange rate path. In the same chapter, analyzing the Mexican crisis of 1994, Corbo explains the increasing vulnerability of the external accounts, which in the end created the conditions for a run on the peso through the absence of a contractionary monetary policy in response to the capital outflows.

As we pointed out before, a fixed exchange rate is an instrument that can be used to improve credibility and impose financial discipline on the management of other macroeconomic instruments. On the contrary, if the exchange rate is flexible in the sense that periodic adjustments are introduced to correct macroeconomic imbalances, fixing the exchange rate would not necessarily impose financial discipline and improve credibility if the government maintains the option to devalue periodically. So the authorities face a trade-off between credibility and flexibility. If all the sources of exchange rate misalignment come from domestic inconsistencies, the solution to that trade-off would be obvious: introduce a strong commitment to the nominal exchange rate and try to maintain a stable real exchange rate by means of a coherent set of credit, fiscal and income policies. The answer is not so obvious in the presence of external shocks. An optimal solution would be to adopt rigid exchange rate rules, according to which the exchange rate could be moved only in response to well-specified exogenous shocks. But exchange rate rules contingent on the specific state of the economy are difficult to implement.

The cases of Indonesia and Kenya, analyzed in Chapters 6 and 7, are good examples of the problems that terms of trade shocks provoke for exchange rate management. As Iwan Azis documents, the real exchange rate was appreciated in Indonesia after the oil boom of 1974, especially for non-oil exports. However, during the second oil boom in 1979, the real exchange rate improved. This was due, in part, to a devaluation of the currency; but the fundamentals of the real exchange rate also benefited from a contractionary fiscal policy. When the price of oil dropped in 1983, inducing a deterioration of the current account, the domestic currency was devalued again in response. A similar situation occurred in 1986 when the oil prices plunged again.

In the case of Kenya, Njuguna Ndung'u estimates a model of real exchange rate determination to show how this variable suffered from

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misalignments after the coffee booms of 1976 and 1986. Unlike the response of Indonesia to the oil boom of 1979, the proceeds of these booms were not sterilized and the resulting expansion in aggregate demand, especially from the public sector, led to balance of payments deterioration in 1978 and 1987, after the transitory effects of the favorable terms of trade shocks were reversed.

As these experiences showed, a flexible exchange rate arrangement can improve the effects of an adverse external shock on the level of activity and competitiveness. But to maintain competitiveness, good management of the fundamentals of the real exchange rate is superior to flexibility in the use of the nominal exchange rate.

Dealing with Capital Movements

From the two sections above, one can reasonably conclude that a strong commitment to nominal exchange rates and a sound policy mix would be, in the long run and given the possibility of multiple shocks, a good recommendation for economic policy. But a case for exchange rate flexibility can be made in the presence of large capital inflows. In the following chapter, Montiel develops a model from which it can be demonstrated that an expansion in the aggregate demand induced by the reduction of the external interest rate under a fixed rate system can be transformed into a contractionary shock under flexible rates.

If some intervention in the exchange rate market is acceptable, there will be a critical level of intervention, between zero and the maintenance of the fixed rate, where the domestic aggregate demand can be isolated from the external shock.

In any case, that result requires an exchange rate appreciation, and this recommendation has been widely resisted among the recipients of large capital inflows. As a result, the usual response to massive capital inflows has been intervention in the exchange rate market, trying to maintain the parity. The concomitant monetary expansion induced a sterilization response in many cases. Montiel discusses this issue in detail and shows that sterilized interventions may insulate the domestic interest rate from foreign interest rate shocks, but at the cost of larger capital inflows than under unsterilized intervention and a deterioration of the public sector accounts. Thus, sterilized intervention is a risky policy, and a fiscal adjustment may accompany that effort to mitigate its costs.

A good description of the costs a sterilized intervention policy can cause is founded in Azis's paper on Indonesia. The Bank Indonesia purchased more than US\$14 billion in 1992–93 to defend the currency. To sterilize the potential money growth, an open market operation involving some US\$11 billion was conducted. According to Azis's calculations, this operation imposed a loss of about US\$400 million on Bank Indonesia's net worth. Recently, Indonesia has moved to a currency band system, allowing the exchange rate to appreciate in the presence of strong capital inflows.

Conclusion

From a reading of all of the papers, we think that a brief list of suggestions can be extracted for policy makers, based on what we know and how we interpret the facts:

- *Be tough*: Making strong commitments seems to be the best alternative for policy makers. If an exchange rate anchor is selected, the economic agents will form expectations with better information and will have an index that can be readily seen to monitor the government commitment.
- *Be patient*: Wait for the long-run effects. It is difficult to manage the nominal exchange rate to achieve targets on the real exchange rate. So the economic policy must act over the fundamentals.
- *Be lucid*: The exchange rate is important, but only for price stability goals. However, if the economy includes fiscal deficits, lack of creditworthiness and regulated markets for goods or factors, do not blame the exchange rate policy for the economic problems.
- *Be cautious*: Look at the economists' findings carefully, but follow your common sense. Simple rules are better understood and enhance credibility. So a stable path for the exchange rate and government expenses can solve many of the problems caused by terms of trade shocks and capital movements, as government revenues related to consumption or income offer a counterbalance to the effects on aggregate demand. Flexible markets reduce the costs of any adjustments. If government expenditures are procyclical and markets are regulated, do not blame the exchange rate policy for your economic problems.

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CHAPTER 2

Macroeconomic Policies and Exchange Rate Management: A Survey

Peter J. Montiel

The environment in which exchange rate policy is formulated has changed markedly for many developing countries over the last decade. The adoption of the Brady Plan, the commitment both to more responsible macroeconomic policies and to more market-friendly development strategies, as well as the extensive overhauls undergone by financial systems both at home and abroad, have all contributed to increasing the creditworthiness of many developing countries and have once again made many such countries desirable destinations for financial capital from the industrial world. Such increased integration with world financial markets has well-known benefits; but it has not come without some unpleasant side effects, chief among which are the added complications posed for macroeconomic management, and in particular for exchange rate policy.

This paper is intended as a selective survey of some issues in exchange rate and macroeconomic management that have either been reevaluated or have newly come to the fore, in light of the recent experience of developing countries. Several such issues have achieved particular prominence during recent years. Most obvious of these, perhaps, is the role of the exchange rate as a nominal anchor. This is not a new issue, but it is one which is affected by the increased mobility of capital. It has traditionally had two dimensions. The first concerns the role of the exchange rate regime in fostering macroeconomic

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stability: that is, in exerting discipline on fiscal policy. While some consensus—or at least a conventional view—had emerged on this issue in the late 1980s, more recently a reevaluation seems to be under way, in light of both analysis and experience. The second dimension concerns the role of the exchange rate as a nominal anchor in inflation stabilization programs. The question here is what lessons are conveyed by the Mexican peso crisis of 1994, which involved the spectacular collapse of an exchange rate–based stabilization program.

The second issue of some importance is the management of the exchange rate in response to the arrival of large capital inflows. This is a problem that has been confronted by a large number of developing countries around the world. The central concern is that such inflows could result in an excessive expansion of aggregate demand, causing an acceleration of domestic inflation that would undermine hard-won gains in domestic price stability achieved by several countries prior to the arrival of the inflows, as well as an appreciation of the real exchange rate and a deterioration of the current account deficit. The issue is what role exchange rate and monetary policies can play in mitigating these negative effects of what is otherwise viewed by most observers as a desirable development.

In many countries, financial liberalization has had both an external and internal dimension. The external dimension entailed capital account liberalization, while the internal dimension involved reform of the domestic financial system, again in the direction of permitting greater scope for market forces. Another relatively new issue for exchange rate management concerns the domestic component of financial reform. Experience predating the recent wave of financial reform has indicated that liberalizing domestic financial systems is a tricky business, and liberalizing under the wrong circumstances can prove macroeconomically destabilizing. It turns out that the performance of the newly liberalized financial system has important implications for exchange rate policy, and exchange rate policy in turn may have much to do with the success or failure of domestic financial reform.

Finally, recent developments in international financial markets have raised much more fundamental questions about exchange rate management concerning the very viability of the managed exchange rate systems that most developing countries have preferred to adopt over the years. The question has been posed whether the adoption of common currencies or of completely market-determined exchange rates are the only feasible alternatives when capital becomes sufficiently mobile.

This rethinking has been motivated both by recent economic events—specifically the European Monetary System (EMS) and Mexican crises—as well as by new analytical insights.

This survey will take up each of these issues in turn. Its structure is as follows. The next section presents a brief overview of interactions between exchange rate policy on the one hand, and successively fiscal and monetary policies on the other, under conditions of high capital mobility. The purpose is to establish the analytical context for the sections that follow. The first policy issue is taken up in the third section, “The Exchange Rate as Nominal Anchor,” which describes the reconsideration of the conventional wisdom on the use of the exchange rate as a nominal anchor. The fourth section, “Exchange Rate Management and Capital Inflows,” turns to a new issue: the role of exchange rate and monetary management in response to capital inflows. This is followed by the analysis of the interaction between exchange rate management and domestic financial reform. The last substantive section, “Capital Mobility and Exchange Rate Regimes,” looks at the more fundamental issue of the viability of managed rates under high capital mobility. The chapter’s conclusions are briefly summarized in the last section.

Exchange Rate Policy and Aggregate Demand Policies: An Overview

This section reviews the analytical links between exchange rate management and fiscal policy, as well as between the exchange rate and monetary policy. The results derived here provide the analytical context for the sections that follow.

Exchange Rate Management and Fiscal Policy

Exchange rate management has implications for fiscal policy that operates through the public sector’s budget constraint. In brief, discrete changes in nominal exchange rates affect the public sector’s net worth, through differences in the currency composition of its assets and liabilities. This means, in particular, that the real effects of an exchange rate change will depend in part on how the change in the net worth of the public sector affects its future actions, as well as on the extent to which the private sector internalizes the effects of those actions on its

own intertemporal budget constraint. Continuous exchange rate changes, on the other hand, determine the long-run domestic rate of inflation, since the real exchange rate must be constant in long-run equilibrium. This has implications for the size of the sustainable fiscal deficit, operating through seigniorage revenue. I take these up in turn.

Discrete changes in the exchange rate. To describe the fiscal implications of discrete exchange rate changes in the most transparent form, consider the idealized monetary-approach case of a small economy producing a single traded good, which is a perfect substitute for the world's output under conditions of perfect domestic wage-price flexibility, as well as perfect capital mobility. A devaluation in such an economy raises the domestic price level in the same proportion as the change in the exchange rate, acting as a capital levy on the private sector by reducing the value of its real money balances and transferring real wealth to the central bank (which experiences a loss in the real value of its monetary liabilities). With the domestic real demand for money unchanged, the reduction in the real value of the money stock creates a portfolio disequilibrium, which is eliminated when the private sector sells enough foreign interest-bearing assets to the central bank so as to restore its initial real balances. Thus the increase in the central bank's net worth takes the form of an increase in its stock of interest-bearing foreign assets, which is the exact counterpart of the reduction in real private wealth.

But how does the public sector react to this increase in its net worth? If previously planned levels of spending and taxation are unchanged, and the public sector was previously spending its permanent income, the effect of the increased interest receipts will be to cause its net worth to grow without bound. This would not be optimal from the perspective of the home country, because it would mean, in effect, that the public sector as creditor would be investing in assets that fail to yield the market rate of return. An optimizing government would instead raise spending and/or cut taxes in response to the devaluation-generated bounty. The economy's real post-devaluation equilibrium would depend on which option was followed by the public sector and the extent to which the private sector internalized the effects of these actions on its own budget constraint.

Suppose, for example, that the government opts to cut lump-sum taxes dollar-for-dollar with the increase in its interest receipts, and that the private sector fully internalizes the consequences for its own

intertemporal budget constraint. Then the devaluation has no real effects. By contrast, the standard monetary-approach result, in which the devaluation results in a reduction in private wealth and a succession of current account surpluses, would require either that foreign exchange reserves are held in the form of noninterest-bearing assets (so there is no reduction in future tax liabilities to offset the capital levy) or that the private sector does not internalize the effects of the tax cut. In the latter case, the private sector would reduce its spending after the devaluation, despite unchanged permanent income.¹

Continuous exchange rate adjustments. While the link between the level of the exchange rate and the balance sheet of the public sector is vital in understanding the macroeconomic effects of devaluation, the rate of change of the exchange rate also has strong links to the public sector budget.² In particular, the sustainability of a crawling peg (including the special case of a fixed exchange rate) places strong constraints on the steady-state value of the primary surplus of the public sector. To see this, write the consolidated budget of the central bank and the government as:

$$\dot{B} + (\dot{B}^* - N\dot{F}A^*)E + \dot{M} = D + iB + i^*(\dot{B}^* - N\dot{F}A^*)E \quad (2.1)$$

where B is the stock of public sector domestic currency-denominated debt, B^* is the stock of foreign currency-denominated debt, NFA^* is the foreign currency value of central bank reserves, M is the stock of high-powered money, D is the public sector's primary deficit, i and i^* respectively are the domestic and foreign interest rates, and E is the nominal exchange rate. A dot over a variable indicates a time derivative. To write the consolidated public sector budget constraint as a ratio to GDP, divide by PY :

$$\frac{\dot{B}}{PY} + \frac{(\dot{B}^* - N\dot{F}A^*)E}{PY} + \frac{\dot{M}}{PY} = \frac{D}{PY} + \frac{iB}{PY} + \frac{i^*(\dot{B}^* - N\dot{F}A^*)E}{PY} \quad (2.2)$$

where P is the domestic price level and Y is real GDP. Now let $b = B/PY$, $f = (B^* - NFA^*)E/PY$, $m = M/PY$, $d = D/PY$, and notice that:

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$$\begin{aligned} \dot{b} &= \frac{\dot{B}}{PY} - (n + \pi)b \\ \dot{m} &= \frac{\dot{M}}{PY} - (n + \pi)m \\ \dot{f} &= \frac{(\dot{B}^* - N\dot{F}A^*)E}{PY} - (n + \pi - \hat{E})f \end{aligned} \quad (2.3)$$

This permits us to write:

$$\dot{b} + \dot{f} + \dot{m} + (n + \pi)m = d + (r - n)b + (r + \hat{e} - n)f \quad (2.4)$$

where: n^* = rate of growth of real GDP,
 π = rate of domestic inflation,
 r = $i - \pi$ is the domestic real interest rate,
 r^* = $i^* - \pi^*$ is the foreign real interest rate, and
 e = EP^*/P is the real exchange rate.

It is useful to rewrite this as:

$$\dot{b} + \dot{f} = [d + (r - n)b + (r + \hat{e} - n)f] - [\dot{m} + (n + \pi)m] \quad (2.5)$$

This equation states that the debt-to-GDP ratio will increase to the extent that the public sector's inflation-and-growth-adjusted deficit exceeds the amount of financing obtainable by printing money.

The equation above holds at every instant of time. Consider now, however, the sustainable (steady-state) values of the variables in (2.5). In a steady state, the real exchange rate must be constant, as must the ratio of base money to GDP, so $\dot{e} = \dot{m} = 0$. The equation then has familiar implications about *debt dynamics*. Suppose $(r - n) > 0$. Then if $[d - (n + \pi)m] = 0$, debt would grow without bound, at the rate $r^* - n$. This would engage the public sector in a *Ponzi game* in which interest is paid through new borrowing. Creditors would not willingly finance this strategy, because as a group they would never be repaid. For creditors to willingly finance the public sector, the present value of prospective repayments would have to be at least as large as the debt currently outstanding:

$$PV[-d + (\pi + n)m; r^* - n] \geq (b + f) \quad (2.6)$$

While an infinite number of prospective surplus-inflation paths could satisfy this criterion, the simplest is one that stabilizes the debt-GDP ratio immediately. To stabilize the debt-to-GDP ratio, the required condition is:

$$-d + (\pi + n)m = (r^* - n)(b + f) \quad (2.7)$$

That is, the sustainable value of the primary *surplus* plus seigniorage revenue (the left hand side of equation [2.7]) is determined by the initial stock of debt, given the world safe interest rate and the sustainable value of domestic economic growth. Since the sum of the primary surplus and seigniorage is determined in this way, an inverse relationship is implied between the two. The lower the primary surplus, the higher the inflation rate. But with the real exchange rate constant, the domestic rate of inflation determined in (2.7) will in turn determine the sustainable rate of exchange rate depreciation: $\hat{E} = \pi - \pi^*$. The upshot is that sustaining a given rate of nominal exchange rate depreciation requires a determinate value of the public sector's primary surplus.

Equation (2.7) has another important implication for the links between fiscal and exchange rate policies. Contrary to conclusions occasionally drawn from early models of balance of payments crises, as long as this equation holds, sustainability of a managed exchange rate regime does not impose any constraints on the rate of growth of domestic credit. Expansion of credit to the government by the central bank does not increase the money supply in this model, since the additional money leaks out through the capital account of the balance of payments. The result is indeed to deplete the central bank's stock of net international reserves. But what matters for exchange rate sustainability is whether sufficient *gross* reserves can be mobilized to defend the exchange rate parity—that is, whether the government can borrow the foreign exchange required to defend an announced parity. It will presumably be able to do so as long as it is perceived to be solvent. Thus a government which is perceived to manage its affairs well will not find its monetary policy constrained by the requirements of maintaining an announced exchange rate parity. In principle, it can sustain a monetary expansion which depletes its stock of net foreign assets without undergoing a balance of payments crisis as long as its fiscal accounts are perceived to be in order, since it will then be able to borrow an unlimited amount to defend the parity. In terms of equation (2.7), credit-driven monetary expansion implies an increase in

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b offset by a reduction in f . The point is that, while increases in b will indeed cause one-for-one reductions in f , no crisis is implied when f reaches a value of zero. It can become arbitrarily negative as long as the equation holds.

Exchange Rate Management and Monetary Policy

The links between exchange rate management and monetary policy required for what follows are somewhat simpler than those above. They are best expressed in the form of the “impossible trinity”—that is, a country cannot simultaneously have perfect capital mobility, monetary autonomy and an officially determined nominal exchange rate. Under perfect capital mobility, the monetary authorities must choose between retaining monetary autonomy and fixing the exchange rate. The logic is that, if the exchange rate is fixed, any exogenous change in domestic credit would create an incipient money market disequilibrium, which would put pressure on the domestic interest rate to deviate from its uncovered-parity level. But any such deviation would trigger massive capital flows which could not be sterilized. To defend the parity, therefore, the central bank would have to intervene in the foreign exchange market, and its doing so in unsterilized fashion would cause the money supply to adjust in a direction opposite to that implied by the original change in credit. Indeed, the magnitude of the change in the money supply caused by intervention in the foreign exchange market would have to be exactly equal to but opposite in sign from the original change in domestic credit, thereby offsetting the initial credit expansion and restoring the original money supply. Thus, with perfect capital mobility and a fixed exchange rate, the money supply is demand-determined. On the other hand, if the central bank eschews intervention in the foreign exchange market after a change in the stock of domestic credit, the domestic interest rate must adjust to clear the money market. Incipient capital flows triggered by the resulting divergence between foreign and domestic interest rates will simply cause the exchange rate to adjust until the expected returns on domestic and foreign interest-bearing assets are equalized when expressed in a single currency. Monetary autonomy is preserved, but at the cost of loss of control over the level of the exchange rate.

The Exchange Rate as Nominal Anchor

With these preliminaries, we turn to the first of the substantive issues to be examined in this survey, the role of the exchange rate as a nominal anchor. As indicated in the first section, this issue arises both in the context of the sustainable nominal exchange rate regime, and in the narrower context of the appropriate nominal anchor to use during disinflation. The first part of this section takes up the regime issue, while the next looks at disinflation.

Fixed Exchange Rates and Fiscal Discipline

During the 1980s, the assimilation of the time inconsistency literature made macroeconomists aware of the potential value of a precommitment technology—that is, of institutional mechanisms that would commit the government to follow through on announced policies, particularly with regard to future values of nominal variables such as the money supply or the exchange rate. In the Barro-Gordon (1983) framework, government policy announcements would not be credible in the absence of such a technology, because if the private sector acted on the assumption that the government would do what it said it would, the government would later find it socially optimal to renege on its promise, conditional on the private sector's actions. Knowing this, the private sector would design its own actions in such a way that the government would indeed not find it optimal to follow through with its promise in the future, making the “cheating” outcome a rational expectations equilibrium. The value of the precommitment technology arises from the fact that the value of the social objective function is smaller under the cheating equilibrium than it would have been if the government could somehow have committed itself irrevocably to act as it had promised.

An important issue raised by this analysis is whether the form of the government's policy announcement matters. In particular, if the “impossible trinity” mentioned earlier forces the government to choose between the money supply and exchange rate as nominal policy variables (that is, as nominal anchors), is the government's credibility affected by whether it chooses a preannounced path for one or the other? The beginning of the section, “Exchange Rate Policy and Aggregate Demand Policies,” established that the path of the nominal exchange

rate is tightly linked to that of the public sector's primary surplus through the implications of the former for the steady-state domestic inflation rate and thus for seigniorage revenue. Thus, given equation (2.7), a unique path of the money supply is implied for any announced exchange rate path and vice versa. Choosing one implies the other, so the government could choose either.³ However, this equation implies only that the paths of the primary surplus and the nominal exchange rate/money supply must be mutually consistent in order to comply with the requirements of public sector solvency. It does *not* imply, in particular, that announcing a specific path for the nominal exchange rate or the money supply will force the government to adapt its fiscal policy so as to achieve this consistency. If the anticipated paths of the nominal exchange rate/money supply and the primary surplus are mutually inconsistent, something will have to give; but it may not be fiscal policy.

Why should the form of the policy announcement matter? The main reason is that the costs to the government of acting in a manner that is inconsistent with its policy announcement may be different in the two cases. The conventional view has been that fixed exchange rates enhance the credibility of policy announcements, essentially because playing by the rules of the game required to sustain the system amounts to appointing a conservative central banker—that is, the central bank of the country to which the domestic currency is pegged. Essentially this assumes that *breaking* the rules of the fixed exchange rate game would be perceived by the government as carrying a prohibitively large political penalty. While this may be so under some fixed exchange rate arrangements (such as a constitutionally mandated currency board or membership in an internationally negotiated currency union that conveys other benefits), it is not clear why it should be the case otherwise. Thus, convincing stories for the disciplining effects of fixing the nominal exchange rate would need to account for the incentives to play by the fixed exchange rate rules.

Giavazzi and Pagano (1988) took up this issue by building a formal model to analyze the potential benefits of tying one's hands on exchange rate policy through membership in the European Exchange Rate Mechanism (ERM). They supplemented the standard Barro-Gordon government objective function (which gives positive weight to inflation "surprises" and negative weight to the level of inflation) with a term that gave positive weight to external competitiveness (depending on the real exchange rate), and argued that fixing the exchange rate would increase the cost to the government of attempting to engineer inflation

“surprises,” because doing so would entail a larger loss of competitiveness under fixed than under flexible rates. As a result, social outcomes would be closer to the cooperative precommitment equilibrium under flexible rates. The incentive to play by the rules of the game arises in the Giavazzi-Pagano analysis simply from the fact that higher welfare is available inside than outside the ERM.

Strictly speaking, the Giavazzi-Pagano analysis is not applicable to a single country announcing a fixed exchange rate, because the cumulative loss of competitiveness arising from inflation—which represents the penalty that imposes discipline on the domestic authorities—emerges only if periodic exchange rate realignments within the EMS are not sufficient to restore the original pre-inflation real exchange rate for high-inflation countries. This may be plausible in a multilateral context in which individual countries are not free to choose their nominal exchange rates at the time of realignment, but is obviously much less likely when the fixed rate is a unilateral commitment and the domestic authorities are free to determine both the timing and magnitude of devaluation. Nevertheless, the Giavazzi-Pagano mechanism can readily be extended to this case by positing that discrete devaluations impose a political penalty on the authorities. As Cooper (1971) demonstrated some time ago, this assumption is not without empirical support in developing countries.

However, the view that fixed exchange rates can help to promote price stability is less widely held currently than it had been prior to the ERM and Mexican financial crises. Svensson (1994), in summarizing the lessons learned from the ERM crisis, lists the failure of fixed exchange rates to promote price stability in a prominent role. The reasons cited involve the tendency for the automatic disciplining mechanism associated with the fixed exchange rate to work too slowly, allowing the accumulation of real appreciation, the possibility that a fixed exchange rate may result in a procyclical monetary policy (through the effects of inflation on real interest rates, which may be aggravated if the nominal exchange rate is used in a countercyclical fashion), and the emergence of an inflation bias associated with variation in the equilibrium real exchange rate in the presence of asymmetric price level adjustment.

Tornell and Velasco (1995) found both the slow convergence experience of the EMS itself as well as that of the major common currency area in the developing world (the Communauté Financière Africaine [CFA] franc zone) inconsistent with the view that fixed exchange rates provide a shortcut to price stability by disciplining fiscal policy. In the

case of the CFA zone, they found greater fiscal adjustment during 1980–1984 in response to similar adverse external (terms of trade) shocks during the late 1970s for African countries outside the CFA franc zone than for those inside it. To explain these observations, they argued that the major differences between the two exchange rate regimes with respect to fiscal discipline is that under fixed exchange rates an unsustainable fiscal expansion results primarily in reserve depletion, rather than higher inflation in the present. This is followed by more inflation in the future as the unavoidable consequence of the government's intertemporal solvency constraint (equation [2.6]) when the fixed exchange rate is abandoned and the public sector finds itself with lower reserves and/or a larger stock of debt. By contrast, under flexible rates, debt-financed fiscal expansion in the present would result in a smoother path for inflation. If the government likes fiscal expansion but dislikes inflation, the arrangement that provides more discipline therefore depends on the government's discount rate.⁴

Thus, the jury appears to be out on this issue, perhaps to a greater extent than was true several years ago. The analytical treatments in Giavazzi-Pagano and Tornell-Velasco are both incomplete (the former incorporates neither intertemporal solvency constraints nor an explicit role for fiscal policy, and the latter neither allow gains from inflation "surprises" nor costs from currency overvaluation), and the empirical evidence is mixed.

Choice of Nominal Anchor in Stabilization Programs

As suggested by the analysis in the second section, the roots of high inflation are invariably fiscal. Equilibrium high inflation requires ongoing monetization, which typically arises in the context of financing fiscal deficits. A necessary condition for successful inflation stabilization, therefore, is a fiscal adjustment that weans the public sector from excessive reliance on the inflation tax. However, while adjusting the fiscal fundamentals may be the key step in shifting the economy from a high-inflation equilibrium to one with a much lower inflation rate, the existence of predetermined variables such as stocks or nominal wage contracts implies that adjustment between these two equilibria will typically not be instantaneous, even if the new policy is perfectly credible. With slow convergence of inflation, the transition path between the old and new equilibria will in general depend on the path followed

by policy-determined nominal variables—that is, the exchange rate or the money supply. As implied by the impossible trinity, under high capital mobility, the government can set the path for one of these variables but not the other in the course of stabilization.

Thus a choice must be made between exchange rate-based or money-based stabilization. Under exchange rate-based stabilization, the path of the nominal exchange rate is set to track the projected price level path, and the stock of central bank credit to the government is allowed to grow at a rate equal to the target rate of inflation plus the economy's long-run real growth rate. The money supply becomes endogenous through the unsterilized foreign exchange market intervention required to sustain the exchange rate path. Under money-based stabilization, the rate of growth of the stock of central bank credit to the government is set so as to cause the monetary base to grow at a rate equal to the target inflation rate plus the real growth rate, and there is no intervention in the foreign exchange market.⁵

On what criteria should a choice between money-based and exchange rate-based stabilization be made? The two obvious candidates are the eventual success of the stabilization effort and the sacrifice ratio—that is, the cumulative loss of real GDP per unit of inflation reduction. These two criteria are likely to be related, since a stabilization program is more likely to be successful if its sacrifice ratio is small. The choice of nominal anchor under a sacrifice-ratio criterion was studied by Fischer (1986) in a model with slow price level adjustment arising from the presence of two-period overlapping wage contracts. Under a credible exchange rate-based stabilization, the transition path to price stability is characterized by real exchange rate appreciation as well as by reduced real output. The real appreciation is caused by the wage inertia built into the model, which causes the rate of inflation to converge slowly to the world level, while the nominal exchange rate is fixed. Reduced real output results from the depressing effects on aggregate demand both of the appreciated real exchange rate as well as of an increase in the domestic real interest rate. The latter is implied by uncovered parity, given rational expectations and the temporary real exchange rate appreciation.

However, under money-based stabilization, the real appreciation during the transition path tends to be even larger for reasonable parameter values.⁶ The key difference is that while under exchange rate-based stabilization the nominal money stock can expand on impact through the balance of payments, in this case the nominal money stock is fixed on impact at the reduced level associated with high inflation. Thus, a

higher domestic nominal interest rate is required to clear the money market. Under uncovered parity, this requires a large initial nominal exchange rate appreciation. Wage inertia ensures that this nominal appreciation is also a real one. Larger real appreciation, in turn, implies larger real output costs under money-based stabilization.

The preference for exchange rate-based stabilization is strengthened in the presence of uncertainty, since in the context of stabilization the behavior of money demand is likely to be a key source of uncertainty. In this case, the standard Poole-type analysis (see Turnovsky, 1976) suggests that fixing the exchange rate is likely to prove more stabilizing to the economy than allowing it to float.

Exchange Rate-Based Stabilization: Lessons from Experience

The period of the mid-1980s to the mid-1990s witnessed both successful and unsuccessful exchange rate-based stabilization programs. The best known of the latter were the Argentine austral plan and the Brazilian cruzado plan of the mid-1980s, both of which featured a heterodox component in the form of wage-price controls and both of which foundered on an inability to adjust the fiscal accounts to consistency with the announced exchange rate target. Of the heterodox plans adopted in the mid-1980s, only the Israeli plan proved to have staying power. Key features of this plan involved both the implementation of fiscal adjustment as well as the relatively timely move to “flexibilization”—that is, adjustment of the exchange rate before real appreciation became excessive. The chronology and modalities of flexibilization in Israel are described in the last substantive section of this chapter.⁷

The Mexican and Argentine experiences provide interesting contrasts with that of Israel. Mexico’s exchange rate-based stabilization was launched in December 1987 and was quite successful in bringing down inflation in the context of a succession of tripartite agreements undertaken by the government with business and labor, setting the paths of the exchange rate and public sector prices as well as wages and prices in the private sector. As did Israel, Mexico undertook an ambitious fiscal adjustment. However, unlike Israel, Mexico made very limited moves toward flexibilization. As described in the last substantive section of this chapter, an exchange rate band was introduced in November 1991 with a very gradual rate of crawl for the top of the band. The substantial cumulative appreciation of the peso eventually made

the currency subject to a speculative attack that ended the band. Argentina was much more aggressive than either Israel or Mexico in using the exchange rate as a nominal anchor, adopting a constitutionally sanctioned currency board arrangement in 1991 that proved enormously successful in stopping inflation. However, Argentina achieved price stability at the cost of a real appreciation which exceeded even that of Mexico. In the wake of the Mexican crisis, Argentina came under severe speculative pressure, which it has withstood up to the present with substantial IMF assistance and at the cost of a very severe domestic recession.

The implication of these experiences is that, whatever the merits of exchange rate-based stabilization in bringing down inflation quickly with reduced output costs, this strategy becomes more difficult to implement in the context of high capital mobility. The choices facing countries that undertake this strategy in the context of high capital mobility would seem to consist of tightening fiscal policy even more than would be required to sustain the new target steady-state inflation rate (to limit the extent of real appreciation during the transition), to impose temporary restrictions on international capital movements, or to abandon the exchange rate anchor sufficiently early as to avoid excessive cumulative real appreciation—that is, to move quickly to the flexibilization stage of the stabilization—thereby perhaps adopting a less ambitious target for the inflation rate. A difficulty with the fiscal option is, of course, that fiscal overshooting may not only be politically untenable, but also that if implemented it may cause the country to incur the very output costs that the exchange rate-based disinflation strategy was intended to avoid. Restrictions on capital movements, on the other hand, may not only prove to be ineffective when the perceived extent of real exchange rate misalignment becomes sufficiently large, but may also undermine the credibility of the stabilization program from the beginning, since they may be interpreted by private agents as revealing a low level of commitment to the announced inflation target on the part of the authorities. This suggests that, unless flexibilization is undertaken early and in an orderly fashion, as in Israel, countries that employ this strategy will face an unpleasant choice as real appreciation mounts of abandoning the nominal anchor in a disorderly fashion, as in Mexico, or holding it at high cost to the domestic economy, as in Argentina. In both of the latter cases, the real costs to the economy need to be offset against the gains that were sought through the initial adoption of an exchange rate-based stabilization strategy.

Exchange Rate Management and Capital Inflows

In principle, increased integration with international financial markets allows scope for flows of capital both in and out of developing countries. However, because integration has partly been the result of an improvement in creditworthiness on the part of the developing countries, and because the post-Brady period was characterized by relatively expansionary monetary policy in the United States, the direct manifestation of increased developing-country financial integration in recent years has been a large-scale inflow of capital into a limited, but not insubstantial, number of developing countries.⁸ Exchange rate management has a central role to play in determining the consequences for domestic macroeconomic performance of capital inflows that are driven by external interest rate shocks.

This section takes up two important links between exchange rate management and domestic macroeconomic outcomes. The role of exchange rate management in determining the implications of an external interest rate shock for domestic aggregate demand is taken up in the first section, while the second looks at the consequences of sterilized foreign exchange intervention for domestic interest rates. An important conclusion is that neither allowing the nominal exchange rate to adjust nor sterilizing intervention in the foreign exchange market while holding the nominal rate is likely to prove effective in insulating the domestic economy from external financial shocks. An alternative approach is then to attempt more direct insulation by intervening directly to influence the scale of capital movements. The potential role of capital account restrictions is taken up in the third part of this section.

Exchange Rate Flexibility and Aggregate Demand

A reduction in industrial-country interest rates will tend to trigger a reallocation of portfolios toward claims on developing countries, generating capital flows into the latter. What are the macroeconomic implications of such flows for the recipient countries? Much of the literature devoted to the macroeconomics of capital inflows has been concerned with the potential for overheating—that is, an excessive expansion of aggregate demand—as a consequence of inflows. However, the effects of inflows on domestic aggregate demand depend on

the extent to which nominal exchange rate changes are allowed to absorb some of the impact of the foreign interest rate shock. Indeed, this section will show that allowing the nominal exchange rate to float would reverse the impact of the foreign interest rate shock—that is, what is an expansionary shock under a fixed exchange rate becomes a contractionary shock under flexible rates.

This can be demonstrated in the context of the Dornbusch (1976) overshooting model. Let the log of aggregate demand (D) be given by:

$$\ln D = u + \delta(e - p) + \gamma y - \sigma r \quad (2.8)$$

Thus, demand for domestic goods depends positively on the log of the real exchange rate ($e - p$) and of real income y , and negatively on the level of the domestic interest rate r . The rate of inflation depends on the excess of domestic demand over supply:

$$\dot{p} = \pi(\ln D - y) \quad (2.9)$$

Money market equilibrium is given by:

$$m - p = \phi y - \lambda r \quad (2.10)$$

where m denotes the log of the nominal money stock. Finally, suppose that capital mobility is perfect, so the uncovered-parity condition:

$$r = r^* + \dot{e} \quad (2.11)$$

holds continuously, where r^* is the foreign interest rate, and perfect foresight is assumed in the formation of exchange rate expectations.

By substituting the aggregate demand and money market equilibrium expressions into the inflation equation, and the money market equilibrium equation into the uncovered arbitrage equation, the model can be expressed in terms of the two dynamic equations:

$$\begin{aligned} \dot{e} &= \lambda^{-1} p - r^* + \left(\frac{\phi}{\lambda}\right)y - \lambda^{-1} m \\ \dot{p} &= \pi \left[u + \delta e - \left(\delta + \frac{\sigma}{\lambda}\right)p + \left(\gamma - 1 - \phi \frac{\sigma}{\lambda}\right)y - \left(\frac{\sigma}{\lambda}\right)m \right] \end{aligned} \quad (2.12)$$

With the domestic price level predetermined and the nominal exchange rate representing a jump variable, this system will exhibit saddlepath stability if its determinant is negative. It is easily verified that this is the case.

To analyze the effect of a foreign interest rate shock in this model, it is easiest to proceed graphically. Figure 2.1 plots the loci $\dot{e} = 0$ and $\dot{p} = 0$ in $e - p$ space. Since e does not enter the former, the locus $\dot{e} = 0$ is a vertical straight line located over the steady-state value of p . The $\dot{p} = 0$ locus, on the other hand, has a positive slope given by:

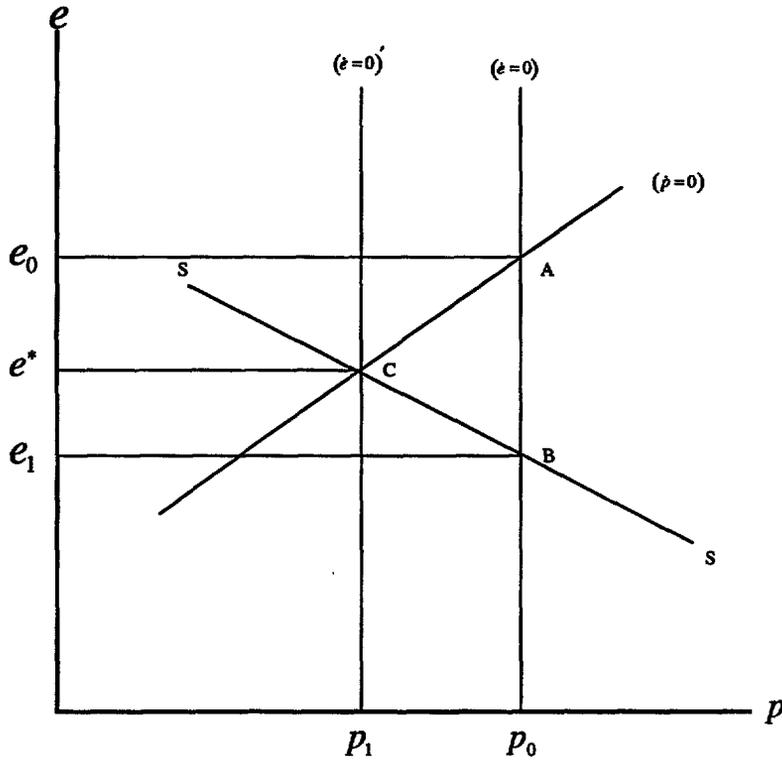
$$\left(\frac{de}{dp}\right)_{\dot{p}=0} = 1 + \frac{\sigma}{\delta\lambda}$$

It can easily be shown that the saddlepath to the initial long-run equilibrium at A has a negative slope. A reduction in r^* has no effect on the $\dot{p} = 0$ locus, but causes the $\dot{e} = 0$ locus to shift to the left by $(dp/dr^*) = l$. The new steady state is at C , where the price level has fallen and the nominal exchange rate has appreciated.⁹

On impact, however, the price level cannot change. Thus the short-run equilibrium will be at the point B on the saddlepath ss , where the appreciation of the nominal exchange rate overshoots its long-run value. Since the price level does not change and the nominal exchange rate appreciates, the real exchange rate appreciates on impact; and as can be verified from the aggregate demand equation, this exerts a contractionary effect on aggregate demand, as asserted earlier. It is this contractionary aggregate demand effect that generates the gradual deflation required to generate an increase in the real money supply in the long run, given an unchanged nominal money stock.

The flexible exchange rate regime analyzed above is admittedly an extreme case, however. Consider now an alternative which is more realistic in the specific context of the countries that have been receiving capital inflows—namely, one in which the authorities intervene in the foreign exchange market, but less than would be required to keep the exchange rate fixed. This case can also be analyzed readily with the apparatus just described. Intervention in the foreign exchange market will cause m to increase, in contrast to the flexible-rate case with constant m . An increase in m causes the $\dot{e} = 0$ locus to shift to the right relative to its new steady-state position above p_1 . The rightward shift in this locus is proportional to the change in m . At the same time, $\dot{p} = 0$ shifts to the right as well, but *less* than in proportion to the increase in

Figure 2.1 Foreign Interest Rate Shock



NOTES: e and p are respectively the nominal exchange rate and the domestic price level.

SOURCE: Author.

m. Thus the new steady-state value of the nominal exchange rate will be greater than e^* (but less than e_0), and the new steady-state price level will be greater than p_1 (but less than p_0). The saddlepath in this case would lie above SS , and the short-run equilibrium would thus lie above B . In this case, the initial appreciation is less than before. Moreover, since the money supply has expanded, the domestic interest rate must have fallen, and for both reasons the outcome is more expansionary than in the absence of intervention. The greater the level of intervention, the greater the expansion of the money supply, the lower domestic interest rates, and the more muted the extent of initial real appreciation. In the

limit, intervening sufficiently to fix the exchange rate would be expansionary, since the real exchange rate would not move on impact and all effects on aggregate demand would operate through the domestic interest rate, which falls *pari passu* with the foreign rate. Thus there will be some critical level of intervention, between zero and the amount needed to peg the rate, short of which the decrease in the foreign interest rates will be contractionary, and beyond which it will be expansionary.

The implication of this analysis is that nominal exchange rate movements can play a key role in ameliorating the potential macroeconomic overheating associated with capital inflows. Yet a stylized fact of the recent experience with exchange rate management in response to capital inflows is that few countries have availed themselves of this tool (see Montiel, 1996). With the notable exceptions of Chile and Singapore, nominal appreciation has been widely resisted among the recipients of large capital inflows.¹⁰ There are several potential reasons. The most obvious one is that, while nominal exchange rate appreciation may facilitate the attainment of an internal balance target in the face of capital inflows driven by external rate shocks, this would be achieved at the cost of sacrificing external balance—that is, the real appreciation would be associated with a deterioration of the current account and an increase in the country's net international indebtedness. To the extent that the economy's net international creditor position is a policy target of the authorities, they would be reluctant to countenance an increase in the current account deficit, and will in any event come under political pressure from exporters to avoid doing so.

A second and logically separate objection to exchange rate flexibility in this context is that, to the extent that external interest rate shocks are transitory, wasteful resource reallocations between traded and nontraded goods sectors may be induced by the increased real exchange rate variability that would accompany increased flexibility of the nominal rate. This argument can be overstated, since one lesson from the trade hysteresis literature is that, in the presence of fixed costs of resource reallocation, movements in the nominal exchange rate would have to be large and expected to be persistent in order to induce the intersectoral reallocation of capital.¹¹

Finally, to the extent that increased real exchange rate variability magnifies the difficulty of the signal extraction problem faced by private agents, policy makers may have been motivated by the fear that allowing increased flexibility to the nominal exchange rate in the context of an unstable external financial environment and high capital mobility would be associated with inefficient resource allocation more generally,

by reducing the information content of changes in the real exchange rate. The plausibility of this view is enhanced by evidence from the cross-country growth literature, which indeed suggests that increased real exchange rate variability is associated with lower growth.¹²

Sterilized Intervention and Domestic Interest Rates

Whatever the motivation of policy makers in resisting a greater role for market forces in the determination of the nominal exchange rate, the revealed preference of the vast majority of countries has been to intervene—sometimes massively—in the foreign exchange market, and to attempt to avoid a concomitant monetary expansion by sterilizing the monetary effects of that intervention. This policy has also raised several issues, however. At one extreme, some observers have questioned whether sterilized intervention can be effective in preventing a domestic monetary expansion and a decline in domestic interest rates *pari passu* with international rates. At the other extreme, critics of sterilized intervention have blamed this policy for *raising* domestic interest rates in the context of a favorable external interest rate shock.

To sort out these issues, consider the effects of a foreign interest rate shock on the domestic interest rate, capital inflows and the central bank's budget under alternative assumptions about the sterilization of foreign exchange intervention in a simple portfolio model.¹³ The economy in question is taken to be a small open one operating a fixed exchange rate. Domestic residents hold base money M , domestic bonds B , and foreign assets, denominated F .¹⁴ Their net worth A_p is pre-determined, and their asset demands are thus constrained to satisfy:

$$A_p = M^D + B^D + F^D \quad (2.14)$$

The three assets are assumed to be gross substitutes, and the (nominal) rates of return on money, domestic bonds and foreign assets are zero, i and i^* , respectively. Asset demand functions of domestic agents are given by:¹⁵

$$\begin{aligned} M^D &= m(0, i); \quad m_1 > 0, \quad m_2 < 0 \\ B_p^D &= b(0, i, i^*); \quad b_1 < 0, \quad b_2 > 0, \quad b_3 < 0 \\ F_p^D &= f(0, i, i^*); \quad f_1 < 0, \quad f_2 < 0, \quad f_3 > 0 \end{aligned} \quad (2.15)$$

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These asset demand equations must satisfy the adding-up constraints:

$$m_j + b_j + f_j = 0, \quad \text{for } j = 1, 2, 3.$$

In this specification domestic bonds and foreign assets are imperfect substitutes. In the extreme case of perfect substitutability, we have:

$$b_2 = -b_3 = \infty, \quad \text{and } f_2 = -f_3 = -\infty$$

In addition, since there are no other assets in the model, it is assumed that equal increases in all rates of return leave all asset demands unchanged:¹⁶

$$\sum m_j = \sum b_j = \sum f_j = 0$$

Foreigners also hold domestic bonds, and their demand for such bonds is denominated B_F :

$$B_F = b^*(0, i, i^*); \quad b_1^* < 0, \quad b_2^* > 0, \quad b_3^* < 0 \quad (2.16)$$

with $\sum b_j^* = 0$. Foreigners' net worth is A^* (equal to the cumulative current account deficits of the home country), defined by:

$$A^* = B_F - F \quad (2.17)$$

where F is the supply of foreign assets to the domestic economy. Finally, the model contains two domestic public sector agents: (1) the central bank, with zero net worth and balance sheet given by:

$$0 = R + B_C - M^S \quad (2.18)$$

where R is the stock of foreign exchange reserves and B_C is the stock of domestic bonds held by the central bank, and (2) the government, with net worth A_G equal to the predetermined stock of domestic bonds outstanding:

$$A_G = -B \quad (2.19)$$

By summing the net worth of all the agents in this model, it can be shown in the usual way that the value of the excess demands for the three assets must be identically zero. Thus, only two of the equilibrium

conditions for the markets for money, domestic bonds and foreign assets are independent. Moreover, since the economy in question is small in the market for foreign assets, the latter are available in perfectly elastic supply; and the value of the excess demand for foreign assets, given by:

$$f(0, i, i^*) + R - F \quad (2.20)$$

must be identically zero. This implies, in turn, that the markets for money and domestic bonds are not independent, so the model contains a single independent asset equilibrium condition.

Sterilized intervention involves offsetting the effects of intervention in the foreign exchange market on the monetary base through open market transactions in bonds, so as to keep the stock of base money unchanged. When examining this case, it will prove convenient to focus on the money market equilibrium condition:

$$M = m(0, i) \quad (2.21)$$

Alternatively, unsterilized intervention involves holding the central bank's stock of bonds constant. In this case we examine the effects of foreign interest rate shocks through the bond market condition:

$$B - B_C = b(0, i, i^*) + b^*(0, i, i^*) \quad (2.22)$$

The supply of domestic bonds available for domestic and foreign private agents to hold is $B - B_C$, and this must be equal to the total demand from both types of agents. For a given monetary policy stance, defined by B_C , this equation determines the domestic interest rate i . Given i , the money supply and stock of foreign assets held by domestic agents follow from the demand equations for both types of assets.

We can now explore the effects of a foreign interest rate shock on the domestic interest rate, the total value of capital inflows and the central bank's budget, under alternative scenarios in which the central bank does and does not sterilize the monetary implications of its foreign exchange market intervention.

Consider first the effects on the domestic interest rate. Under sterilized intervention, the domestic money supply is constant, and the money market equilibrium condition implies:

$$\left(\frac{di}{di^*} \right)_s = 0$$

Thus, sterilization has the effect of insulating the domestic interest rate from foreign interest rate shocks.¹⁷ In the case of unsterilized intervention, B_C is constant in the bond market equilibrium condition. Differentiating this equation produces:

$$\left(\frac{di}{di^*}\right)_{NS} = \frac{-(b_3 + b_3^*)}{(b_2 + b_2^*)}$$

Since $b_2 > -b_3$, and $b_2^* > -b_3^*$, this is a number between zero and one. Thus, with no sterilization, a drop in foreign interest rates reduces domestic interest rates as well, but by a smaller amount.

As domestic and foreign interest-bearing assets become closer substitutes, the adjustment in the domestic interest rate becomes larger, and $(di/di^*)_{NS}$ converges to unity under perfect capital mobility.

Consider now the effects on capital inflows. Capital inflows are comprised of the increase in foreigners' holdings of claims on domestic residents plus any reductions in domestic claims on foreigners, or $d(b^* - f)$. Such flows occur in this model in response to changes in foreign and domestic rates of return. With sterilized intervention, domestic interest rates are unchanged, and capital flows respond only to the foreign interest rate shock:¹⁸

$$d(b^* - f) \Big|_{di^*} = b_3^* - f_3 < 0$$

It is worth emphasizing that the stock reallocation of portfolios implied by this equation is a one-time event. Once the desired composition of portfolios has been adjusted to the change in the foreign interest rate, no additional capital movements take place. Thus, sterilization does not imply a continuation of capital inflows. It does, however, imply that capital inflows would be larger than under unsterilized intervention. To see this, note that under unsterilized intervention, the domestic interest rate moves in the same direction as the foreign rate. This weakens the incentives for portfolio reallocations. The size of the capital movement in this case is:

$$\begin{aligned} d(b^* - f) \Big|_{NS} &= (b_3^* - f_3) + (b_2^* - f_2) \frac{di}{di^*} \Big|_{NS} \\ &= m_2 \frac{di}{di^*} \Big|_{NS} < 0 \end{aligned}$$

The second term on the right-hand side of the first line of this equation captures the effects on capital flows of changes in the domestic interest rate induced by the foreign interest rate shock. This term is positive, but smaller in absolute value than the first term. Thus, domestic interest rate adjustments mitigate, but do not eliminate, the effects of the foreign interest rate shock on capital movements. The direction of capital flows is the same, but the magnitude is smaller. Capital flows are reduced when foreign exchange intervention is unsterilized.

Finally, the central bank's income (the quasi-fiscal surplus) is given by:

$$qs = i^*R + iB_C \quad (2.23)$$

To establish the effects on qs of the foreign interest rate shock under the alternative sterilization assumptions, note first that under the fixed exchange rate regime under consideration, changes in R will reflect capital flows—that is, $dR = d(b^* - f)$. In general, therefore, a foreign interest rate shock will affect each component of qs : Interest receipts on reserves will change, both because foreign interest rates do and because the stock of reserves does, and interest receipts on domestic bonds will reflect both the change in domestic interest rates and in the central bank's holdings of domestic bonds.

Under sterilized intervention we have:

$$\left. \frac{dqs}{di^*} \right|_S = R + i^*(b_3^* - f_3) - i(b_3^* - f_3) = R + (i^* - i)(b_3^* - f_3) > 0$$

This derivative is positive. With sterilization, changes in foreign exchange reserves are exactly offset by changes in central bank bond holdings, so $dR = -dB_C$. In the case of a *reduction* in the foreign interest rate, interest receipts rise with the associated increase in reserves, but fall due to the exactly offsetting reduction in central bank holdings of domestic bonds. On net, the quasi-fiscal surplus falls both because the rate of return on reserves decreases directly and because high-yielding bonds are exchanged for low-yielding reserves (as long as $i > i^*$). Without sterilization:

$$\begin{aligned} \left. \frac{dqs}{di^*} \right|_{NS} &= R + i^*(b_3^* - f_3) + i^*(b_2^* - f_2) \left(\frac{di}{di^*} \right) + \left(\frac{di}{di^*} \right) B_C \\ &= R + (i^* m_2 + B_C) \left(\frac{di}{di^*} \right) \end{aligned}$$

This derivative is indeterminate in sign. In the absence of sterilization, a reduction in foreign interest rates translates into lower domestic interest rates and a capital inflow that is smaller than when intervention is sterilized, as shown above. There are three separate effects on the quasi-fiscal surplus: (a) interest receipts on the previously existing level of reserves fall, just as in the sterilization case; (b) because domestic interest rates fall, interest receipts on the (unchanged) stock of domestic bonds held by the central bank also decline; (c) offsetting this loss of interest income, the increase in reserves generates an increase in interest receipts from abroad. The net effect on the central bank's quasi-fiscal surplus is ambiguous.

Using the two preceding equations, we can investigate the effects on the quasi-fiscal surplus of the decision whether to sterilize or not. The two equations can be manipulated to yield:

$$\frac{dq_{NS} - dq_S}{di^*} = i^* m_2 \left(\frac{di}{di^*} \right)_{NS} - (i^* - i)(b_3^* - f_3) + B_C \left(\frac{di}{di^*} \right)_{NS}$$

If this derivative is negative, a reduction in the foreign interest rate would cause a more severe deterioration in the central bank's budget when intervention is sterilized than when it is not. Three effects are at work. The first term on the right-hand side captures the fact that when intervention is unsterilized, the reduction in domestic interest rates causes the demand for money to increase, and this creates a capital inflow which causes the foreign exchange reserves of the central bank to rise. This increases the central bank's interest income by the amount $i^* m_2 (di/di^*)_{NS}$. This term is negative. If $i^* < i$, the second term is also negative. It reflects the fact that, when the rate of return on reserve assets is less than that on domestic bonds, reserve accumulation has an *adverse* effect on central bank income under sterilization, due to the exchange of a high-yield asset for one offering a lower yield. The final term, on the other hand, is positive. It represents the loss of central bank income on its stock of domestic government bonds when intervention is unsterilized and domestic interest rates fall. Because of the presence of this last term, the effect on the quasi-fiscal surplus of the sterilization decision appears to be ambiguous.

However, the fiscal implications of this policy decision depend not just on its effects on the quasi-fiscal deficit, but also on its effects on the conventional government deficit—that is, they depend on the effects of sterilization on the surplus of the *consolidated public sector*. Because

the sterilization decision affects the level of domestic interest rates, the government's interest payment obligations, given by iB , and thus the conventional government deficit will be affected as well. To incorporate this factor and derive the effect of the sterilization decision on the surplus of the consolidated public sector, subtract the term $B(di/di^*)_{NS}$ from the previous equation. The result is:

$$\frac{dcps_{NS} - dcps_S}{di^*} = i^* m_2 \left(\frac{di}{di^*} \right)_{NS} - (i^* - i)(b_3^* - f_3) - (B - B_C) \left(\frac{di}{di^*} \right)_{NS}$$

where cps denotes the surplus of the consolidated public sector. This derivative is unambiguously negative. Thus, the decision to sterilize foreign exchange intervention associated with capital inflows triggered by a reduction in external interest rates will result in a reduction in the surplus of the consolidated public sector.

So far, this is a fairly traditional analysis. It highlights the importance of asset substitutability—the extent of capital mobility—in determining the macroeconomic effects of sterilized intervention. Recent evidence suggests that, while external interest rates have played an important role both in driving capital inflows and determining the behavior of domestic interest rates, imperfect substitutability between domestic and foreign interest-bearing assets continues to be the rule even among the major capital-importing countries. Frankel and Okungwu (1996) estimated the within-quarter offset coefficient (that is, $d(b - f)/dB_C$) at about 0.28 in a panel of seven capital-importing countries during 1987–1994. The implication is that, despite extensive liberalization of capital flows, capital-importing countries have continued to retain some degree of short-run monetary autonomy. This means that insulating the domestic economy from the potential expansionary effects on aggregate demand of reductions in external interest rates through sterilized intervention in foreign exchange markets continues to be feasible, albeit—as implied by the traditional portfolio model—at the cost of magnifying the scale of capital inflows and increasing the deficit of the consolidated public sector. In this traditional context, as demonstrated above, sterilized intervention in response to external interest rate shocks would cause the domestic interest rate to move by some fraction of the change in the external interest rate.

However, there are less traditional channels through which sterilized intervention could cause changes in the domestic interest rate to *exceed* those in foreign interest rates. Suppose that the differential between the interest rate on domestic securities i and on foreign exchange reserves i^* reflects exogenous devaluation expectations. Then, from a position in which equation (2.7) in the second section holds as an equality, as shown earlier the financial position of the consolidated public sector would deteriorate. In the absence of an announced compensating fiscal adjustment, creditors would demand a premium to compensate them for the expected shortfall in the government's debt-servicing performance—thus, sterilized intervention would increase domestic interest rates by increasing country risk.

An alternative mechanism emphasized by Calvo (1991) works through *endogenous* devaluation expectations. The effect of sterilized intervention is to increase the stock of domestic currency-denominated government debt in the hands of the public. The government's decision whether to devalue the exchange rate depends on the benefits and costs it perceives in doing so. An important component of the latter is the improvement in the government's net worth described in the second section, derived from the capital levy that devaluation imposes on the owners of domestic currency-denominated government liabilities. An increase in the stock of such liabilities, such as would ensue from sterilized intervention, would therefore tilt the government's benefit-cost calculation in favor of devaluation, increasing the probability of such an outcome. Knowing this, creditors would charge a premium to compensate them for expected devaluation.

Is there any empirical evidence in support of these mechanisms? Indeed, survey data employed by Frankel and Okungwu (1996) suggested that the failure of interest rates in capital-importing countries to converge to world levels could largely be attributed to increases in expectations of devaluation. The upshot is that sterilized intervention, while remaining feasible, is fraught with risks. In particular, its fiscal implications may make this a very expensive way to sustain domestic macroeconomic stability in the face of external interest rate shocks, particularly for governments with tenuous credibility. To mitigate its costs, sterilized intervention may need to be accompanied by fiscal adjustment. Not only would this reinforce the effects of sterilization in restraining domestic demand, but it would at the same time reduce the required scale of intervention by reducing pressure on domestic interest rates, reduce pressures on fiscal solvency, and demonstrate a willingness

to adjust the fiscal accounts in ways other than through the imposition of a capital levy on prospective creditors.

Capital Account Convertibility

As mentioned earlier, increased financial integration and the associated capital inflows have in part reflected movement toward capital account convertibility in many developing countries. However, one implication of such financial openness is increased exposure to external financial shocks, specifically in the form of fluctuations in world interest rates or in creditor perceptions of country creditworthiness. The previous two sections have indicated that it is impossible to insulate the domestic economy from the effects of such shocks through exchange rate management. In the case of downward movements in external interest rates, allowing the exchange rate to adjust endogenously creates a real appreciation and an associated deterioration in the trade balance, while holding the nominal exchange rate at a predetermined parity and sterilizing inflows has fiscal implications which may in turn feed back to domestic interest rates. Faced with such a choice, a tempting alternative is to intervene directly in the capital account, attempting to influence the magnitude of net capital movements by encouraging gross capital outflows or discouraging gross inflows. The former can be consistent with an intensification of the process of capital account liberalization, but the latter would represent an attempt to hold back or even reverse the pace of financial integration.

While liberalization of capital outflows may in principle avoid conflicts between efficiency and stabilization objectives in managing capital inflows, neither theory nor evidence gives much hope for the effectiveness of this tool as a stabilization instrument. The basic problem is that removing restrictions may simply attract additional inflows. One analytical reason why this may be so is that easing restrictions on outflows essentially removes an irreversibility—as long as outflow restrictions are in place the act of bringing capital into the country may not be easy to reverse. Outflow liberalization thus increases the relative return on claims on the domestic economy by eliminating the value of the option to wait by keeping capital offshore (Laban and Larrain, 1993). In addition, Bartolini and Drazen (1995) have pointed out that the presence or absence of controls on outflows may provide a signal to investors. Since such controls are often maintained to facilitate

taxation of the financial sector through financial repression taxes, their removal may be interpreted as an indication of a change in fiscal regime to one in which future capital taxation is less likely. Again, this would increase the expected return on claims in the domestic economy, magnifying capital inflows. Moreover, neither the evidence cited by Bartolini and Drazen for industrial countries nor the experience to date of capital-importing developing countries suggests that such measures have been successful in reducing net capital inflows.

The argument against reliance on controls on capital inflows is, of course, that effective controls force the domestic economy to forgo some of the benefits of financial integration, in the form of increased availability of financing for high-yield investment opportunities, intertemporal smoothing of consumption and improved risk-return portfolio trade-offs. If controls can be made effective, such costs would have to be weighed against potential benefits in the form of increased macroeconomic stability achieved through the insulation of the domestic economy from external financial shocks. A key issue in this regard is whether such insulation can in fact be achieved—whether capital controls can be effective.

The purpose of capital controls is to limit the extent of arbitrage between some subset of foreign and domestic financial instruments. In principle, restricting arbitrage can be designed to achieve one of two objectives: either to restrict the overall scale of capital movements, and thus to preserve (or to increase) domestic monetary autonomy, or to alter the composition of capital flows, favoring some types of flows over others. While economists tend to be skeptical of the potential effectiveness of controls in achieving these goals, the systematic evidence is somewhat more nuanced. A useful survey was recently provided by Dooley (1995). Looking primarily at experience in industrial countries, he concludes the evidence is consistent with the predictions of theory—that is, controls cannot be used to sustain permanently an otherwise unsustainable policy regime. While successful capital controls may delay the advent of a balance of payments crisis when the fiscal fundamentals described in the second section are not in place to sustain an announced exchange rate path, the crisis cannot be avoided permanently through the imposition of controls. On the other hand, controls have at times been effective in preserving short-run monetary autonomy—that is, in driving temporary wedges between domestic and foreign interest rates.¹⁹ However, they probably cannot make such wedges permanent. How large the sustainable wedge is and how long

it can be sustained under what circumstances is an issue on which there seems to be little evidence.

Evidence from developing countries suggests that the effectiveness of controls may depend on a number of characteristics of the controlling economy as well as on the size of the arbitrage margins motivating incipient capital movements. Many developing countries seem to have possessed a meaningful degree of monetary autonomy in the past, coincident with the presence of capital controls. It is not clear, of course, if this can be attributed to the presence of controls, or to more natural barriers to capital movements.²⁰ One indication that controls have played a role is the existence of large premia on foreign exchange in free—relative to official—foreign exchange markets in many developing countries, particularly for long periods of time in many African countries outside the CFA franc zone and in several Latin American countries during times of economic crisis (Ghei and Kamin, 1996). Similarly, the emergence of large capital inflows following capital account liberalization in the context of the Southern Cone stabilization programs of the late 1970s also suggests that previously existing controls mattered. Both types of experiences indicate that “generic” capital controls can work, in the sense of preserving some short-run monetary autonomy and limiting the size of net capital flows. At the same time, however, analysis of capital flight episodes has found that controls on outflows have generally proved unable to prevent the emergence of large amounts of capital flight in the presence of severely overvalued domestic currencies and domestic financial repression (see, for example, Mathieson and Rojas-Suarez, 1993).

A consistent interpretation of both the industrial- and developing-country evidence is that controls of various types have proved capable in the past of preserving some degree of short-run monetary autonomy. But they have not been able to prevent large capital outflows and inflows when prospective arbitrage profits have been very large. Not surprisingly, the implication is that the effectiveness of controls is likely to depend on the benefits and costs of evasion for individual economic agents.

The observation that controls are capable of being effective in preserving some monetary autonomy does not, of course, imply that any arbitrarily specified set of restrictions on capital movements will prove to be effective, and even less that restricting capital movements is necessarily desirable. Unfortunately, little research has been undertaken on the conditions under which restrictions on capital movements can or cannot be effective. Consequently, each recent application of

capital controls in capital-importing countries has to be evaluated on its own merits, with little other to guide one's priors than general presumptions based on the evidence described earlier.

The Exchange Rate and Financial Reform

As indicated in the introduction, financial liberalization in developing countries has had an internal, as well as an external, dimension. As the costs of domestic financial repression—in the form of misallocation of capital—have become more evident, many countries have moved to liberalize their financial systems by freeing up controlled interest rates, removing restrictions on bank portfolios, lowering reserve requirements, and easing the conditions for entry and exit in the banking sector. In doing so, however, some countries—notably Mexico—have been forced to relearn some of the lessons that emerged from an earlier wave of financial liberalization in the Southern Cone of Latin America during the late 1970s. That is, because of the key macroeconomic role of the financial system, the public tends to assume that bank deposits are implicitly guaranteed, even when the government has no explicit guarantee program in place. The presence of implicit guarantees, or improperly priced explicit guarantees (that is, when bank premiums for deposit insurance do not adequately reflect the risk structure of bank assets), creates well-known moral hazard problems for bank managers, causing them to attract deposits by offering high interest rates and using the proceeds to fund high-risk investments. The incentives for bank managers to behave in this manner are magnified when banks have low net worth relative to the value of their deposits. The solution to the problem is for the authorities to implement the type of oversight procedures that are standard in insurance contracts. However, problems arise when domestic supervisory and regulatory capacities are weak. Financial liberalization in such contexts has in several important cases resulted in lending booms followed by financial crises. The Chilean case in 1982 was a precursor to the recent experiences of both Venezuela and Mexico in this regard.

What is the role of exchange rate management in this context? I would emphasize four issues, reflecting influences both from the management of the exchange rate to the macroeconomic consequences of financial sector difficulties and from financial sector phenomena to the management of the exchange rate. First, when the currency peg loses

its credibility, bank balance sheets are likely to be adversely affected. Thus, an emerging balance of payments crisis may be accompanied by a financial crisis. Second, credible exchange rate guarantees associated with a preannounced exchange rate path have the potential of aggravating the macroeconomic boom-bust cycle triggered by a bank lending boom. Third, implicit or explicit deposit guarantees in the context of an improperly supervised financial sector tend to convert banking crises into balance of payments crises. Finally, financial sector fragility may impose important constraints on exchange rate management.

Overvalued Exchange Rates and Financial Fragility

As indicated before, moral hazard problems for bank managers are aggravated when bank balance sheets are weak. Overvaluation of the domestic currency is likely to impair bank profits through two channels. First, when the emergence of overvaluation causes the currency peg to lose its credibility, the domestic financial sector will be forced to pay high interest rates on its domestic currency liabilities that it may not be able to recoup through its assets (since the latter tend to be longer term and may carry fixed interest rates). Second, the combination of high domestic interest rates and an overvalued currency is likely to result in domestic recession, impairing the quality of bank assets.²¹ The weakening of bank balance sheets gives rise to the potential for bank runs and/or a solvency crisis for the financial system. Thus, an emerging balance of payments crisis may be associated with a financial crisis as well.

Credibly Fixed Exchange Rates and Boom-Bust Cycles

Gavin and Hausman (1995) argue that the rapid expansion of the domestic financial system associated with liberalization in the context of improper supervision is likely to result in a boom-bust cycle, rather than merely a transitory boom. The mechanism linking the boom to the subsequent bust is that rapid expansion makes it harder for banks to monitor the quality of their portfolios, in part because when times are good and overall bank credit is expanding, borrowers find it easy to meet liquidity-based solvency tests. Consequently, the average quality of banks' portfolios deteriorates during the boom, which magnifies the

adverse effects on bank solvency of negative shocks to the economy, triggering the bust.

Exchange rate management may aggravate this boom-bust cycle, since when the capital account is open, the scope for bank expansion is increased by the ability of banks to attract external funds, particularly if deposit guarantees are perceived to apply to foreign depositors. In this context, deposit insurance safeguards the domestic currency value of the claims acquired by foreign depositors on domestic banks. With a credibly fixed exchange rate, the foreign currency value of these claims is safeguarded as well. Thus, a credibly fixed exchange rate provides a form of insurance for external creditors, lowering the cost of attracting external funds for banks.

Banking Crises and Balance of Payments Crises

The two previous points concerned ways in which exchange management can affect the performance of the financial system. Financial system difficulties can also complicate exchange rate management, however. When the supervisory framework is inadequate, and the financial position of domestic banks is weak, rapid expansion of the domestic financial system may be associated with asset-price bubbles through lending for real estate and stock speculation, and may also trigger consumption booms with the potential to destabilize aggregate demand. The likely short-run macroeconomic consequences include rising inflation, large current account deficits and real exchange rate appreciation. Indeed, a stylized fact of the recent capital inflow experience is that consumption booms and real appreciation are strongly correlated in cross-country data.²² While alternative mechanisms can be imagined that would generate such a correlation, lending booms are a prime suspect.

A second link from financial sector performance to exchange rate management operates through the effect of deposit guarantees on the vulnerability of an exchange rate peg to a liquidity crisis. The credibility of a central bank's promise to supply foreign exchange at an announced par value depends on the stock of foreign exchange available to the central bank relative to the potential claims on that stock. The central bank's foreign currency assets are its stock of foreign exchange reserves, and the potential claims on those assets are its short-term domestic currency liabilities—that is, the monetary base. However, when the

government guarantees the deposits of the banking system, the entire stock of broad money can potentially be converted into base if the private sector's attempt to change the currency composition of its portfolio drains funds from the banking system, as it is quite likely to do. As has been emphasized by Calvo (1995), this means that the measure of liquidity relevant to assessing the central bank's ability to withstand a run on the currency may be not the ratio of the base to reserves, but rather the much less comfortable ratio of broad money to reserves. The upshot is that the deposit guarantee makes the value of the currency much more vulnerable to liquidity crises.

Financial Sector Constraints on Macroeconomic Policies

The final link to be considered between financial sector performance and short-run macroeconomic stability is an indirect one, operating through the constraints placed on policy makers by the perception of financial sector vulnerability. Given the macroeconomic consequences of lending booms, bank runs and bank solvency crises, and given the likelihood that macroeconomic developments could trigger such events, policies that would have the potential of doing so would be less likely to be adopted.

The constraints imposed by financial sector fragility on macroeconomic policies are most familiar in the context of short-run demand-management policies. Tight monetary policy or expected devaluation would be particularly problematic in this context, because the increase in real interest rates would simultaneously imperil the quality of bank assets and raise their borrowing costs. Tight fiscal policy, on the other hand, has more ambiguous effects on the banking system because while the economic slowdown that accompanies it may impair the performance of bank assets, the effects on bank borrowing costs will be favorable.

However, these constraints may affect policy regimes in a broader sense as well. For example, vulnerability of the financial sector has been used as an argument against the adoption of a currency board as an exchange rate system, because the domestic central bank cannot serve as a lender of last resort under such a system. When the domestic currency becomes overvalued and domestic interest rates rise, confidence in the financial system cannot be ensured by the availability of a lender of last resort. The Argentine financial crisis of 1995, described in Caprio, Dooley, Leipziger and Walsh (1996), illustrates the problem.

Lessons for Exchange Rate Management

These links between financial system performance and exchange rate management suggest several observations. A key point is that periods of financial fragility are particularly bad times to allow the emergence of overvaluation. This means, for example, that pursuing an exchange rate-based stabilization when the balance sheets of banks are in precarious condition is a very risky strategy, as Chile discovered in 1982 and Mexico in 1994. A second observation is that a poorly supervised financial system, an open capital account and a credibly fixed exchange rate may be a recipe for disaster. Such conditions may nurture lending booms with built-in tendencies to result in both financial and balance of payments crises. Allowing some flexibility to the exchange rate under such conditions may curtail the expansion of bank balance sheets by restricting the scale of capital inflows as the nominal exchange rate appreciates and external creditors face greater uncertainty regarding foreign currency rates of return.

Capital Mobility and Exchange Rate Regimes

This section takes up a fundamental issue raised for exchange rate management by the experience of recent years with high capital mobility—that is, the possibility that the exchange regime choices currently available to countries that have become highly integrated with world capital markets may be extremely restricted. This issue is considered in the first part of the section, and country experience with exchange rate bands around crawling parities—a novel regime for developing countries that does not represent either of the stark options outlined in the first part—is described in the second part.

Are Managed Rates Obsolete?

In the wake of the ERM crisis of 1992 and Mexican peso crisis of 1994, several knowledgeable observers have drawn the conclusion that fixed (that is, managed) exchange rates have become obsolete, and that viable exchange rate systems in a world of very high capital mobility have converged to the polar opposites of completely flexible rates or the adoption of a common currency (see, for example, Svensson, 1994, as

well as Obstfeld and Rogoff, 1995). The reasoning is that when a government's promise to defend an announced parity lacks credibility, global financial integration renders the attempt to sustain the parity extremely expensive.

On the other hand, it has become increasingly difficult for governments to achieve that credibility. The reason for the latter is that balance of payments crises can be self-fulfilling. Even a well-intentioned government which has managed the fundamentals responsibly—that is, in a manner consistent with the announced path of the nominal exchange rate, as described in the second section—may nonetheless, if its currency is attacked, find it preferable to devalue rather than incur the costs (in the form of very high domestic interest rates) of defending it. In that case, the expectation of devaluation would prove to be rational *ex post*, and the situation would be characterized by multiple equilibria: If no devaluation is expected, the behavior of the fundamentals would not cause one to emerge. But if credibility is somehow lost and the market comes to expect a parity adjustment, one will indeed come about. This obviously makes managed rates fragile indeed.

How can this argument be evaluated? It has two logically distinct parts. The first is that under high capital mobility a government which has lost credibility will find it very expensive to defend an announced parity. The ERM and Mexican experiences of recent years certainly make it difficult to take issue with this assertion. The second part, however, is that, since balance of payments crises can be self-fulfilling, getting the fundamentals right is not sufficient; and credibility may be very difficult, if not impossible to achieve, since any government that is attacked is likely to find it optimal in the end to cave in. This view suggests that currency crises may well be unpredictable under managed rates, since they need not necessarily be closely tied to the behavior of fundamentals. One way to address the empirical importance of this observation, then, is to investigate how closely actual currency crises have been linked to adverse fundamentals. Several recent papers have done exactly this. Frankel and Rose (1996) found that currency crashes were linked to low foreign exchange reserves, high rates of growth of domestic credit, high international interest rates and appreciated real exchange rates, among other variables. However, this study relied on samples of currency crashes extending further into the past than does the most recent capital-inflow episode, so it may in part be reflecting characteristics of currency crashes that may no longer be relevant under conditions of increased financial integration.

More relevant for present purposes, therefore, is a recent study by Sachs, Tornell and Velasco (1996) on the incidence of post-Mexican crisis “tequila effects.” The focus of that study was precisely on the extent to which the severity of the tequila effect across countries in 1995 was explainable in terms of fundamentals. The authors were able to explain 70 percent of the cross-country variation of their crisis index on the basis of three variables. They summarize their findings as follows:

Our main conclusion is that some degree of previous misbehavior was a necessary condition for crisis: overvalued real exchange rates and recent lending booms, coupled with low reserves relative to the Central Bank’s short-term commitments, rendered economies vulnerable to the mood swings of fickle international investors. In the absence of these fundamental weaknesses speculation and contagion were at worst short-lived, and the Tequila effect left no hangover behind (p. 31).

Thus, the evidence indicates that fundamentals have mattered in the past and continue to do so. Of course, the set of “fundamentals” that matter in all of these studies is substantially broader than envisaged in the original speculative-attack models, encompassing variables (such as the health of the banking system or the level of domestic capacity utilization) that may influence the cost to governments of resisting a speculative attack. The point remains, however, that such attacks are not entirely self-fulfilling, since in the absence of “misbehavior” the costs to the economy of resisting the attack may well be bearable, a situation which is likely to deter attack in the first place. The implication is that, while managed rates may indeed have become more fragile as financial integration has increased, they remain feasible.

Exchange Rate Bands

When the exchange rate is officially determined, it plays dual macroeconomic roles, which are often in conflict with each other. On the one hand, the nominal exchange rate serves as a nominal anchor for the domestic price level; while on the other hand, the real exchange rate is a key macroeconomic relative price which allocates resources between traded and nontraded activities. The conflict arises when domestic nontraded goods prices are sticky. In those circumstances, achieving

adjustments in the real exchange rate while retaining the nominal anchor role of the nominal rate may require undesirable changes in the domestic price level (to achieve a real appreciation) or a temporary slowdown in economic activity (to achieve a real depreciation). Countries that manage nominal exchange rates have thus understandably sought to devise institutional mechanisms that would preserve some degree of exchange rate flexibility while retaining the role of the exchange rate as nominal anchor.

Announced exchange rate bands are one such mechanism that has been adopted by several developing countries in recent years. Bands attempt to strike a compromise between credibility and flexibility essentially by restricting the scope of fluctuations in nominal exchange rates to an announced range around a central parity. The purpose is to allow the central parity to continue to function as nominal anchor, even when the actual exchange rate deviates from it, by announcing before the fact that such deviations will be temporary. These temporary fluctuations allow some scope for temporary real exchange rate adjustments to occur through changes in nominal exchange rates. Bands have been adopted in recent years by Chile (1985), Israel (1989), Mexico (1989) and Colombia (1991). The experience of these countries has been reviewed by Helpman, Leiderman and Bufman (1994), Leiderman, Bufman and Kiguel (1994), and Williamson (1996).

Adopting a band requires the authorities to address several issues: First, if the domestic rate of inflation exceeds the rate of inflation of trading partners and is expected to continue to do so, then an unalterably fixed central parity is not an option; and a choice must be made between frequent discrete realignments of the central parity and the adoption of a crawling central parity. Second, the mode of accommodation of the central parity to permanent shocks affecting the fundamental determinants of the equilibrium real exchange rate has to be determined. Aside from the issue of identifying the relevant set of fundamentals and the expected duration of changes in these variables, this also requires quantifying the required extent of adjustment in the real exchange rate and designing the adjustment path for the central parity. Third, the permitted range of fluctuation of the exchange rate around the central parity (that is, the width of the band) has to be determined. Finally, the rules governing foreign exchange intervention inside the bands need to be established.

The bands that have been adopted in developing countries to date have in common that they have typically been implemented on the heels

of exchange rate-based stabilization programs. They thus represent the flexibilization stage of such programs. While the bands share this common background, the choices that individual countries have made in their implementation have been rather different. All of these countries have adopted a crawling central parity, a key feature of the developing-country bands that distinguishes them from the European ERM. Yet the rules governing the behavior of the central parity have differed across countries. In Chile, the central parity has been adjusted continuously, with preannounced daily depreciations for the coming month determined as a function of the difference between the domestic rate of inflation during the previous month and a forecast of foreign inflation over the coming month. Periodic revaluations reflecting perceived changes in fundamentals (associated with capital inflows) have been superimposed on this gradual nominal depreciation. In Israel, by contrast, the central parity was initially fixed relative to a basket in January 1989, and then in December 1991 was allowed to crawl at an annual rate determined by the difference between the government's *targeted* rate of inflation over the coming year and a forecast of foreign inflation. Mexico announced no central parity, but fixed the lower end of the band at the value that prevailed at the time the band was adopted and announced a predetermined rate of daily depreciation for the upper end, implying a gradually increasing band width. The daily change in the value of the U.S. dollar was initially set at 20 cents per day when the band was adopted in November 1991, and was later increased to 40 cents per day in October 1992, allowing for an accelerated annual rate of depreciation of the peso. By the time of the Mexican crisis in December 1994, the width of the band had increased to 14 percent. Colombia formally introduced a crawling band in January 1994, although a de facto band existed under the *certificados de cambio* system that was adopted in the attempt to reduce the cost of sterilizing capital inflows.²³ The initial rate of crawl was set at 11 percent, and was increased slightly to 11.5 percent at the end of 1994.

Band widths tended to increase over time in each of these cases. As already indicated, the Mexican band widened automatically over time, since its upper bound was depreciated continuously while its lower bound was fixed. Band widths also increased over time in Chile and Israel, but in discrete fashion and relative to an announced parity. The width of the Chilean band started out at 2 percent around the central parity in 1985 and had increased to 10 percent by 1992. Similarly, the width of the Israeli band was increased from 3 percent to 5 percent around the central parity in March 1990. Colombia began with a total

band width of 12.5 percent under the *certificados de cambio* system, but widened the band to ± 7 percent when a crawling peg was formally adopted at the beginning of 1994. Concerning intervention inside the band, only Chile appears to have made use of the full band width, with the exchange rate regularly approaching the upper and lower bounds. Israel and Mexico were much more active in restricting fluctuations to a narrower zone inside the band.

The relevant lessons from experience with exchange rate bands in developing countries can be summarized as follows (see Helpman, Leiderman and Bufman, 1994; and Leiderman et al., 1994). First, moving to a band from a fixed rate, or to a band with a crawling central parity from one with a fixed parity, has not been associated with an acceleration of inflation. Thus, the additional exchange rate flexibility has not obviously been associated with a loss of price stability. This finding is consistent with the suggestion in the third section of this chapter that alternative nominal anchors may not be as heavily disadvantaged as had previously been thought. Second, bands have been associated with a variety of real exchange rate experiences. In Chile, the real exchange rate depreciated during the early years of the band, and it appreciated after capital inflows began to arrive in 1989. In Mexico and Colombia, by contrast, the exchange rate band was associated with fairly continuous real appreciation. Israel's real exchange rate has been approximately stable since the adoption of the band. These differences reflect different weights attached to competitiveness and price stability by the authorities in the management of the central parity, and suggest that the crawling nature of the central parity—which allows this variety of real exchange rate outcomes and which distinguishes these bands from their European counterparts—is an important clue to their survival up to the present in three of the four countries that have adopted them.

Finally, the adoption of a band does not represent a magic solution to credibility problems. The Chilean, Mexican and Israeli bands were all characterized by periods in which expectations of realignment—associated with the behavior of fundamentals such as the performance of the real economy, the stock of foreign exchange reserves and the path of the real exchange rate—emerged, even before the Mexican crisis. The long cycles in interest rate differentials associated in timing with the renewal of Pacto agreements in Mexico, as well as the behavior of interest rate differentials in Israel around the time of realignments, suggest that, as those who question the viability of managed rates would expect, markets identify episodes of misalignment and act quickly on

expectations of devaluation. In Colombia, revaluations occurred twice (at the beginning and end of 1994) when market pressures were strong and the exchange rate was at the lower end of the band.

This implies that active management of the central parity to keep it in line with the equilibrium real exchange rate is indispensable to preserve the bands when capital mobility is high. The Mexican crisis in December 1994 certainly implies that circumstances may not always lead the authorities to react quickly enough and to adjust parities by appropriate magnitudes, but the survival of the remaining bands in the wake of the Mexican crisis suggests that credibility in exchange rate management has not been beyond the reach of the other countries that have adopted this exchange rate arrangement.

Conclusion

The previous sections have covered a rather broad territory. By way of conclusion, it may be useful to summarize the most important lessons for exchange rate policy:

1. Several observers have articulated the view that increased financial integration has rendered the exchange regime for which developing countries have demonstrated a revealed preference in the past—officially managed, but adjustable exchange rates—highly problematic in the current international environment, and that countries may be pushed to exchange rate arrangements at the polar extremes of currency boards or completely flexible rates. An important component of the argument is that currency crises may be self-fulfilling, so that getting the fundamentals right may not provide much guarantee that an exchange rate may be sustainable. However, while managed-rate arrangements may indeed have become more fragile as capital mobility has increased, achieving credibility by good behavior appears to remain feasible. Reports of the demise of managed rates appear to be exaggerated.
2. The last half of the 1980s saw the emergence of a conventional wisdom in support of the view that using the exchange rate as a nominal anchor would have a desirable effect on fiscal discipline, compared to the alternative of allowing the exchange rate to float. The analytical support for this view was never particularly strong, relying on the implicit assumption that the cost to the government of deviating from the announced parity would be arbitrarily large. More recently, the pendulum has swung in the other direction, based

both on country experience and on new analytical results. The state of play on this issue is that there is no strong presumption based on analysis or evidence that choosing the exchange rate or the money stock as nominal anchor has a particularly strong advantage in inducing fiscal discipline.

3. Aside from the effects of the exchange rate regime on fiscal discipline during “normal” times, a separate issue is whether the exchange rate should be used as a nominal anchor during stabilization from high inflation. Again, despite the notable failures of some heterodox stabilization programs during the mid-1980s, many observers, relying partly on analytical results and partly on the experience of Israel and the early success of the Mexican program, became convinced that exchange rate–based stabilization could offer quicker inflation convergence with lower output costs than the money-based alternative. The eventual demise of the Mexican program suggests that an open capital account is incompatible with pursuing exchange rate stabilization to the point where the credibility of the parity becomes questionable. Either “incredible” stabilization is accompanied by controls on capital movements or the flexibilization stage of exchange rate management is adopted more quickly—that is, possibly before the desired degree of inflation convergence has been attained—or countries may have to be prepared to accept substantial real output costs to preserve the parity in the later stages of exchange rate–based stabilization.
4. Recent capital inflows have complicated the task of exchange rate management in capital-importing countries. While concerns with macroeconomic overheating would have suggested that nominal exchange rate appreciation would have carried a large share of the burden of adjustment in response to inflows driven by decreases in foreign interest rates, few recipient countries have availed themselves of this option, out of concern for implications on competitiveness. However, the alternatives of pursuing sterilized intervention or restricting capital movements have their own shortcomings. The limitations of policies in the monetary–exchange rate sphere suggest that coping with such shocks in the future may require the design of mechanisms that facilitate a more active role for fiscal policy.
5. Financial liberalization in developing countries from the mid-1980s to the mid-1990s has at times resulted in financial fragility. Periods of financial fragility are particularly bad times to allow the emergence of overvaluation, because the associated high domestic interest rates and recession may contribute to increasing the likelihood of a financial crisis. Moreover, at such times speculators will be aware

of the government's reluctance to use a high interest rate defense of the currency, making it more likely that the currency will be attacked. The lesson is that financial fragility is a good reason for the real exchange rate to track close to its long-run equilibrium value.

6. Widening the permissible bands for exchange rate fluctuation would seem to be appropriate when the domestic financial system has been liberalized, but remains poorly supervised, and when the capital account is open. Under these circumstances, a credibly fixed exchange rate may help to fuel a lending boom, which may carry with it a built-in tendency to result in both financial and balance of payments crises.
7. Finally, a common theme running through these observations is a familiar one in discussions of exchange rate management—that is, there are circumstances under which stabilizing the nominal parity may be desirable, times when the parity should move, and times when it should at least be perceived as capable of moving. Several developing countries have attempted to combine these features in a single exchange rate arrangement during recent years through the adoption of exchange rate bands with crawling central parities. Although one such band was operated by Mexico in the period prior to the December 1994 crisis, by and large these bands appear to have been successful up to the present, at least when judged by the (admittedly not very demanding) criteria of their ability to survive and their being associated with successful macroeconomic performance in the countries that have adopted them. In a world of high capital mobility, a necessary condition for these bands to succeed is that their central parities closely track a sustainable equilibrium real exchange rate. To date, with the exception of the Mexican band, they appear to have done so.

Appendix 2.1

Exchange Rate–Determined Stabilization Policy or Fiscal Policy–Based Exchange Rate Policy?

Colin I. Bradford, Jr., former chief economist, USAID

This chapter by Professor Montiel is a superb survey by a master of the subject. It is literate, clear, supple and interesting. He has done us

all a favor by summarizing so elegantly the complexities and nuances of recent exchange rate literature and experience.

The early literature on exchange rates focused on macroeconomic policy consistency to sustain the price incentive effects of devaluation. The focus was on successful devaluation that would not lead to an additional spurt of inflation as import prices rose. Fiscal and monetary contraction were compelled by the need to sustain the expenditure switching effects induced by the relative price changes that would lead to an improved trade balance. The crisis was triggered by the imbalance of payments, and devaluation-cum-stabilization was the solution. So we had exchange rate-driven monetary and fiscal policy in this period where external balance was the trigger for the policy change.

With hyperinflation experiences in the 1980s following the oil and interest rate shocks, there was something of a new twist on this policy dynamic. Inflation, not the balance of payments, was the forcing event. Some countries experimented with exchange rate anchors which were designed, not so much to correct the balance of payments, but to lock in monetary and especially fiscal policy discipline which seemed impossible to achieve in any other way. This seemed to be a useful stabilization policy approach, especially in hyperinflation circumstances or in countries with long histories of inflation, such as Argentina.

But using the exchange rate as disciplining device for fiscal policy is a risky exchange rate policy. There is a risk of future discontinuous exchange rate adjustments because the strait jacket inevitably becomes too tight the longer it is worn. When the market no longer thinks the exchange rate can be maintained, policy makers find themselves with an exchange rate crisis in the older mold, even if substantial gains have been made in dampening inflation in the interim.

In the end in many countries with inflationary problems, the central problem is fiscal policy and not the exchange rate. What seems to be required in these common circumstances is a fiscal policy-based exchange rate policy rather than an exchange rate-based stabilization policy. This critical point seems to receive less than the attention it deserves in Professor Montiel's otherwise excellent study. A longer run, more sustainable stabilization and exchange rate policy that would hold together over time and would be more likely to endure would reign in fiscal policy as the top priority (locking into a budget deficit reduction path, for example) and let the exchange rate crawl behind the progress on the fiscal front rather than fixing the exchange rate and locking fiscal policy to it.

A more rigid fiscal policy and a more flexible exchange rate policy seem more sustainable over the long run. This is due to the fact that, however successful a stabilization program may be, some inflation is always going to creep in eventually and undermine the fixed exchange rate which has become the pillar of the entire strategy. A more realistic approach is to realize that some inflation is inevitable, anticipate it with a more flexible exchange rate policy and force a more rigid fiscal policy stance as the cornerstone of both the stabilization and the exchange rate policy.

This approach should be accompanied by two complementary approaches. First, policy makers across the government should take a broad approach to getting the real effective exchange rate to favor exports somewhat more than imports by making investments in infrastructure, education, labor market reforms and the like which affect the entire production chain within the country concerned, not just the prices of tradables and nontradables.

Second, there should be a simultaneous effort to improve governance in the stabilizing country by engaging in reforms which affect the functioning of the economic system but are not directly economic policies themselves. This effort includes measures to fight corruption; increase transparency and accountability; establish strong legal and judicial systems, assuring a financial system that is sufficiently supervised and regulated (in a deregulated context) to assure financial stability; and the like.

These two complementary approaches will reinforce the effort to establish a realistic exchange rate policy and stabilization program in countries which are committed to long-run sustainability as the only route to attracting private capital internally and externally as a powerful basis for dynamic development.

Professor Montiel's study gives us a splendid overview of exchange rate policy issues to which I would simply add the above caveat.

Notes

1. If the government instead increased its own spending rather than cutting taxes in the Ricardian case with interest-bearing reserves, the short-run and long-run real equilibria would again be unchanged, except for the public-private composition of domestic absorption.

Obstfeld (1982) showed that, even under imperfect capital mobility, in the Ricardian case an open market operation would affect only the economy's short-run equilibrium,

- and not its long-run equilibrium, when reserves pay no interest; and the short-run equilibrium would also be unaffected when reserves pay interest. The extension to the case of an exchange rate devaluation is straightforward.
2. The analysis of the links between fiscal policy and the exchange rate regime was developed in a series of papers during the early 1980s by Willem Buiter. For a clear exposition, see Buiter (1986).
 3. Notice that if either the time path of the nominal exchange rate or that of the monetary base are predetermined, fiscal discipline is imposed on the public sector by capital markets, which would refuse to finance prospective time paths for the primary deficit that would threaten to render the public sector insolvent.
 4. Other recent work in this area, by Edwards and Losada (1994), looks at the role of fixed exchange rates in Guatemala and Honduras, two small Central American countries that maintained fixed exchange rates against the U.S. dollar for several decades. They found that while fixed rates appeared to have been effective in enforcing the gold standard rules of the game for a long period, they could not withstand a significant increase in terms of trade volatility during the 1980s.
 5. For details, see Howard (1987).
 6. The key parameter is the elasticity of money demand.
 7. An excellent review of experience with exchange rate-based stabilization is provided in Végh (1992).
 8. The relative roles of improved domestic creditworthiness and changes in external financial conditions in driving the recent surge of capital inflows have been the subject of substantial debate in recent years. While it is hard to deny that improved creditworthiness has been important, particularly in determining the geographic destination of flows, the weight of the evidence suggests that external financial conditions have been dominant in determining their magnitude. For a flavor of the debate, see Calvo, Leiderman and Reinhart (1993); Chuhan, Claessens and Mamingi (1993); Fernandez-Arias (1994); and Dooley, Fernandez-Arias and Kletzer (1994).
 9. Since the slope of the $\dot{p} = 0$ locus is greater than unity, at B the real exchange rate will have appreciated as well.
 10. Chile has revalued the central parity of its exchange rate band in several instances during the mid-1990s, while Singapore has appreciated fairly continuously against the U.S. dollar since 1986.
 11. In the absence of such costs, of course, intersectoral reallocation of capital would not present a problem.
 12. See, for example, Corbo and Rojas (1995). Of course, the cross-section literature does not identify whether this effect arises from the signal extraction problem accompanying variability of the real exchange rate or from misalignment. The implications for nominal exchange rate management would be quite different in the two cases.
 13. This model is a special case of the general open economy portfolio framework described in Branson and Henderson (1985).
 14. All variables are denominated in domestic currency terms and the exchange rate is omitted, since it will be held constant in what follows.
 15. Income and wealth are suppressed as arguments in asset demand functions, since they are constant in the time frame considered.
 16. See Branson and Henderson (1985).
 17. If foreign interest rates enter the domestic money demand function, then the domestic interest rate would actually *rise* with sterilized intervention when the foreign interest rate falls.
 18. The impossibility of sterilizing under perfect capital mobility follows from the fact that this derivative approaches negative infinity under such circumstances.

19. Johnston and Ryan (1994) have also recently looked at the effects of controls on the magnitude of capital flows. They found that controls had significant effects in restricting outflows in industrial, but not in developing, countries.
20. Although attempts to disentangle the two in specific country cases are not plentiful, some do exist. Phylaktis (1988), for example, found that changes in capital controls accounted for over 80 percent of the deviations from uncovered parity in Argentina during 1971–1984.
21. High real interest rates and an overvalued currency were blamed by Dornbusch and Werner (1994) for slow growth and a weakened financial system in Mexico.
22. See Montiel (1996).
23. Under this system, sellers of foreign exchange received dollar-denominated claims on the central bank, denoted *certificados de cambio*, in return for foreign exchange. These could be redeemed at maturity (initially three months, but set at one year in August 1991) for the full face value at the then-prevailing exchange rate, redeemed before maturity at 87.5 percent of face value, or sold freely in the market.

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CHAPTER 3

Exchange Rate Management in a Structural Reform Environment: The Case of Hungary

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Exchange rate policies play a crucial role in transition economies. They simultaneously influence the outcome and costs of stabilization policies, as well as the speed, sequencing and sustainability of trade and financial sector liberalization programs and main structural changes.

Theoretical considerations and lessons from the exchange rate policies in the industrial economies and stabilization programs of developing countries in the 1980s produced suggestions regarding the choice of exchange rate regime by economies in transition. These proposals ranged from the adoption of the currency board approach to fully flexible exchange rates.¹

The majority of liberalizing Eastern European countries chose at the beginning either strong, currency board-type regimes (Estonia) or weaker forms of fixed exchange rates (Poland, the former Czechoslovakia), while the rest established flexible regimes (like Slovenia, Bulgaria or Latvia).

Most countries in transition were initially experiencing either high open or repressed inflation, where the exchange rate changes strongly influenced the evolution of nominal variables. A fixed exchange rate could help in disinflation due to its role as a nominal anchor in stabilization programs. This assumption was justified by the successful cases of relatively rapid stabilization of high inflation in Argentina (after 1991) or in Israel (in the 1980s).

Using flexible exchange rates removes the need to determine at the beginning of the stabilization policy the equilibrium value at which the exchange rate should be fixed. Because the initial exchange rate was highly distorted, the factors affecting this equilibrium value are rapidly changing during transition and the value of currencies to which these currencies might be pegged is also varying. Thus, fixed exchange rates may rapidly become misaligned. Flexible exchange rates correct disequilibrium situations without requiring a peg change that has big credibility costs.

In contrast, from the beginning of transition, Hungary used an adjustable peg. Due to overvaluation under central planning, an initial steep devaluation was unavoidable in all the transition economies: This sharp depreciation of the exchange rate was later followed by either its fixing or floating. In Hungary the adjustment was smoother and the dynamics of exchange rate changes also differed. What were the reasons for this special exchange rate behavior, and how did the exchange rate policy develop amid deep structural, institutional and ownership changes?

The study analyzes Hungary's exchange rate policy: It evaluates the choice of the exchange rate regime, the factors explaining its development and its macroeconomic effects. Within the framework of an adjustable peg regime, there were frequent shifts in the main goals of the exchange rate policy between increasing external competitiveness, improving the current account, and mitigating the inflationary pressures stemming from price liberalization and structural reforms, and undisciplined macroeconomic policies.

The study discusses the major periods of exchange rate policy and their characteristic features, and shows the reasons for the collapse of the adjustable peg regime and the shift to a preannounced crawling peg. Finally, it draws some conclusions regarding the use of exchange rate policy in economies in transition, and discusses the differences between most transition economies and Hungary in exchange rate management.

Exchange Rate Policy in the Hungarian Economy in the 1970s and 1980s

Since centrally planned economies were driven by quantitative targets, exchange rate policies always played a very passive role. These were closed economies; foreign trade was centrally regulated and divided between state monopolies; import rights were centrally allocated; imports were determined based on rest principle from the quantitative

plan targets; and the exchange rate had only to convert the external price of imports to national currency units for accounting purposes.

Since the monetization of these economies was low and the price mechanism was entirely distorted by individually set subsidies, tax regulations and administrative controls, the exchange rate did not play its role in allocation of resources between different economic sectors. The full absence of current account convertibility, the administrative and centralized regulation of imports, and the centralized allocation of foreign currency for import demand prevented the exchange rate from fulfilling that function.

This allocative role of the exchange rate was performed by the rigid price mechanism, which was determined by administratively set prices, where price changes were the outcome of plan decisions and quantitative targets.

The exchange rate policy was centralized, and the officially set exchange rates were entirely separated from the market-determined exchange rate developments. The rigid and monopolized system of import regulation resulted in multiple exchange rates, where essential imports were supported by a preferential exchange rate and the rate for trade and tourist purposes was separated.

The outcomes of the functioning exchange rate regimes were fairly similar in all formerly socialist economies. The exchange rates were generally overvalued to allow access to essential imports, while other imports were restricted by quantitative restrictions. The overvalued exchange rates combined with shortages produced a significant demand for foreign currencies, leading to high currency substitution. Since the fulfillment of quantitative targets was the main goal, exchange rate policies could not influence the allocation of scarce resources, the profitability of enterprises and so on.

While this was the general framework of the exchange rate mechanism in Hungary as well, several important differences have emerged gradually after the first market-oriented reforms were introduced in 1968. They allowed a greater role for prices in allocation, increased the independence of enterprises from their regulating authorities, increased to a limited degree the openness of the economy, and brought some liberalization to the administrative import system. These modest reforms have been required to give up the passive role of exchange rate policy and bring it more in line with market developments.

Another factor that made the Hungarian exchange rate policy different from other former socialist economies was the simultaneous increase of the current account and fiscal deficits from the mid-1970s. Increasing

the current account deficit was the outcome of the first oil shock and lack of adjustment to it,² while fiscal deficits were caused by a simultaneous decline of revenues due to slower economic growth and an increase of welfare expenditures. Both the current account and fiscal deficits were financed by increasing foreign debt, which by that time was exclusively public debt (of the Central Bank).

Initially, there was no exchange rate adjustment in the 1970s, and the increasing indebtedness of the economy was also the reflection of the lack of the adjustment. But after the second oil shock and the Mexican default, accompanied by almost full depletion of international reserves, the country had to adjust by applying a very strict administrative import regulation system and the devaluation of the domestic currency to avoid insolvency in 1982 and 1983.

Reflecting increasing concern with foreign balance, the exchange rate policy was very active in the 1980s, which resulted in continuous devaluation of the domestic currency to stimulate exports and reduce the almost unlimited demand of financially undisciplined enterprises for imported inputs.

Table 3.1 Changes in Hungary's Real Exchange Rate Indexes Based on Different Deflators (Producer price index [PPI], consumer price index [CPI] and the GDP deflator)

Period	PPI	PPI	GDP	GDP	CPI	CPI
	(1989 = 100)	(previous year = 100)	deflator (1989 = 100)	deflator (previous year = 100)	(1989 = 100)	(previous year = 100)
1989	100.0	—	100.0	—	100.0	—
1990	102.3	102.3	100.0	100.0	97.3	97.3
1991	97.0	94.8	95.9	95.9	87.3	89.8
1992	97.4	100.5	91.2	95.1	82.0	93.8
1993	95.3	97.8	81.0	88.9	75.3	91.8
1994	100.2	105.1	80.7	99.6	76.8	102.1
1995	107.5	107.3	91.2	113.0	81.1	105.5

NOTES: — Not available.

Values above 100 mean depreciation, below appreciation.

SOURCE: National Bank of Hungary, 1996.

Table 3.2 The Changes in Different Price Indexes in Hungary, 1988–1995 (percent)

Period	Industrial producer prices	Domestic sales prices of industry	Export sales prices	Consumer prices
1988	4.7	4.1	6.0	15.5
1989	15.4	13.4	18.2	16.9
1990	22.0	24.2	12.4	28.8
1991	32.6	31.9	30.2	35.0
1992	12.3	9.7	16.0	22.9
1993	10.8	10.7	12.3	22.5
1994	11.3	10.2	15.0	18.8
1995	28.9	27.3	34.0	28.8

SOURCE: National Bank of Hungary, 1995.

The role of exchange rate policy has increased after 1986 for two reasons. First, the country initiated an unsustainable economic growth after 1985 which led to doubling of gross foreign debt from US\$10 billion to almost US\$20 billion between 1985 and 1988. Besides that, starting in 1986, several liberalization measures were adopted. Among them, the most relevant were the greater freedom given to certain enterprises in imports, the gradual beginning of subsidy reduction and piecemeal price liberalization, the use of the retention system, and the first steps in import liberalization. The simultaneous aim of liberalization was to reduce fiscal expenditures and to enhance the productivity of the domestic economy. The liberalization has increased further the role of exchange rate policy in resource allocation, in regulating import demand and in export promotion.

These structural and macroeconomic changes produced results different from those typical in centrally planned economies' exchange rate developments even before the transition to a market economy. First, the Hungarian exchange rate policy was more active than in other economies, with its primary goal attached to the improvement of the current account balance. In the light of high and increasing foreign debt and associated interest services, the exchange rate adjustments were determined always by the path of the sustainable current account requiring continuous devaluation of the currency. Since inflation had been increasing only since the mid-1980s, this policy led to significant

Table 3.3 The Development of Some Monetary Variables in Hungary, 1989–1995
(percent change over the previous year)

	1989	1990	1991	1992	1993	1994	1995
Domestic credit supply	16.2	11.1	7.4	10.4	18.4	19.7	10.2
Money supply	14.0	28.7	28.7	27.4	18.1	13.7	11.7
Inflation rate	17.0	28.9	35.0	23.0	22.5	18.8	28.8
Change in nominal GDP	21.0	21.2	11.3	21.6	18.7	21.2	30.4
Money supply in GDP	41.5	44.0	46.7	51.1	49.5	45.5	42.8

SOURCE: National Bank of Hungary, 1995.

real depreciation of the domestic currency, which partly corrected the appreciation observable during the 1960s and 1970s.

Second, the fact that the exchange rate policy was determined by current account constraints and several liberalization measures had been adopted before the transition produced noticeable differences from other centrally planned economies. The Hungarian exchange rate was less overvalued than in other economies, and therefore less initial correction was needed at the beginning of transition.

Moreover, due to less overvaluation and fewer shortages, the black market for foreign currencies was smaller and the black market premia much less than in other pretransition economies. (While black market premia of 80–100 percent were common in other economies, they never exceeded 30 percent in Hungary.)

Finally, the factors influencing exchange rate changes were more market oriented than in other economies where they were rigidly set reflecting quantitative targets of central planners. These differences had significant impact both on the initial choice of exchange rate regime at the beginning of transition and the macroeconomic consequences of the unavoidable exchange rate adjustments accompanying this transition.

Evolution of Exchange Rate Policy during the Transition to a Market Economy

During the last six years of rapid structural, institutional and ownership changes, Hungary used two different exchange rate regimes:

Table 3.4 Indicators of the Balance of Hungary's General and Central Governments, 1991–1996 (projected) (percent of GDP)

	1991	1992	1993	1994	1995	1996
General government						
GFS balance	-2.8	-6.0	-5.2	-7.4	-4.0	-2.5
PSBR	-3.2	-6.9	-5.5	-8.3	-6.5	-4.0
Primary balance	-0.8	-2.9	-2.3	-2.8	1.0–1.5	3.0–3.5
Operational	1.2	-3.6	-2.8	-3.7	0.0	2.0
Central government						
Revenues	28.6	26.9	29.2	27.0	28.4	26.0
Expenditures	32.5	32.9	34.3	32.9	31.3	28.0
Balance	-3.9	-6.0	-5.1	-5.9	-2.9	-2.0
PSBR	-3.9	-6.7	-5.1	-6.6	-5.6	-3.5
Primary balance	-1.5	-2.2	-1.7	-0.9	2.9	3.9
Operational balance	-2.0	-3.0	-2.3	-1.8	0.8	2.7

NOTES: PSBR = public sector borrowing requirement.

SOURCE: Ministry of Finance, 1996.

Table 3.5 Interest Expenditures of Hungary's Central Government, 1990–1995 (percent of GDP)

	1990	1991	1992	1993	1994	1995
Related to fiscal deficit	1.7	2.2	3.0	3.1	3.9	5.1
Related to other assumed obligations	1.0	1.4	2.2	1.4	2.7	3.6
Total interest expenditures	2.7	3.6	5.2	4.5	6.6	8.7

SOURCE: Ministry of Finance, 1996.

initially the adjustable peg, which was replaced after its collapse by the preannounced crawling peg regime.

In the adjustable peg regime, the two factors that most often determine the frequency and magnitude of exchange rate changes are the trade balance and inflation. As both the trade balance and inflation depend partly on real exchange rate changes, the exchange rate policy

Table 3.6 Hungary's Consolidated Public Debt, 1990–1995 (percent of GDP)

	1990	1991	1992	1993	1994	1995
Gross public debt	60.3	67.1	65.2	82.5	86.5	89.2
Domestic public debt	3.7	5.5	12.1	23.2	23.5	24.4
Foreign public debt	56.8	61.5	53.2	60.2	59.0	64.8

SOURCE: National Bank of Hungary, 1996.

has different macroeconomic outcomes depending on real exchange rate developments.

In Hungary these two goals were given different weight between 1989 and 1995, and as a result the effect of exchange rate policy differed substantially. The evolution of the exchange rate policy during transition to a market economy may be divided into several periods, according to its emphasis on the external balance or inflation, and associated real exchange rate developments. There were four clearly distinguishable periods, out of which the first three were within the adjustable peg regime while the last one was related to the switch to a crawling peg regime:

1. The period of strong nominal devaluations and real exchange rate depreciation against a basket of currencies between 1988 and 1990
2. The period of relaxed domestic macroeconomic policies accompanied by irregular and small exchange rate adjustments leading to real exchange rate appreciation between mid-1991 and 1993
3. The period of repeatedly more frequent and bigger in nominal terms devaluations leading to real exchange depreciation in 1994 and early 1995
4. The replacement of the adjustable peg regime by a forward-looking crawling peg regime in March 1995

The Choice of the Adjustable Peg Regime

As has been shown, Hungary had balance of payments difficulties during most of the 1980s, stemming from high debt service and weak trade performance. At most the exchange rate policy of stepwise devaluation was used to improve the trade balance and the competitiveness of the tradables sector. Due to the pressing balance of payments difficulties, the exchange rate was less overvalued in Hungary before

transition than in other economies, and no significant initial adjustment was required to establish the unified exchange rate.

Hungary liberalized a substantial share of prices and imports during 1987–1989.³ This led to exchange rate adjustment to reduce the growth of import demand stemming from increasing openness, and to maintain the competitiveness of Hungarian exports in light of substantial price increases. Because further stepwise liberalization of prices and imports was assumed, the use of a fixed exchange rate in light of expected inflation and balance of payments problems did not seem to be possible.

As Hungary had become relatively open before transition, it was clear that exchange rate adjustments should be carefully designed. It was recognized that the new rounds of import and price liberalization would lead to high inflation and would require exchange rate depreciation. But as the growth of domestic prices and wages was highly dependent on exchange rate changes, significant devaluation of the national currency had to be avoided as the temporary gains in competitiveness would have been rapidly neutralized by wage inertia.

The standard policy for transition economies of steep devaluation by fixing the exchange rate was opposed, because the Hungarian stabilization initially was not an exchange rate— but a money-based one, where the growth of money supply played the role of nominal anchor.⁴

The money supply was chosen as an anchor because monetary policy had been restrictive since 1988 and—compared with other economies in transition—the link between the nominal variables and the exchange rate was weaker in Hungary due to missing formal or informal indexation and significant U.S. dollarization of the economy. Moreover, exchange rate changes were weakly correlated with inflation expectations; thus, the use of a fixed exchange rate to mitigate them was not required.

Therefore, the exchange rate did not have to play the role of nominal anchor, and the monetary policy could be relied on to restrain the growth of nominal variables after the general wage, price and import liberalization.

Another reason for opposing the fixed exchange rate was the assumption that the inflation following the liberalization of the economy would later be followed—even with credible and sustainable macroeconomic policies—by subsequent price increases due to changes in the relative price structures, and supply and demand side disturbances. Due to the experience with almost decade-long moderate inflation, it was thought that the price liberalization would not result only in one-time adjustment, but would create long-term inflation problems.

Table 3.7 Savings and Investments in Hungary, 1990–1995 (percent of GDP)

	1990	1991	1992	1993	1994	1995
Gross national savings	25.7	17.4	14.1	10.5	13.6	17.9
Households	8.6	14.9	12.4	7.7	9.3	10.0
Enterprise	12.4	-1.1	0.2	2.8	4.8	-2.0
State	4.8	3.6	1.5	0.0	-0.6	9.9
Gross national investments	24.0	19.8	15.5	19.9	21.6	21.4
Households	3.6	5.4	4.4	4.7	4.5	4.3
Enterprises	17.0	10.2	5.0	9.8	12.2	3.4
State	3.4	4.1	6.0	5.3	5.0	13.6
Balance	1.8	-2.4	-1.4	-9.4	-8.1	-3.5
Households	5.0	9.4	7.9	3.0	4.8	6.6
Enterprises	-4.6	-11.4	-4.8	-7.1	-7.3	-6.5
State	1.4	-0.5	-4.5	-5.4	-5.6	-3.5
Current account	1.1	1.2	1.0	-9.0	-9.5	-5.0

SOURCE: National Bank of Hungary, 1996; and World Bank, 1995.

The use of flexible exchange rates was rejected basically because of the lack of sophisticated financial markets and institutions needed for efficient functioning of foreign exchange markets. Initially, there was no interbank foreign currency market; the use of export revenues was restricted and centrally controlled; and there were no spot and forward markets. Although the final goal of exchange rate policy was to move toward a more flexible regime, it was initially assumed that the institutional constraints would not allow its smooth functioning in the beginning of transition. Moreover, the adoption of flexible exchange rates would have required wider convertibility, the establishment of which would have been accompanied by higher devaluation that did not seem to be feasible in light of growing inflation.

Besides that, the monetary authorities feared the exchange rate volatility that flexible exchange rates would produce. As the country already had by that time relatively liberal regulations regarding capital inflows, while the domestic capital markets were very thin, the possibility of destabilizing speculative capital flows was seen as high. This could have created macroeconomic problems, well-known from the experiences of developing countries. But as the difference between

the speed of adjustment in the financial and real markets is much larger in Hungary than in most developing countries, these imbalances would have produced more serious problems.

The Period of Initial Strong Adjustments (1989–1991)

Starting in 1987, macroeconomic policies tried to reduce the macroeconomic imbalances emerging from the unsustainable growth between 1985 and 1987 and from price and import liberalization after 1988. The options for stabilization policy were restricted, as fiscal policy remained loose and it was based on the restrictive monetary policy and exchange rate adjustments. By leading to declining real wages, devaluations helped to reduce domestic demand, thereby supporting monetary policy in bringing down corrective inflation and improving the trade balance.

Exchange rate policy played an important role in reducing the growth of import demand and improving the competitiveness of the tradables sector. Under the program of import liberalization, the widespread quantitative restrictions were not converted to tariffs, which allowed the authorities to use only devaluation to regulate the increase in import demand, besides restrictive monetary policies.⁵ This concern, coupled with high debt-service payments due to significant foreign debt, led to significant real devaluation of the currency.

During this period, the timing of bigger exchange rate adjustments was connected with subsequent rounds of price and import liberalization, while smaller devaluations were carried out to improve the competitiveness of the tradables sector and to reduce the trade deficit.⁶

The policy of real devaluation improved the price competitiveness of Hungarian exports and the trade balance. The exchange rate policy successfully reduced the import demand and helped to sustain trade liberalization without strong resistance from pressure groups. It has also reduced the spread between market and official exchange rates, thus weakening currency substitution while the impact of exchange rate policy on inflation was weakened by very strict monetary policy and limits on wage increases.

The costs of the exchange rate policy were related to the character of adjustments, as they have created strong inflation and devaluation expectations. As devaluations were tied to announced new rounds of import and price liberalization, they were foreseen by market participants, leading to currency substitution, surges in import demand and

delays in exports. The forthcoming devaluations justified these expectations resulting in a vicious circle between exchange rate adjustment and inflation.

Relaxing Macroeconomic Policies with Nominal Exchange Stability (1991–1993)

After the first period of depreciating the real exchange rate, the exchange rate policy shifted toward a more neutral stance with respect to real exchange developments. This shift was apparent in changes in the frequency and magnitude of devaluations.

While in 1989 the Forint was devalued nine times, there were altogether only five devaluations in 1991 and 1992. Compared to earlier exchange rate adjustments, these devaluations were small, in the range of 1–3 percent except for the last big nominal devaluation in January 1991 of 15 percent. This large devaluation was related to the last round of price and import liberalization, in which more than 90 percent of prices and imports were liberalized.

Another difference of the exchange rate policy compared with the late 1980s was related to the impact of exchange rate adjustments on expectations and nominal variables. After 1991 exchange rate adjustments were separated from import and price liberalization, and they became more dispersed in time to reduce their unfavorable impact on expectations and underlying inflation.

Several factors explain the shift in the goals of exchange rate policy within the adjustable peg regime after 1991. The most important one was that a more balanced role was attached to inflation and trade balance as targets of exchange rate policy. The exchange rate policy was directed more toward restraining the impact of subsidy reduction and simultaneous price liberalization on inflation.⁷

Besides liberalization, other factors have also stimulated the central bank to use the exchange rate policy in an anti-inflationary manner. One of them was the rapid growth of the fiscal deficit, which was quite significant before the transition in the 1980s, but increased to 5 percent of GDP in 1991 and 1992. The growth of the public sector borrowing requirement was determined by the high primary deficit, which was initially caused by the output, employment and inflation consequences of transition to a market economy.

The fiscal policy stance was not changed to adjust to these exogenous shocks, and it remained quite relaxed. Moreover, starting from 1992, the government took over the nonperforming portfolio of the banking sector by issuing public debt within the consolidation program, which led to a rapid buildup of public debt and associated interest expenditures.⁸

The initially tight income policies were also relaxed, as it was assumed that the enterprises could be unable to grant wage increases above productivity growth in the period of rapidly collapsing demand and output. This was a significant policy mistake as the financially undisciplined public enterprises (which at that time still produced more than 75 percent of registered output) financed unsustainable wage increases by increasing their payment arrears to the banking, enterprise and—increasingly to the—public sector.

This was recognized too late and real incomes declined much less than real GDP which later had a profound impact on savings and consumption as well as related current account developments (Table 3.8). Compared to other East-Central European transition economies, Hungary was the only economy where the initial fall of consumption was far less than the decline of GDP, which produced a huge gap between them leading to increasing current account deficits.⁹

The new priority of the exchange rate policy was also related to changes in monetary policy, which had gradually become neutral and later became expansive after 1991.¹⁰ The money supply gradually lost its role of nominal anchor due to this shift in the monetary policy, which was caused by several factors.

First, after an initial period of corrective inflation due to price liberalization and subsidy reduction, inflation started to decline gradually, while the output costs of disinflation remained high and the prospects for recovery were weak. The Central Bank changed its initial policy and instead of its firm anti-inflationary stance tried to help the recovery from poststabilization recession by reducing the interest rates which seemed to restrain both domestic demand and private sector capital formation.¹¹

The shift was also due to the assumed negative impact of the restrictive monetary policy on output performance and on the financial discipline of the enterprise sector. Restrictive monetary policy produced a credit crunch for the enterprise sector (Calvo, 1992), and one form of avoiding the lack of monetary financing was to resort to increases in payment arrears reflected simultaneously in the growth of inter-enterprise

Table 3.8 Balance of Payments of Hungary, 1990–1995 (billions of US\$)

	1990	1991	1992	1993	1994	1995
Exports	6,346	9,258	10,028	8,094	7,613	12,810
Imports	5,998	9,069	10,076	11,340	11,248	15,252
Trade balance	348	189	-48	-3,247	-3,635	-2,442
Services, net	302	67	103	-104	-55	195
Tourism, net	345	560	590	442	503	658
Revenues from FDI	-24	-32	-45	-56	-117	-194
Balance on investment income	-1,414	-1,331	-1,216	-1,130	-1,286	-1,599
Unrequited transfers	727	860	859	732	909	1,127
Current account	127	267	324	-3,455	-3,911	-2,480
Capital balance	-127	-267	-324	3,455	3,911	2,480
Medium- and long-term capital	204	3,070	432	5,632	2,295	5,601
Assets, net	-76	-57	-145	237	36	118
Net repayment	-31	1,668	-894	3,066	1,161	1,073
Borrowing	2,516	4,077	2,204	6,388	5,429	7,131
Repayment	2,547	2,409	3,098	3,322	4,267	6,058
FDI						
In Hungary net	311	1,459	1,471	2,339	1,146	4,453
Abroad	n.a.	n.a.	n.a.	-11	-49	-43
Basic balance	331	3,337	756	2,177	-1,616	3,121
Short-term capital	-893	-617	5	459	960	1,411
Credits	-324	141	-152	-165	189	-9
Debits	-569	-758	157	624	771	1,420
Balance of payments	-562	2,720	761	2,635	-656	4,532
Reserves	562	-2,720	-761	-2,635	656	-4,532

NOTES: n.a. = Not applicable.

FDI = foreign direct investment.

SOURCE: National Bank of Hungary, 1996.

payment arrears and outstanding payments of enterprises toward the banking sector. By relaxing the monetary policy, it was wrongly supposed that this development could be reversed.

Second, notwithstanding the legal independence of the Central Bank, there were increasing pressures from the Treasury to reduce the costs

of debt service associated with the growth of the fiscal deficit and high nominal interest rates. Lower interest rates were achieved partly by increasing the growth of money supply and by an agreement between the National Bank, the Ministry of Finance and commercial banks to reduce in a coordinated way the nominal interest rates.

Finally, the shift in the stance of monetary policy was also the result of significant foreign currency inflows as both foreign direct investments and unrequited transfers grew rapidly. The growth of money supply was not sterilized by the National Bank because of fears of the impact the sterilization might have on already high interest rates.

As the money supply was no longer an explicit anchor, the exchange rate policy had to replace monetary policy in its role. It also had to support disinflation because of the increasingly negative impact price increases exerted on fiscal balance. Inflation was eroding fiscal revenues due to the Olivera-Tanzi effect¹² while the expenditures (and particularly the debt service due to high nominal interest rates) increased.¹³

The changes in the emphasis of the exchange rate policy were also related to assumptions about the changing competitiveness of the tradables sector after the collapse the CMEA. The monetary authorities assumed that after the simultaneous collapse of the CMEA and domestic demand, producers would have to switch their production from the nontradables to the tradables sector and from the relatively closed CMEA markets toward developed market economies.

As a result exports would be driven more by nonprice factors, and the role of the exchange rate policy in influencing export performance would decrease. Moreover, several structural measures (like the liberalization of imports, the inflow of foreign direct investments and productivity growth) could further enhance the competitiveness of the tradables sector and improve the trade balance without further significant exchange rate adjustments.

These factors contributed to the shift from the policy of real exchange rate depreciation to more nominal exchange rate stability, which resulted in a gradually appreciating real exchange rate due to the inflation differences with major trading partners. This appreciation was different depending on which deflator is used but between 1991 and 1993 was around 15 percent if we use the PPI and around 22 percent if we use the CPI index (Table 3.1).

At first glance the shift in the exchange rate policy seems to be successful as both the inflation and trade balance improved. After the initial jump associated with price liberalization, the inflation rate started

to decline relatively rapidly,¹⁴ but simultaneously an increasing (and observed in almost all transition economies) gap emerged between the consumer and producer price indexes.

The exchange rate policy has contributed to this gap since import liberalization exchange rate adjustments produced a threshold for producer price increases, while consumer prices were more related to domestic demand conditions.¹⁵ The high and increasing gap between the CPI and the PPI indexes later had significant impact on the evolution of the real exchange rate and created problems for exchange rate policy.

Besides its favorable impact on price developments, the trade policy goal was also met as exports rapidly increased and a modest trade surplus was achieved. The nonprice factors forcing the domestic producers to convert their production from nontradables toward the tradables sector and from CMEA markets to developed economies worked as policy makers had assumed and led to significant increase in exports.

Besides positive changes, several warning signs were observed as well. First, the inflation and trade balance developments were influenced more by factors exogenous to the exchange rate policy. Inflation decreased since further price adjustments in the public sector were postponed, and a strong demand constraint emerged, while the improvement in the trade balance reflected the consequences of output and domestic demand collapse and the substitution of production from the nontradables to the tradables sector.

Second, the growth of exports was not based on increasing competitiveness, and its sustainability was questionable. Starting from mid-1992, there was a sharp reversal in export growth, and the positive trade balance of 1990–91 was replaced by a slight deficit of US\$48 million in 1992 followed by a sharp decrease in exports and a huge trade deficit (US\$3.5 billion in 1993). It should be mentioned also that declining exports and worsening trade balance were not caused by exchange rate policy but by supply side and institutional problems.¹⁶

Gradual Collapse of the Adjustable Peg Regime (1994–1995)

The stance of exchange rate policy started to change again from the end of 1993 reflecting concerns with macroeconomic developments. Between 1993 and March 1995, the Hungarian economy showed a very contradictory performance. Starting from the last quarter of 1993, the

economy seems to have overcome the initial transition recession and the poststabilization stagnation and started to recover, reflected in the 2.5 percent increase of GDP in 1994.

The recovery was accompanied by increasing macroeconomic imbalances. The most pressing one was the growth of the fiscal deficit and public debt. The deficit reached 7.5 percent of GDP in 1994 while public debt was over 90 percent. The recovery has also led to the growth of net foreign debt, which increased by about US\$5 billion between 1992 and 1994 reaching at the end of 1994 US\$18 billion equal to 46 percent of GDP. This growth was related partly to the increase of the current account deficit and to the higher foreign borrowing of the enterprise sector and central government.¹⁷ There was no further decline in inflation, and it has stabilized around a moderate but unstable level of 20 percent.

Considering these macroeconomic developments, the exchange rate policy was changed reflecting the renewed priority given to the balance of payments as the current account deficit increased significantly and its long-term financing was doubtful. The primary goal of the exchange rate policy was to improve the trade balance by changing the priority of maintaining a stable nominal exchange rate to maintaining a stable real exchange rate. The intended real devaluation of the currency meant that exchange rate adjustments became based more on the higher CPI than the lower PPI index.

To achieve real depreciation, the Forint was devalued more frequently compared to earlier periods. Besides small and dispersed devaluations, bigger adjustments were carried out in September 1993 and in August 1994, when the currency was devalued by 4.5 percent and 8 percent respectively. While their strong impact on inflation and expectations was recognized by policy makers, these big devaluations reflected two major concerns.

First, the trade balance was not improved by earlier small devaluations, and it was assumed that further significant adjustments were required. But it was partly a wrong assumption since export growth was weakly dependent on exchange rate devaluation; but other nonprice factors constrained it more, while the growing import demand could not be reduced by exchange rate adjustment in the absence of credible and consistent macroeconomic policies.

The effectiveness of these exchange rate adjustments was questionable. The major problem with these devaluations was that they were not accompanied by restrictive macroeconomic policies. They fueled

inflation while at the same time their possible positive impact on the tradables sector was rapidly eroded due to the increase of domestic wages and incomes, as wage and price rigidity was strong in the Hungarian economy.

Besides concern with foreign balance, these bigger exchange rate adjustments reflected the increasing impact of speculation against the Forint due to the growing inconsistency of the pursued exchange rate policy with monetary and fiscal policies. The speculation on the foreign exchange market was already strong before the September 1993 devaluation, but (after being temporarily reduced) became extremely strong in 1994.

The renewed speculation in 1994 was associated with the elections and with uncertainties related to the change of government and its possible future macroeconomic policy. Moreover, the macroeconomic indicators worsened further, reflected in a fiscal deficit of 7 percent, a current account deficit of 10 percent and slightly accelerating inflation. These factors ultimately brought into question the sustainability of exchange rate policy and small adjustments.

The impact of speculations on the exchange rate policy was strong, as the foreign exchange market was still weak while the interventions of the National Bank were insufficient and therefore relatively small changes on the FOREX market may have created strong pressures.

The National Bank tried to reduce the extent and impact of these speculations by increasing its prime rate to very high levels.¹⁸ But as this had an unfavorable impact on the interest rate developments and interest expenditures of the central government, the National Bank finally had to devalue the currency when the demand for Forint could not be increased any further with interest rate adjustments. But these devaluations justified the speculations and were not followed by policy adjustments, and therefore speculations appeared again after a short period.

The trade balance worsened further in 1994 reaching a US\$3.9 billion deficit. Worsening trade balance was accompanied by the gradual acceleration of inflation. Although the high fiscal deficit, the adjustment of certain administrative prices and several other factors have contributed to price changes, the real devaluation of the domestic currency played a significant role. The impact of devaluation was also strong because of the growth of domestic incomes far exceeding the growth of productivity. At the same time, the fiscal deficit remained high without any signs of possible correction, which increased the possibility of new exchange rate adjustment.

The macroeconomic problems were left uncorrected in the first quarter of 1995 leading to the collapse of the adjustable peg regime. The trade and fiscal deficit reached unsustainable levels as financing requirements were far above the assumed and acceptable levels (the fiscal deficit in the first two months exceeded the one projected for the first six months), price increases accelerated, and currency substitution and foreign currency-denominated savings increased while savings in national currency declined. Besides that, the tequila effect of the Mexican crisis strengthened the concern with twin deficits, and questioned the soundness of macroeconomic policies and the availability of foreign finance.¹⁹

All these problems produced extreme speculation against the Forint and the foreign exchange market could no longer be calmed down by two small (1–2 percent) adjustments in January and February of 1995. The speculation against the Forint and the macroeconomic imbalances finally led to the collapse of the adjustable peg regime and its replacement by the crawling peg.

The Shift to the New Crawling Peg Regime (1995)

The trade-off between the recovery and the worsening domestic and external imbalances required the implementation of a strong stabilization policy in March 1995 aimed at reducing the fiscal deficit from 9 percent of the GDP to 6 percent and the current account deficit from 9 percent of GDP to less than 5 percent. The fiscal deficit had to be corrected by expenditure cuts, growth of revenues from the introduced import surcharge and reduction of tax evasion. To improve the trade balance, a 9 percent devaluation and the introduction of an 8 percent import surcharge were announced.

As a part of the stabilization policy, the exchange rate regime was changed, and this was accompanied by an initial currency devaluation and by an announcement about the path of future exchange rate adjustments based on the difference between forecasted external and domestic price changes. This meant a 1.9 percent monthly devaluation of the currency in the second quarter of 1995, which was reduced to 1.3 percent in the rest of the year.

The devaluation was planned to be carried out against the basket of currencies that the Forint was pegged to and was to be implemented on a daily basis.²⁰ The aim of this measure was to produce an approximately 28 percent nominal devaluation of the domestic currency which

together with the expected inflation would produce a sizable real exchange rate depreciation. After the initial successes, from January 1996 the monthly rate of devaluation was reduced to 1.2 percent, and this was to be maintained throughout the whole year.

The major reason for the introduction of the preannounced crawling peg regime was the full loss of credibility of the exchange rate policy within the adjustable peg regime. Since monetary and especially fiscal policy was loose, accompanied by rapidly increasing internal and external imbalances, the maintenance of the adjustable peg regime and of the policy of small devaluations was incredible. The low credibility of the regime was visible from the growing currency substitution and repeated attacks against the Forint.

As the speculation against the national currency created high interest rates and strongly influenced trade balance,²¹ the demand for foreign currency and the extent of currency substitution and capital flight, a new exchange rate regime had to be adopted that could better influence the expectations. This was increasingly required as the forecasted inflation was also increasing, making small adjustments decreasingly credible.

The shift in the exchange rate regime was also aimed at improving the trade balance. Both the competitiveness of exports could be improved and their volatility reduced with this change. As the real exchange rate developments were to be more predictable, it was reasonable that not only the profitability of exports but also of investments in the tradables sector would increase.

Finally, it was thought that the change of the exchange rate regime might have significant implications for interest rate developments. The volatility and high level of interest rates were also caused by exchange rate adjustments and speculations against the domestic currency.²² By determining the amount of possible devaluation, it was hoped that the volatility of interest rates might be reduced, and the stabilizing impact of the new exchange rate regime would also result in lower interest rates.

Although the change in the exchange rate regime seemed to be inevitable, there were some dangers with the use of a crawling peg regime. First, it was questionable how successful this exchange rate regime would be in improving the trade balance. The foreseen real exchange rate depreciation might improve the trade balance but might adversely affect the exporters due to the increasing and very high import content of exports. Microeconomic studies revealed that the most significant obstacles to Hungarian exports were the lack of credit supply,

export guarantees and infrastructure. Since these factors were not corrected and the import content of exports remained high, the impact of assumed real exchange rate depreciation might remain doubtful.

Second, the shift toward crawling peg would—at least temporarily— increase further the already slightly growing inflation rate. Experiences of economies applying the crawling peg (for example, Poland in East-Central Europe) suggest this regime may produce cost-push inflation. Although credible and consistent anti-inflationary policies and the absence of administrative price adjustments may reduce the extent of this impact, the openness of the Hungarian economy and high import content of production and consumption may result in an unfavorable impact on inflation.

Another problem was that the shift from adjustable peg toward crawling peg did not solve the problem of speculation and adverse expectations. As long as the announced devaluations are consistent with the projected and expected inflation, the credibility of the exchange rate policy may be maintained. But it depends on the monetary-fiscal mix whether the monthly inflation may be reduced below the announced monthly rate of devaluation. As long as the fiscal imbalances and the growth of domestic incomes exceeding the productivity increase is not corrected, the possibility of reemerging adverse expectations and speculation may remain.

The outcome of the applied stabilization policy and new crawling peg regime was much better than expected. The program brought about a huge improvement in both the fiscal and current account balance at the cost of almost zero output loss and a small increase in inflation. The fiscal deficit of the consolidated general government which was reaching 9 percent of the GDP was reduced to 6.5 percent. This was achieved by a significant improvement in the primary balance, which outbalanced the further increase of interest expenditures.

The improvement of the primary balance was almost 4 percent of GDP, and the deficit of 1 percent in 1994 was changed to a 3 percent surplus in 1995. The public sector borrowing requirement was also substantially reduced by the inflow of huge privatization revenues from the sale of public utilities, which reached almost 3 percent of GDP.

The improving fiscal balances eased the pressure on the Central Bank and domestic debt management, which was reflected in declining interest rates from mid-1995. The growth of domestic savings produced an increase of loanable funds far above the public sector borrowing requirement which allowed an improvement in the terms of public debt management.²³

The inflow of privatization revenues led to rapid accumulation of reserves, which increased from US\$8 billion (early 1995) to US\$12 billion at the end of 1995. This increase produced an import coverage ratio of eight months. This inflow reduced net total and public foreign debt, which reduces future debt service payments and eases the pressure on the current account.

The reversal in fiscal balance was accompanied by an improving current account. The driving factor of this was the decrease of trade balance since both exports and imports strongly responded to exchange rate changes and other trade policy measures. The strong devaluation of the national currency and almost 12 percent decrease in real wages led to sharply improving competitiveness of the tradables sector and rapid recovery of exports far exceeding the growth of import demand. The improving trade balance was accompanied by increasing revenues from invisible trade, especially unrequited transfers which is partly a reflection of a new phenomenon related to the adoption of the crawling peg regime: growth of capital inflows.

The rapid inflow of foreign capital was one of the predictable factors of the change in the exchange rate regime. Growing capital inflows were composed of unexpectedly high foreign direct investments and associated privatization revenues, from short-term portfolio investments and also from increased borrowing of the private sector on the international capital markets.

Short-term capital inflows were stimulated by the credible commitment to maintain the stabilization program and the adopted new exchange rate regime, and also by significant differences between domestic and international interest rates as the convergence of expectations to the announced path of devaluation were not accompanied by decreasing interest rates. This was due to growing underlying inflation and associated inflation expectations, which maintained the already high nominal interest rates. Since interest rates reflected the past (while exchange rate changes, the future) inflation expectations, they necessarily were more rigid.

Moreover, the improvement of the fiscal balance and the decline of the public sector borrowing requirement were very slow as the adjustment of the primary balance was initially modest and privatization revenues were recorded only at the end of the year. Therefore, the public sector borrowing requirement did not decline until the last quarter, and this put a strong pressure on interest rates which therefore declined very slowly.

Table 3.9 Hungary's Indebtedness Indicators, 1990–1995 (millions of US\$ and percent)

	1990	1991	1992	1993	1994	1995
Gross foreign debt	21,270	22,658	21,438	24,560	28,521	31,655
Net foreign debt	15,938	14,555	13,276	14,927	18,935	16,187
Reserves	1,166	4,017	4,381	6,736	6,769	12,010
GDP	32,893	31,238	36,503	38,282	41,268	43,578
Imports	5,998	9,069	10,076	11,340	11,248	15,252
Exports	9,466	11,621	13,332	10,898	10,674	17,028
Debt service	4,191	4,037	4,733	4,908	6,214	8,415
Gross interest payments	1,644	1,628	1,635	1,586	1,947	2,357
Net interest payments	-1,414	-1,331	-1,216	-1,130	-1,286	-1,599
Gross debt to GDP (%)	64.7	72.5	58.7	64.2	69.1	72.3
Net debt to GDP (%)	48.5	46.6	36.4	39.0	45.9	38.4
Debt service to GDP (%)	12.6	12.0	11.4	11.0	12.6	17.0
Gross debt to exports (%)	251.2	195.0	160.8	225.4	267.2	185.9
Debt-service ratio (%)	49.0	32.2	31.2	38.6	48.7	43.8
Gross interest to exports (%)	19.4	14.0	12.3	14.6	18.2	13.8
Net interests to exports (%)	-16.7	-11.5	-9.1	-10.4	-12.0	-9.4
Reserves to imports (month)	2.3	5.3	5.2	7.1	7.2	9.4

SOURCE: National Bank of Hungary, 1996.

The slow fall of nominal interest rates when the expected inflation was declining produced huge real interest rates reaching in the case of three- or six-month Treasury bills 6–7 percent. This was a very strong factor stimulating the inflow of US\$3.5 billion of short-term capital between August 1995 and July 1996.

Besides speculative short-term capital inflows, another important change was the growth of foreign borrowing of the private sector

leading to a rapid increase of net private foreign debt. The growth of net private foreign debt was exclusively driven by the differences in domestic and international costs of funding. These differences are even higher than those on domestic and international deposit rates due to the much higher interest margin applied by Hungarian banks compared with international practices.

The growth of private foreign debt was US\$1.6 billion in 1995, and net private foreign debt made up almost 30 percent of total net foreign debt while the share of private sector was zero in 1990.²⁴

This increasing borrowing on the international capital markets created additional (similar to speculative inflows) macroeconomic problems. They further squeezed the room for monetary policy because it was increasingly difficult to maintain its anti-inflationary stance and high interest rates because that would have stimulated further inflows.

The Central Bank had to sterilize the inflow since otherwise the increase of domestic money supply would have been inconsistent with the preannounced exchange rate and monetary targets. Sterilization was carried out partly by selling government bonds; by increasing the amount of special central bank facility, the passive repurchase of which

Table 3.10 Composition of Hungary's Foreign Gross and Net Debt according to Major Debtors (percent)

	1990	1991	1992	1993	1994	1995
Gross debt						
National bank	83.4	79.1	75.2	74.7	70.9	66.9
Government	2.2	6.7	7.7	8.2	7.9	9.1
Commercial banks	8.6	8.8	8.4	7.2	8.3	6.4
Enterprises	5.8	5.4	8.7	9.9	12.9	17.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
Net debt						
National bank	102.4	94.5	87.8	77.4	69.4	54.5
Government	1.5	8.9	11.0	12.3	11.0	11.6
Commercial banks	4.3	4.1	2.4	3.0	7.1	11.1
Enterprises	-8.2	-7.5	-1.2	7.3	12.5	22.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: National Bank of Hungary.

Table 3.11 Capital Inflows to Hungary in US\$ Billion and Percent of GDP, 1990–1995

	Net inflow	GDP	Net inflow/GDP
1990	-689	32,893	-2.1
1991	2,453	31,238	7.9
1992	437	36,503	1.2
1993	6,091	38,282	15.9
1994	3,255	41,268	7.9
1995	7,012	43,840	15.1

SOURCE: National Bank of Hungary.

meant the sale of different securities for investors; and by increasing the already high reserve requirements.

But sterilization has been very costly to the Central Bank due to high differences on returns on its assets and liabilities, and this was reflected in rapid decline of the Central Bank's revenues and net worth. The amount of required sterilization measures was very significant (almost 5 percent of GDP in 1995), and it increased substantially the interest expenditures of the central government.

Besides the mentioned positive developments, one could observe also some threats for the exchange rate policy, among which the most important was rapid increase of inflation which—measured on a monthly basis—was already rising before the adoption of the stabilization policy. It was due to exchange rate devaluation and the introduction of an import surcharge, which led to the growth of both underlying and expected inflation.

Higher inflation rates supported the real wage adjustment required to establish the credibility of the crawling peg regime and to improve the trade and fiscal balances. They have also contributed to the stabilization of debt-GDP ratios and the fiscal deficit. But the increase in inflation was very costly due to its strong inertial elements, already high level and the costs associated with the reduction of moderate inflation.

When evaluating the efficiency of the new exchange rate regime, one has to consider the initial position of the economy, the nature of accumulated macroeconomic imbalances and the problems with the adjustable peg regime.

One positive outcome of the crawling peg regime is its *stronger credibility* compared with the adjustable peg regime. This increased

credibility is related to the implemented stabilization policy and reversal in macroeconomic trends, besides the change in the exchange rate regime. But the latter has also improved the credibility of both exchange rate and macroeconomic policies.

The reason for this is that an implicit anchor was established which the Hungarian economy had lacked since 1991. The initial money-based stabilization program and the money supply as nominal anchor was rapidly eroded and replaced by loose monetary policies determined by the financing requirements of the public sector. The predetermined rate of devaluation required the strong adjustment of both the fiscal and monetary policy and established a visible anchor which so far has improved credibility of the economic policy.

Another important factor contributing to increased credibility was that it became increasingly difficult for the government to renege on its recommitment, which was a widely adopted practice within the adjustable peg regime. Due to its strong impact on expectations and its positive contribution to the current account balance, the monetary authorities are more committed to subordinate their fiscal and monetary policies to the requirements of the crawling peg regime.

The improvement of the credibility was nevertheless gradual, and almost half a year was spent before the markets started to accept the new exchange rate policy. Initially, the slow improvement of the credibility was reflected in the interest rate differentials far exceeding the difference predicted by the uncovered interest parity. But after the domestic currency was not devalued for more than half a year and the preannounced rate of devaluation for 1996 was below the actual values for 1995, the markets started to accept the new regime.

The improving credibility was reflected in the behavior of the nominal exchange rate. While before the introduction of crawling peg regime, it was almost always at the upper end of the exchange band, since March 1995 it has been almost exclusively at the lower end. This is also explained by the capital inflows and growing demand for Forint which kept the exchange rate at the lower end without requiring intervention from the Central Bank.

Another positive impact of the crawling peg regime was on *the competitiveness of the tradables sector*. This was the result of real depreciation and real wage decreases and stimulated an increase of both investments and output in the tradables sector. Moreover, the stability of exchange rate developments increased the predictability of future developments, which was an important contribution to profitability and

competitiveness of the tradables sector since it was strongly hampered by high exchange rate volatility before March 1995.

The earlier exchange rate volatility produced huge swings in import demand and export supply, contributed to export underpricing and import overpricing before devaluation, and created unfavorable expectations for producers in the tradables sector. This unfavorable impact of volatility has practically ceased to exist after the introduction of the crawling peg regime.

Another positive contribution of the regime switch *was the pressure it exerted on fiscal adjustment*. While the devaluation of the domestic currency helped fiscal adjustment since it increased revenues from both trade taxes and taxes on the tradable sector, the stability of the exchange rate policy required stronger than expected adjustment in the fiscal policy.

It was an important factor in Hungarian conditions since repeated attempts at fiscal consolidation were given up between 1991 and 1994 because exchange rate adjustments had reduced the costs of inconsistent fiscal policies. Now it has become very costly to follow inconsistent fiscal policies with the predetermined rate of devaluation, as the collapse of the exchange rate regime could produce much higher macroeconomic costs.

Currently, there are some *serious macroeconomic problems* which may critically weaken the credibility of the crawling peg regime. The crucial factor is obviously inflation. The decline of the rate of inflation is slower than was initially expected, especially because of the strong impact of cost-push factors, the remaining adjustment of certain administratively determined prices (especially energy prices) and slowly declining expectations.

According to certain estimates, 40 percent of price changes are due to policy measures (devaluation, increase of energy or other regulated prices, and so on) while the remaining 60 percent is due to expectations of the private sector. The actual and expected inflation has decreased, but its decline is less than would be required to successfully maintain the crawling peg regime.

Inflation has a very strong inertial element in Hungary related partly to an implicit indexation mechanism and strong inflation expectations. In addition, inertia is strengthened also by the inability of macroeconomic policies to reduce inflation below 20 percent since 1992, when inflation declined from the 35 percent peak caused by the corrective inflation. But since then it has stabilized at this modest level, and its rigidity has increasingly adversely affected expectations and its inertial elements.

The slow decline of inflation is also due to the still-high public sector borrowing requirements, part of which is financed by the implicit taxation of the banking sector and associated with its seigniorage revenues. The taxes on financial intermediation stemming from financial repression amounted to 0.8–1.2 percent of GDP between 1992 and 1995, while the seigniorage revenues varied between 3.1 and 5 percent (in 1995) of GDP. This high reliance on seigniorage revenues shows that while most of the public sector borrowing requirement (PSBR) is financed by domestic debt issue, deficit financing still has significant impact on inflation.

While the adjustment in 1995 and 1996 has been impressive, its long-term sustainability is rather vulnerable because it was partly based on temporary measures (like the revenues from privatization and introduction of an import surcharge which was gradually abolished in 1997). Therefore, further adjustments in the primary balance are required, especially since interest expenditures grow rapidly partly because of the high costs of sterilization.

Another problem related to the crawling peg regime is that the strong capital inflows seem to be further stimulated by policy measures aimed at regulating them. The liberalization of capital movements (especially of capital outflows associated with Organization for Economic Cooperation and Development [OECD] membership in 1996) and the sterilization of capital inflows have stimulated further inflows, because the policy has both maintained high domestic returns and reduced risks associated with investment in this emerging market.

But capital inflows also reflect the weakness of monetary policy and highlight the traditional problem of simultaneously using some form of fixed exchange rates and maintaining monetary independence and liberalized capital flows. This is a very serious problem for the Hungarian monetary policy since here the liberalization of capital flows was especially rapid, and the initial dependence of monetary policy on deficit financing was immediately replaced by dependence on capital inflows. While in the last four years the tools of monetary regulation have changed significantly, now only the exchange rate level has remained as an effective intermediate target for monetary authorities.

The long-term success and viability of the crawling peg regime hinges on two crucial factors. First, it depends on the success of income policies, whether real wages can be kept under control in order to reduce their pressure on domestic inflation.

The second precondition of the success is related to the sustainability of fiscal adjustment, which should strongly reduce the PSBR. The success in fiscal adjustment should simultaneously reduce domestic interest rates and weaken the inflationary impact of the public sector borrowing requirement. Moreover due to long-term fiscal problems, the success in fiscal adjustment is the critical test for the credibility of macroeconomic policies and the crawling peg regime.

Lessons from Exchange Rate Policies in Transition Economies and Hungary

The last six years allow one to determine several common aspects of exchange rate policy in transition economies, which are equally applicable to Hungary as well. On the other hand due to its different initial macroeconomic conditions, the extent of its market-oriented reforms and its applied macroeconomic policies, Hungary's case offers some special and different lessons than can be found in other transition and developing economies.

In the following we will first review those experiences from the Hungarian exchange rate policy that are equally observable in other transition economies as well, while later some specifically Hungarian experiences are evaluated.

1. Exchange rate policies in a transition economy may be divided into two stages. The first one is associated with the replacement of the earlier rigid system with a market-based exchange rate regime. The second is associated with the shift to exchange rate management in an open economy with remaining strong market distortions and increasing exchange rate flexibility, as compared with the initial stage. In the first period the most important issues are the introduction of current account convertibility, liberalization of prices and imports, unification of official and parallel markets, deep devaluation of currencies to adjust to price liberalization and the inherited overvaluation of national currencies, and the choice between fixed and flexible regimes. In the second stage the key issue is how to adjust the exchange rate policy to rapid capital account liberalization and increasing openness in economies with a still-high public sector, market distortions and serious macroeconomic imbalances. The

- development of nominal and real exchange rates are especially different from developing economies in the first stage, while the differences gradually decline in the second one.
2. Another regionwide trend is the gradual appreciation of real exchange rates, which is observable in all different exchange rate regimes. The appreciation is partly the reflection of the initial deep devaluation, which brought actual exchange rates far below purchasing power parity (PPP) or FEER levels, and which is being gradually corrected by this appreciation. Besides that, the appreciation is also the reflection of the use of exchange rate policy for anti-inflationary purposes and of the gradual convergence of inflation to lower levels. The strong inflation inertia and the widespread use of rigid exchange rate regimes have also contributed to the appreciation. Finally, the Balassa-Samuelson impact also had its influence on real exchange developments, as one could observe after the initial decline of the huge increases in productivity in the tradables sector.
 3. While initially exchange rate policies were directed primarily to reducing inflation, later the appreciation of real exchange rates and the accompanying worsening of the current account required the use of more flexible exchange rates. This was reflected in the Czech Republic by the move from the fixed exchange rate to a currency band, and in Poland from a crawling peg to a crawling and quite significant band (7 percent in both directions around the central parity). This shift reflects increased concern with balance of payments developments and competitiveness of the tradables sector.
 4. A very important and a common factor influencing exchange rate policies in transition economies is the rapid opening of these economies. The liberalization of the current account occurred almost simultaneously or even preceded the adoption of macroeconomic stabilization policies in the early 1990s. Currently more than 90 percent of imports are liberalized and the openness of these economies has increased significantly above the middle income developing economies. The rapid liberalization of the capital account proved to be an even more important factor influencing exchange rate policies. This liberalization has been almost as rapid as the liberalization of the current account, and the transition economies have reached a significant degree of capital account convertibility as well. This capital account liberalization has not only been quite significant but also relatively early compared with the experiences of other economies and theoretical considerations. Based on the

sequencing literature, it is considered better if the opening of the capital account is the last part of the liberalization program.

In transition economies the liberalization of the capital account occurred almost simultaneously with current account liberalization although the degree of capital account convertibility is still much more restricted than that of the current account. The rapid liberalization of the capital account was reflected in allowing the almost unlimited foreign borrowing of the enterprises and banking sector, inflows of foreign capital, and opening of domestic capital markets for foreign investors.

The reasons for rapid liberalization can be found in rapid structural changes, lack of domestic savings, and the positive impact liberalization was assumed to have on macroeconomic discipline. Besides that, some economies—most notably Hungary—thought to reduce their internal macroeconomic problems with capital account liberalization.²⁵

The rapid liberalization of the capital account had profound implications for the exchange rate and macroeconomic policies in general. It increased the vulnerability of economies to external shocks and the volatility of major macroeconomic variables, and required much more prudent macroeconomic and regulatory policies. The liberalization reduced the link between the current account and exchange rate policy and increased the role of capital movements in the determination of the balance of payments.

5. A very important factor influencing exchange rate policies is the inflow of foreign capital, particularly for speculation. This inflow is, on the other hand, stimulated by exchange rate stability in several economies, slow convergence of inflation and real interest rates to international levels, and much higher return opportunities. The inflow of foreign capital resulted in appreciation of nominal and especially real exchange rates, increased inflationary pressure, and created significant fiscal and monetary problems due to the sterilization policies.

The experience of Hungary differs in several respects from the general patterns of East-Central European transition economies.

1. First, the role of exchange rate policy was different in Hungary. The initial choice of the exchange rate regime in the transition economies was determined by the extent of openness and liberalization of prices and imports before transition, by the degree of macroeconomic imbalances, and by the availability of foreign exchange reserves.

Most of the economies chose exchange rate-based stabilization policies with a key role attached to the fixed exchange rate (nominal anchor), while Hungary opted for a money-based stabilization policy with a more flexible exchange rate regime.

2. In Hungary the exchange rate policy played a minor role in the initial stage as no initial deep devaluation was needed, the economy was much more open and liberalized requiring less import and price liberalization, and the extent of monetary overhang and associated corrective inflation was smaller. Therefore, the adjustable peg regime was used simultaneously to maintain external competitiveness in the period of rapid import liberalization and to reduce corrective inflation.
3. The differences from other transition economies in the exchange rate regime and policies also remained in the second stage when the growing openness was accompanied in other economies by increasing flexibility of the adopted exchange rate regimes. In Hungary the high macroeconomic imbalances required the use of more rigid exchange rate regimes than those used by other economies in the first stage of transition to a market economy.
4. A similar and closely related difference between Hungary and other economies is in the sequencing of liberalization and stabilization measures. The liberalization of both current and later capital account movements occurred earlier in Hungary than in other economies, thus modifying the impact of exchange rate policies. The early current account liberalization required exchange rate adjustments in the 1980s, and therefore the Hungarian currency was less overvalued and needed less adjustment than the currencies of other economies.
5. Another important aspect of Hungarian exchange rate policy is the difference in the real exchange developments, which was observable even before transition. There are two major differences: one is in the level of the exchange rate and the second in the trend of real exchange rate changes. The exchange rate in Hungary has never been as undervalued as was the case in other transition economies.

As shown in Havlik (1996), the ratio of the actual to the PPP exchange rate was the lowest in Hungary and Slovenia, meaning that the actual exchange rates approached the long-term one in these economies. In other economies, notwithstanding the observed real exchange appreciation, the actual exchange rates are far below the PPP or FEER ones. This has a significant implication for the competitiveness of the tradables sector and affects the structure of capital inflows to the region as well.

The changes in real exchange rates were also different here. Hungary avoided the initial sharp real devaluation of its currency followed later by gradual appreciation. The real exchange rate development has been much smoother, reflecting the simultaneous concern with inflation and the current account balance.

Appendix 3.1

Comments on Pál Gáspár's Study

James Elliott, USAID

In this paper, Pál Gáspár has given us a highly interesting description and analysis of Hungary's exchange rate management policies from the late 1980s through 1995 and of the problems encountered in implementing these policies, focusing on the period dating from the onset of the country's transition from a centrally planned to a predominantly market- and private property-based economy. The exchange rate policy developments as related in this paper seem to strongly corroborate in this specific country and historical setting the lessons of Montiel's more general survey paper on the interplay and interdependence between exchange rate and monetary and fiscal policies.

In particular, Gáspár's study convincingly shows how Hungary's economic policy makers appear to have changed their exchange rate management policy a number of times since 1987 as their priorities have shifted rather sharply among a number of conflicting policy objectives—namely the objectives of (1) slowing down inflation, (2) reducing the cost of financing the budget deficit, (3) arresting output and employment declines, and (4) containing international payments and current account imbalances—and as their reliance on other policy instruments to stem inflation (for example, monetary policy) changed or was somehow constrained. We see exchange rate policy first being geared toward trying to devalue the Forint in real terms as and when policy makers thought it was needed in order to offset the adverse current account impacts of trade and price liberalization (1987–1991); then, with trade and price liberalization mostly completed, striving to keep the nominal exchange rate steady to provide an anchor for the price level during a period of relaxed (or expansionary) fiscal and monetary policy (1992–1994); and finally, once again (1995), seeking to devalue the Forint in

real terms to stimulate better foreign trade performance. We also see what the effects of the different policy combinations which resulted from this seem to have been on Hungary's overall progress in macroeconomic stabilization and structural adjustment during this period.

To briefly recapitulate and condense the chapter's rather lengthy exposition, the following six-point summary may be useful. (1) In the early transition and pretransition period (1988–early 1991), the Hungarian authorities managed the exchange rate (ER) to maintain and enhance, through a series of unpreannounced and mostly small (but real) devaluations, Hungary's export competitiveness and current account performance. They also used restrictive monetary policy to make the domestic money supply serve effectively as an anchor for the price level (that is, to slow inflation) and ensure that the nominal devaluations translated into real devaluations. (2) In 1991, Hungary's fiscal and monetary policy and performance weakened significantly, and at this point the exchange rate was assigned the key anti-inflationary price level anchor role, at the expense of its foreign trade competitiveness role, so that monetary policy could be relieved of the price level anchor role. (3) During this phase (1991–1994), policy makers attempted to achieve the maximum possible degree of nominal exchange rate stability, and thus they chose to forgo devaluation as a means of stimulating exports and domestic production of importables. Although they still kept to the “no preannouncements” adjustable peg exchange rate regime, the exchange rate policy itself had been substantially modified. But (4) this policy of nominal exchange rate stability could not be sustained indefinitely, given the perceived weaknesses of monetary policy and the worsening current account imbalances. Fairly large nominal devaluations of the Forint occurred in both 1993 and 1994, in response to worsened external trade performance and to speculative attacks against the Forint; and these devaluations led to increased inflation and anticipations of further inflation and devaluation (showing up in leads in imports and lags of exports), so that the period running from late 1993 through 1994 witnessed a gradual collapse of the no preannouncements adjustable peg regime. (5) In early 1995, the by-then no longer credible adjustable peg regime was replaced by a preannounced crawling peg regime, which was thought to be more credible and thus less liable to generate destabilizing expectations of further inflation and devaluation. (6) Accompanied by a return to tougher monetary and fiscal policies, the new crawling peg regime (in which daily nominal exchange rate changes are preannounced in advance based on policy makers'

forecast of domestic inflation relative to inflation in trading partner countries and target rates of real devaluation) enjoyed (or, one might perhaps better say, shared great and better-than-hoped-for) success, as the combination of the tougher macrostabilization policy (involving expenditure cuts and increases in tax collections and strong devaluation coupled with an import tax surcharge) and the shift to the new, pre-announced crawling peg exchange regime brought about big reductions in the fiscal and current account imbalances and did so with virtually no real output loss, and only a slight increase in inflation. How much of the success is due to the stabilization package and return to greater exchange rate flexibility and how much is due to the replacement of the adjustable peg ER by the preannounced crawling peg ER seems to me to be open to question. It would seem to be due more to the former than to the latter.

Comments and Conclusions

Gáspár's description and analysis of the Hungarian experience seem to suggest or support the following ideas:

1. Exchange rate policy by itself cannot substitute adequately as a macroeconomic stabilization tool for suitably tight monetary and fiscal policies.
2. In absence of appropriately tight monetary and fiscal policies, moreover, nominal devaluations of the national currency do not translate into real devaluations of any significant duration; thus, nominal devaluations against a background of loose monetary and fiscal policy cannot bring about current account improvements of any duration. Because of a likely tendency to give rise to destabilizing expectations of further devaluation, devaluations under these circumstances may actually worsen the current account as imports are speeded up and exports are delayed in anticipation of foreign exchange costing even more in the near future.
3. Without monetary restraint sufficient to reduce the domestic rate of inflation to a level comparable to the inflation rates of other countries whose currencies are in a basket to which the national currency is pegged, the exchange rate cannot be kept stable in terms of such a basket of currencies, since doing this would involve an eventually unsupportably high cumulative real appreciation of the currency

relative to the other currencies. If an attempt is made in these circumstances to maintain the exchange rate constant in terms of another currency or basket of currencies, the attempt will not succeed for long, because current account difficulties will tend to appear as the domestic rate of inflation tends to outpace other countries' rates of inflation and the real exchange rate therefore tends to appreciate.

4. Appreciation of the currency in real terms, in addition to shifting resources away from exportables and importables production, may also tend to slow down real output and employment growth (or worsen a real decline of output and employment). It may also facilitate a level of real consumption temporarily higher than otherwise possible, since foreign capital inflows attracted by moderate to high interest rates in the context of a gradual exchange rate depreciation in nominal terms will substitute for domestic savings.

Questions

1. Why did the return to tight macroeconomic policies (specifically tighter fiscal policy) and to a more flexible exchange rate policy in March 1995 result in such a favorable short-term outcome at that time? This raises the question, Would adherence to tight monetary policy and a tightening of fiscal policy in 1991 and beyond (instead of what really happened) have brought about such favorable results sooner? Or was the stabilization package of March 1995 introduced at a time when the economy was readier to achieve a sustainable recovery and to grow in real terms than it had been four years earlier, perhaps due to new investments including foreign direct investment (FDI) and reorganization of firms and sector restructurings (for example, in agriculture, where many enterprises went bankrupt) between 1991 and 1995?

It might be that Hungary had come through the worst. With the weather having improved and reorganization having taken place in agriculture, the current account was ready to improve and would not have improved any sooner except at the expense of an adverse effect on growth. So maybe Hungary did well to postpone monetary and fiscal adjustment as long as it did?

2. To what extent did Hungary's capital account drive the current account and influence the determination of the short-term equilibrium nominal and real values of the Forint, so that these were higher on

average than they would have been otherwise? The heavy inflow of FDI and other inflows on the capital account would have supported the Forint vis-à-vis other currencies, slowing its tendency to depreciation, while at the same time causing inflation by swelling the money supply (since the monetary authorities, according to Gáspar, chose not to sterilize their purchases of the inflows because they wished to avoid upward pressure on domestic interest rates, which they considered to be already excessive for government and many enterprises). Actually, the Central Bank's purchase of the foreign exchange would seem to increase base money and therefore to put downward pressure on Hungarian interest rates, whereas an offsetting sterilizing action would just offset this. According to International Financial Statistics (IFS), annualized deposit interest rates in Hungary during this whole period ranged from 15 percent to 30 percent and lending rates from 24 percent to 35 percent, while Treasury bill rates ranged from 15.2 percent in 1992:II to 33.9 percent in 1995:5, compared with CPI inflation rates of 19 percent to 34 percent. These interest rates compared to annual rates of depreciation relative to the U.S. dollar ranging from 5.6 percent in 1992 to 20 percent in 1995. If sterilization had been tried as a means of reducing inflation and reducing the real appreciation of the Forint, would not the results have been much the same? Sterilization did raise interest rates compared to what they actually were, evidently with unsterilized Central Bank purchases of foreign exchange. Higher interest rates and lower rates of inflation and currency depreciation would have drawn even more short-term capital in than was the case. (The growth of Hungary's international liquidity and of the monetary authorities' foreign assets over this period, shown in *International Financial Statistics*, indicates that the monetary authorities purchased large quantities of foreign exchange).

Observations

Reasons for devaluation of the Forint. The Forint had come under speculative attack, as Gáspar's study points out; but to judge from the data in IFS and in the chapter, it appears that Hungary's Central Bank was in no immediate danger of running out of foreign exchanges defending the Forint. Rather one assumes that why the Forint was devalued was to meet exporters' demand for a more competitive real

exchange rate, also because of recognition that a tight monetary policy would attract still more capital inflow and that some nominal devaluation was desirable initially so the Forint would not be overvalued again from the standpoint of Hungary's tradables producers.

Notes

1. On the choice of exchange rate regime, see Claassen, E. M. (1993), Funke (1995), Hanke (1993), McKinnon (1991), Fry-Nuti (1992), Portes (1993) and Williamson (1991), among others.
2. After the first oil shock, it was assumed that the CMEA markets could protect the Hungarian economy from external pressures, and the impact of oil shocks would not be felt, requiring no adjustment.
3. Due to the gradual liberalization of the 1980s, about 40 percent of both prices and imports were liberalized by 1988.
4. The stabilization programs in other transition economies relied generally on the exchange rate as the basic anchor, supplemented by strict income policies.
5. While the speed of import liberalization was relatively slow, its impact on the domestic production, price and wage changes was substantial and rapid.
6. In this period the national currency was devalued against the basket of currencies representing the currency composition of foreign trade in the previous year. After December 1991 the composition of the basket changed, and the U.S. dollar and the European Currency Unit (ECU) remained with equal shares.
7. Moreover, the growing fiscal deficit and the relaxing macroeconomic policies increased at that time the fear that price liberalization would produce not only a one-time adjustment but an ongoing inflation.
8. Public debt increased between 1990 and 1995 from 63 percent of GDP to 89 percent. Out of this increase, 4-percentage-point growth was related to the high primary deficit, while 16-percentage-point growth was the outcome of different consolidation measures carried out by issuing public debt. The increase of public debt was followed by growing interest expenditures, which reached 9 percent of GDP and almost 30 percent of the central government expenditures in 1995.
9. This gap was closed only partly in 1995, when the drastic adjustment policy brought about the 12 percent decline in real wages needed to restore the current account and fiscal deficit.
10. An important difference between Hungary and other transition economies is that in Hungary the macroeconomic policies were restrictive before transition, and they were gradually eased just when the subsidy reduction, import liberalization and price liberalization would have required their more consistent adoption.
11. This need for changing its stance was strengthened also by the drastic collapse of domestic incomes and demand after 1990, which allowed the shift as further decrease in domestic demand was assumed to occur due to exogenous factors.
12. According to the Olivera-Tanzi effect, real tax revenues decline with growing inflation due to collection lags.
13. The share of interest expenditures among all expenditures of the central government increased from 13 percent in 1991 to 30 percent in 1994.
14. The price increase reached its highest level on a monthly basis in June 1991, when the CPI index grew by 35.6 percent per annum. After that, the CPI inflation rate started to decline, approaching 20 percent in mid-1992.

15. Besides the exchange rate policy, this gap was also related to the increase in the share of service sector in the national economy and to the increasing role of indirect taxes that had a different impact on the growth of producer and consumer prices. The differences in the changes in the CPI and PPI indexes were also related to the opening of the economy, as the producer price index reflected the growth of prices in the tradables sector restrained by import competition while the consumer price index was more determined by price changes in the nontradables sector.
16. The supply side problems arose from the drop in agricultural production (earlier 25 percent of the exports were agricultural). The institutional aspect of the export decline is related to the adoption of the tough bankruptcy procedures, leading to the liquidation and bankruptcy of thousands of state-owned and private enterprises. According to estimates, the enterprises in bankruptcy had produced 30 percent of Hungarian exports in 1992 and 1993. The liquidation of these unviable firms led to decreasing exports.
17. The latter reflected that the public sector borrowing requirements exceeded the amount of available household savings, while the former was the result of the strong crowding out impact of the fiscal deficit.
18. The prime rate reached 25 percent and 28 percent while the forecasted inflation remained around 20 percent.
19. At the same time, privatization was temporarily halted, while political uncertainties grew (due to the resignation of the minister of finance) which forecasted very unfavorable future developments.
20. A plus-minus 2.25 percent band around the central parity has also been established.
21. This was related to the reduction of exports and increase of imports before the assumed devaluation which—due to news about worsening trade balance—further stimulated the expectations.
22. Besides exchange rate adjustments, the main factor behind high interest rates was the growing public sector borrowing requirement and its increasing financing through domestic public debt.
23. While in June 1995 the one-year Treasury bills were sold for a nominal return of 34–35 percent, the interest rates declined to 24–25 percent by mid-January 1996.
24. While in 1990 more than 90 percent of the gross foreign debt was public, its share declined to less than 65 percent in 1995, reflecting rapid increase of private foreign debt.
25. One reason of allowing foreign borrowing by the private sector was the increase of the public sector borrowing requirement and its impact on crowding out domestic private investments.

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CHAPTER 4

Macroeconomic Policy and Exchange Rate Management: The Experiences of Chile and Mexico

Vittorio Corbo

Exchange rate policy is at the center of macroeconomic management in developing countries. In particular, as countries reduce their trade barriers to increase their integration to the world economy, the real exchange rate takes a key role in determining relative prices within the economy. Thus, in a more open economy the tradable sector becomes larger and the real exchange rate is a key determinant of the relative price in terms of nontradable goods; and through this relative price, the real exchange rate affects the composition of output and aggregate demand and the size of the current account deficit.

The trajectory of the nominal exchange rate is also important as it plays a key role in determining the dynamic of the price of tradables and of the overall price level. Thus, it is not surprising that in countries with inflation far above the average of their main trading partners, the nominal exchange rate policy is an integral part of the stabilization policy. In countries that are not yet ready to start a stabilization program, the nominal exchange rate policy has to be consistent with the rate of inflation to avoid a sharp real appreciation and by association an exchange rate crisis. In this case, the exchange rate policy is usually one of periodic adjustments in the nominal rate.

In countries that have decided to reduce inflation to international levels, dealing with the ultimate causes of the inflation poses the problem of choosing between a money-based stabilization program (MBSP) and an exchange rate-based stabilization program (ERBSP).

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Once inflation has been controlled, exchange rate policy is directly linked to the choice of how to carry out stabilization policy. The choice here is between a fixed exchange rate or to forgo completely the use of monetary policy, relying mainly on fiscal policy and a flexible exchange rate system accompanied by an institutional setting to pursue a credible monetary policy.

Chile and Mexico provide an opportunity to evaluate the role of the exchange rate in a stabilization program to cut inflation to international levels. Both countries started with inflation substantially above international levels and used the trajectory of the nominal exchange rate to anchor the evolution of the price of tradables and to shape inflationary expectations in a classical ERBSP.

In Chile, starting in February 1978, a forward-looking schedule of decreasing rates of devaluation was announced; and by June 1979, following a small discrete devaluation, the exchange rate was fixed at 39 pesos to the U.S. dollar. However, in June 1979, the domestic inflation rate was running close to 35 percent per year while labor contracts were indexed to past inflation. Thus, a protracted period of real appreciation was bound to result. In Mexico, the peso was pegged to the U.S. dollar as part of the stabilization program in December 1987. From then on, the exchange rate was adjusted at a decreasing rate of crawl with the final objective of reducing domestic inflation to international levels. But to avoid the inconsistency of the Chilean system, nominal wages were negotiated with the unions to be adjusted with respect to expected inflation rather than past inflation.

Both experiences resulted in a large credit expansion, a major increase in the current account deficit, a large real appreciation, and then a speculative attack that ended with the abandonment of the exchange rate policy and a major recession followed by the collapse of the banking system. What we want to ask in this paper is, What is the appropriate monetary and exchange rate policy for a country that still has inflation far above international levels and decides to carry out a stabilization effort. In particular, is there something inherently wrong with the use of a fixed peg or a sliding peg of the type used by the Southern Cone countries, and in particular Chile, in the 1970s and Mexico in 1987–1994?

The rest of the paper is divided into four sections. The next section discusses the role that the exchange rate can play in stabilization policies for countries with high and chronic inflation. The third section analyzes the exchange rate-based stabilization program that Chile followed in

1978–1982. The fourth section analyzes the Mexican exchange rate–based stabilization program of 1987–1994, and the final section presents some conclusions.

Stabilization Policies for Countries with High and Chronic Inflation

In countries with high and chronic inflation¹ that are ready to correct the fundamentals—usually a high fiscal deficit—and to put in place a program to reduce inflation to the one-digit annual level, the central issue is how to break the dynamic of inflation while avoiding the buildup, in the process, of a real appreciation that could slow down export growth and lead to an exchange rate crisis. A key question is what type of exchange rate and monetary policy should accompany the stabilization program. The authorities will have to choose between the use of an ERBSP or an MBSP. Central to the decision will be the existing inertia of the inflationary process and the possibilities of reducing this inertia.

Inflation Inertia

The dynamics of disinflation can be studied using a simple macroeconomic model such as that presented in Corbo (1985b), Corbo and Nam (1992), Dornbusch and Fischer (1993), and Edwards (1993).

The model starts with two groups of goods: tradables and non-tradables. Tradable prices follow the law of one price, nontradable prices are determined from the equilibrium in the nontradable market or from a markup on unit labor cost. The wage dynamic is obtained using a traditional expected-inflation augmented Phillips curve. The model is completed with an aggregate demand equation to describe the dynamics of the rate of unemployment. Versions of the model differ in the treatment of inflation expectations and the dynamic of the different price equations.

We present below a simple version of this model:

$$\pi = aw + (1 - a)e + \ddot{y} \quad 0 < a < 1 \quad (4.1)$$

$$w = \pi_{-1} - bu \quad b > 0 \quad (4.2)$$

$$e = c\pi + (1 - c)\pi_{-1} \quad 0 < c < 1 \quad (4.3)$$

$$\pi = \pi_{-1} + \gamma\dot{y} - ab\gamma u \quad \gamma = \frac{1}{1 - c(1 - a)} \quad (4.4)$$

$$u = u_{-1} - \mu(m - \pi) - \phi(e - \pi) - sf \quad (4.5)$$

Equation (4.1) is aggregate inflation obtained as the weighted average of the inflation of nontradables and the inflation of tradables where the inflation of nontradables follows the evolution of wages (w) and is also affected by supply shocks (\dot{y}). In this equation the price of tradables follows the rate of depreciation of the currency (e). Equation (4.2) is a stylized Phillips curve: the lagged inflation term reflects either adaptive expectations about inflation or indexation of nominal wage adjustments, which is widespread in high-inflation economies. Equation (4.3) is an exchange rate adjustment rule, in which the government is assumed to try to maintain the real exchange rate constant, but in which—because of lags in measuring or perceiving price changes—inflation surges result in real appreciation. Equation (4.4) is obtained from replacing equations (4.2) and (4.3) in (4.1). Equation (4.5) represents goods market equilibrium: Increases in real balances, real depreciation and fiscal expansion (f) reduce unemployment.

While the lag structures and the treatment of expectations in this model are excessively simple, the model summarizes well the essential problem of stabilization. By adding and subtracting π_{-1} on the right hand side of (4.1), we obtain:

$$\pi = \pi_{-1} + a(w - \pi_{-1}) + (1 - a)(e - \pi_{-1}) + \dot{y} \quad (4.1)'$$

On the supply side, inflation today will be equal to inflation yesterday except for any combination of the following:

- a. Wage inflation falls below past price inflation. This requires a break with any implicit or explicit backward price indexation; otherwise, the real wage tends to rise when inflation is reduced (Simonsen, 1983; Corbo, 1985b; Fischer, 1988). The suspension of indexation, the replacement of backward-looking by forward-looking indexation, or the introduction of an income policy could achieve this.

- b. Exchange depreciation falls below the past rate of inflation. This is the major attraction of exchange rate-based stabilizations, particularly in very open economies.
- c. Favorable supply shocks lead to disinflation without the need for the exchange rate or wages to take the lead. Just as the unfavorable supply shocks of the 1970s increased inflation, the favorable oil price shock of late 1985 helped the Israeli disinflation program that started in July that year.²

By using equation (4.4), we also obtain the Phillips curve conclusion:

- d. Inflation can be cut the old-fashioned way, by increasing unemployment through restrictive aggregate demand policies.

Heterodoxy and Orthodoxy

The stabilization problem is to reduce inflation, the balance of payments deficit and the fiscal deficit at minimum cost in terms of unemployment and the poor, with minimum damage to growth, and in ways that will increase long-run growth. The attraction of supply side policies— income policies, wage-price freezes, changes in indexation rules—is that they appear to hold out the prospect of reducing inflation costlessly. The danger of using such policies is that they cannot permanently reduce inflation unless the underlying fiscal and monetary causes of the inflation have been addressed. But by combining the necessary fiscal and monetary measures with supply side measures, in so-called *heterodox* policies, the unemployment costs of stabilization can in principle be reduced.

In equation (4.1)', heterodoxy would seek to reduce w below the level it would take without direct intervention, either by freezing wages or by suspending indexation that would otherwise set w at the level π_1 . More generally, heterodoxy could be seen also as seeking to produce a negative \dot{y} by controlling price increases.

Wage Controls, Pacts and Taxes

Heterodox programs often seek to control wages, either through controls or through pacts with labor, as in the Mexican "Pacto" among the

government, labor and industry. While the macroeconomic case for reducing the rate of wage increase is clear from the above model, wage controls that are maintained for any length of time either begin to break down or distort relative wages. Thus, wage controls should be viewed at best as a transitory measure to help stabilize inflation.

The Costs of Disinflation

The literature identifies at least two costs of disinflation: distribution costs and output costs. The distribution costs of ending inflation play a prominent role in political economy models that seek to explain stabilization delays,³ but little is known about their empirical importance.⁴ The output cost emerges from the traditional short-term Phillips curve approach to inflation.

Once the role of expectations in the Phillips curve is recognized, the output costs can in principle be avoided if the private sector can be persuaded to expect lower inflation by some route other than lower inflation. Thus, in models where credibility is important, credible preannounced reductions in money growth can reduce the output costs of disinflation.⁵ Even in the presence of long-term contracts, credible disinflations announced sufficiently far in advance, or sophisticated paths of money growth, in principle make it possible to disinflate without cost. However, the evidence suggests that disinflation is costly⁶ except perhaps for disinflations that are based on an exchange rate anchor (Kiguel and Liviatan, 1992). Although in the latter, a larger share of the cost is paid later rather than never paid (Kiguel and Liviatan, 1992; Végh, 1992; Reinhart and Végh, 1994; and Rebelo and Végh, 1995).

Nominal Anchors

A nominal anchor is a variable that governs the evolution of the price level. In modern discussions, the nominal anchor is typically thought of as either the quantity of money or some other nominal asset (for example, credit), or the exchange rate. The exchange rate may be fixed or may follow a preannounced crawling peg path, as in the *tablitas* of the late 1970s in the Southern Cone of South America and as in the recent Mexican experience. The exchange rate path may be reset from time to time, as for instance in the Israeli diagonal band system introduced in 1991.

The exchange rate, the quantity of money and the target inflation can be regarded as anchors in the sense that the central bank can, at least for some time, control both the quantity of money or the exchange rate and can control indirectly the inflation target through its exchange rate and monetary policy. Of course, no nominal anchor can keep inflation low for long unless the underlying real fundamentals, in particular the budget deficit, are consistent with the specified path of the anchor. Also, the behavior of the anchor should be consistent with the mechanism of adjustment in other nominal prices; otherwise large distortions in relative prices could develop and damage the effectiveness of the program. In particular, backward-looking wage indexation is often incompatible with the use of a fixed exchange rate anchor. Chile's stabilization program of 1978–1982 discussed later illustrates this problem (Corbo, 1985a; Edwards and Cox-Edwards, 1987; Corbo and Fischer, 1994).

In practice, the choice between the exchange rate and the quantity of money as the nominal anchor during a stabilization program has almost always been settled in favor of an exchange rate peg.⁷ The exchange rate has several advantages over the quantity of money as a nominal anchor: The central bank knows precisely what it has to do; the public knows at every moment whether the central bank is succeeding; and the exchange rate affects import prices and the prices of other tradables directly. An exchange rate peg can quickly garner credibility, at least for the short term; in the long term, credibility can be retained only by success in maintaining the exchange rate peg. But a fixed exchange rate is very costly for a government to maintain when its promises not to devalue lack credibility. In particular, credibility suffers when unemployment is high or the health of the banking system is in jeopardy.

But the use of a monetary anchor also faces difficulties. In the early stages of a stabilization program, there is bound to be great uncertainty about the demand for real balances, both because it is not known to what extent the preceding inflation has permanently reduced the demand for money and as a result of uncertainty over the success of the stabilization attempt. Furthermore, in high- and variable inflation countries—which usually go together—velocity is very unpredictable, making it very difficult to assess the rate of growth of money demanded compatible with the targeted inflation rate. Consequently, the central bank adhering to a money stock target within an ERBSP may find itself with an exchange rate and interest rates that are far out of line with the needs of the situation. In particular, if the quantity of money demanded is underestimated, the resulting high real interest rates could result in high

unemployment and could plant the seeds of a banking crisis. A pegged exchange rate regime has the advantage that in the earlier stage of stabilization the rate of growth in money demanded can be accommodated with an endogenous increase in the nominal money supply through the balance of payments. In this way, the initial and unpredictable sharp increase in the quantity of money demanded that follows a drop in expected inflation could be accommodated without a sharp increase in the real interest rate and a recession (Sachs, 1995).

The extent of the commitment to the exchange rate anchor varies. At one extreme is the Argentine 1991 convertibility law, which embodies the nominal anchor in legislation that established a currency board like the ones in Hong Kong and Estonia; at the other is an exchange rate peg that is simply announced without any longer term commitment being made, as was the case in Chile in 1978, in Israel in 1985, in Mexico in 1987 and in Poland in 1989. But in a world of open capital markets it is becoming increasingly difficult to maintain fixed exchange rate regimes with a domestic currency (Obstfeld and Rogoff, 1995).

Kiguel and Liviatan (1992) argue that, contrary to the usual pattern in MBSPs, ERBSPs in chronic inflation countries start with a boom (perhaps after a brief recession) rather than a recession.⁸ Then, if the exchange rate peg is maintained, there is a period of overvaluation, which results in a recession. Thus, they argue, the ERBSP does not avoid the recession that accompanies stabilization, but only delays it. During the ERBSP, the trade balance and current account deteriorate, real wages generally increase, the real exchange rate appreciates, and either or both consumption and investment boom. In several cases, the consumption boom took place despite a significant cut in the budget deficit and higher taxes. Real interest rates declined in some cases, and then rose sharply in the early years of the Chilean, Mexican and Israeli stabilizations.

Kiguel and Liviatan identify several possible explanations for the stylized facts of the differences between ERBSPs and MBSPs, including the role of sticky prices, the possibility that lower real interest rates encourage spending, the idea that uncertainty about the success of the stabilization combined with concern over the policies that will follow (for example, imposition of tariffs or tax increases) can account for the spending boom, and the possibility that the increase in real wages encourages consumption.⁹

Rebelo and Végh (1995) present a model to analyze the dynamics of output and consumption in ERBSPs. In particular, they are interested in comparing alternative hypotheses of the source of the boom. They

test several hypotheses: Inflation inertia, which with an open capital account results in a negative real interest rate (Rodriguez, 1982); lack of credibility, which would distort intertemporal prices resulting in a temporary increase in the purchase of durable goods (Calvo, 1986); and efficiency gains of stabilization with their effect in permanent income and consumption (Roldos, 1995). Rebelo and Végh found that inflation inertia and the supply shock of a credible disinflation are capable of creating (in their model) a path for the key macroeconomic variables more compatible with the empirical evidence associated with ERBSPs.

The use of an exchange rate anchor in the early stages of a stabilization program, especially for high inflation cases, is becoming part of the conventional wisdom. There is much less agreement, however, on when to make a transition to a more flexible exchange rate mechanism. The temptation for authorities is to stick with an exchange rate anchor out of a concern that inflation will accelerate. But as happens many times in economics, there is a trade-off. Sticking with a fixed exchange rate for too long could result in sharp appreciation that could fuel expectations of an adjustment in the peg as the investors bet that the government will not be able to face the short-run costs of high unemployment and a recession that eventually result from a sharp real appreciation.

This basic difficulty is compounded for a country that faces a sharp external shock in the form of a drop in terms of trade or a sharp reduction in capital inflows, as these types of shocks require a drastic change in relative prices between tradables and nontradables that is difficult to accomplish with a fixed parity.¹⁰

Thus, the choice between an ERBSP and an MBSP exists only in the early stages of a stabilization program, because even in an ERBSP the authorities will soon have to introduce some flexibility in the exchange rate policy and move into an inflation target strategy. Otherwise, the lack of credibility in maintaining the peg could result in high real interest rates and a deep recession, making the maintenance of the peg less credible and more costly and fueling a speculative attack on the exchange rate regime.

Chile: The Exchange Rate-Based Stabilization Program of 1978–1982

After the military coup of September 1973, Chile implemented a MBSP to bring down inflation, which was running at an annual rate close to

1000 percent.¹¹ The MBSP was accompanied (and made possible) by a sharp fiscal adjustment that eliminated a fiscal deficit that had reached 25 percent of GDP in 1973. The public sector adjustment included a major tax reform initiated in 1974 and drastic reductions in public expenditures—both in 1974 and 1975. By 1976 a public sector surplus equal to 0.6 percent of GDP was achieved (Table 4.1).

In parallel to the stabilization effort, an ambitious program of structural reforms was initiated with the ultimate objective of creating a more competitive and open economy with a strong role for the private sector in production and distribution. Price reform was introduced early on, when most price controls were lifted and public utility prices were adjusted to cover their production costs. Structural transformation in other areas was initiated once enough progress had been achieved in dealing with the reduction of the public sector deficit. Structural reforms were introduced in the trade regime (1974–1979), the domestic financial system (1975–1978), the labor market (1979–1980), domestic regulation (1976–1981) and the public sector (all through the period). However, inflation was still running at a three-digit annual level, reaching 230 percent in 1976, while in the same year the unemployment rate reached 16.8 percent. The economy started to grow as the reforms progressed and their credibility was enhanced. GDP growth was 3.2 percent in 1976, 8.3 percent in 1977 and 7.8 percent in 1978 (see Table 4.1).

Unhappy with the pace of inflation reduction and the high unemployment rate, in February 1978 the stabilization program was changed from an MBSP to an ERBSP. On the exchange rate front, the program started with an active crawling peg at a decreasing rate: a *tablita*. The explicit rate of devaluation included in the *tablita* was substantially below the then-monthly inflation. For a country with chronic inflation, the result was the beginning of the buildup of a real appreciation. By June 1979, the *tablita* converged into a fixed exchange rate system, despite the fact that the domestic inflation rate was still running at an annual rate of around 30 percent.

As a result, a very clear conflict existed between the objective of achieving a stable equilibrium real exchange rate to promote the new export-led development model and the use of the exchange rate as an anchor for the price level. The growing overvaluation of the currency, facilitated and sustained by easy access to external financing by the private sector, had deep macroeconomic repercussions and was one of the main causes of the boom that developed in the following years, as well as of the deep recession that followed.

Table 4.1 Chile's Annual Macroeconomic Indicators, 1960–1997

Year	GDP growth (%) (1)	Domestic expenditure growth (real, %) (2)	Trade deficit (% of GDP ^a) (3)	Current account deficit (% of GDP ^a) (4)	Public sector deficit ^b (% of GDP) (5)	Price of copper (US\$/pound) (6)	Inflation (% change in CPI, Dec.–Dec.) (7)	Unemployment rate (% of labor force) (8)	Real exchange rate ^c (1977 = 100) (9)	Real interest rate (10)
1960	N.A.	N.A.	2.9	3.8	4.6	30.8	5.5	7.1	78.6	—
1961	4.8	6.1	4.3	5.5	4.5	28.7	9.6	8.0	72.6	—
1962	4.7	2.5	1.4	3.0	5.8	29.3	27.7	7.9	69.7	—
1963	6.3	5.8	2.5	4.3	4.9	29.3	45.4	7.5	79.4	—
1964	2.2	2.9	0.9	2.7	3.9	44.1	38.4	7.0	71.3	—
1965	0.8	0.4	-0.8	1.3	4.1	58.7	25.8	6.4	74.9	—
1966	11.2	16.5	-1.1	1.4	2.5	69.5	17.0	6.1	78.4	—
1967	3.2	0.6	-1.4	1.6	1.3	51.1	21.9	4.7	82.5	—
1968	3.6	4.8	-0.8	2.0	1.5	56.1	27.9	4.9	88.9	—
1969	3.7	5.8	-2.3	0.6	0.4	66.6	29.3	5.5	93.5	—
1970	2.1	1.8	-0.7	1.2	2.7	64.2	36.1	5.7	93.4	—
1971	9.0	9.7	1.0	2.1	10.7	49.3	28.2	3.9	85.6	—
1972	-1.2	1.0	3.5	3.9	13.0	48.6	255.4	3.3	64.7	—
1973	-5.6	-6.2	1.9	2.7	24.7	80.8	608.7	5.0	74.4	—
1974	1.0	-2.4	-0.7	0.4	3.5	93.3	369.2	9.5	122.7	—
1975	-13.3	-20.8	2.0	5.2	0.9	55.9	343.3	14.8	147.1	—
1976	3.2	0.2	-4.3	-1.7	-0.6	63.6	198.0	12.7	124.1	—
1977	8.3	14.2	1.8	3.7	-0.1	59.3	84.2	11.8	100.0	16.3
1978	7.8	9.7	3.3	5.2	-1.5	61.9	37.2	14.2	111.4	18.9
1979	7.1	10.5	2.8	5.4	-3.3	89.8	38.9	13.6	112.2	15.6

1980	7.7	9.3	4.2	7.1	-4.5	99.2	31.2	10.4	97.2	10.1
1981	6.7	11.6	10.3	14.5	-0.8	78.9	9.5	11.3	84.5	14.7
1982	-13.4	-24.1	1.9	9.2	3.5	67.1	20.7	19.6	94.2	15.6
1983	-3.5	-8.6	-2.7	5.4	3.1	72.2	23.1	14.6	113.1	11.2
1984	6.1	8.7	1.1	10.7	2.7	62.4	23.0	13.9	118.2	9.2
1985	3.5	-2.4	-2.4	9.4	0.6	64.3	26.4	12.0	145.2	9.1
1986	5.6	4.9	-3.1	7.3	0.0	62.3	17.4	10.8	159.7	9.1
1987	6.6	9.8	-2.9	5.0	0.6	81.1	21.5	9.3	166.6	7.6
1988	7.3	7.7	-7.0	0.5	-2.6	117.9	12.7	8.3	177.6	7.4
1989	10.6	13.3	-4.5	1.8	-0.2	129.1	21.4	6.3	173.5	8.9
1990	3.7	2.9	-3.4	1.9	-1.3	120.9	27.3	6.0	180.1	12.7
1991	8.0	6.2	-4.0	0.3	-1.5	106.1	18.7	6.1	169.9	8.3
1992	12.3	15.0	-1.5	2.3	-2.5	103.6	12.7	5.7	155.8	8.3
1993	7.0	10.8	2.3	5.6	-2.1	86.7	12.2	5.9	154.6	9.3
1994	5.7	5.5	-1.4	3.0	-2.0	104.9	8.9	6.9	150.4	9.3
1995	10.6	16.2	-1.9	2.0	-2.5	133.2	8.2	6.0	142.1	8.5
1996	7.4	7.9	1.7	5.8	-3.2	103.9	6.6	5.7	138.5	8.8
1997	7.1	9.5	1.8	5.5	-2.2	103.2	6.0	NA	127.7	8.4

Notes: — Not available.

a. Computed with national account information at current prices.

b. The figures in parentheses include an estimate of the quasi-fiscal subsidies channeled through the Central Bank (Larrañaga, 1989).

c. An increase indicates a real depreciation of the domestic currency.

COLUMN SOURCES: (1), (2), (3), (4), (6) and (10), up to 1984, Central Bank of Chile, *Indicadores Económicos y Sociales*. From 1985 to 1988: Central Bank of Chile, *Cuentas Nacionales de Chile 1985-1992*. From 1989 on, Monthly Bulletin. (5) It corresponds to the nonfinancial public sector. Up to 1983, Central Bank of Chile, *Indicadores Económicos y Sociales*, excluding copper; from 1984 on, T. Flores, "Sector Público No Financiero," mimeo PIMA, Instituto de Economía, U. Católica de Chile, including copper. (7) Corrected CPI, CIEPLAN. (8) Up to 1985: figures from the survey carried out every year in October through December on Central Bank of Chile, *Indicadores Económicos y Sociales*. From 1986: annual average on Central Bank Monthly Bulletin. (9) Central Bank of Chile Real Exchange Rate corrected by CIEPLAN CPI. (10) Indexed interest rates on 1- to 3-year loans. For the period 1977-1980, they correspond to the indexed interest rate on 90- to 365-day loans.

As a result of the introduction of a preannounced crawling peg and inflation inertia, the cost of foreign borrowing decreased substantially. It fell from 22.6 percent per year in the fourth quarter of 1977 to 10.2 percent per year in the first quarter of 1978, and became negative from there until the last quarter of 1980. The reduction in the cost of foreign borrowing unleashed large capital inflows and a drop in domestic real interest rates.¹² Inappropriate regulation and supervision of the banking system facilitated the increase in capital inflows. The drop in real peso and U.S. dollar interest rates and the large increase in real credit fueled a rapid increase in real domestic expenditures.

The widening gap between the growth rate of expenditures and that of GDP was reflected in a growing trade deficit. The trade balance deficit rose from 1.8 percent of GDP in 1977 to 4.2 percent in 1980, and 10.3 percent in 1981. In parallel, the current account deficit went from 3.7 percent of GDP in 1977 to 7.1 percent of GDP in 1980 and 14.5 percent of GDP in 1981, and the real appreciation between 1978 and 1981 reached 24.1 percent (see Table 4.1).

By the end of 1981 and early in 1982, the large trade deficit and adverse external shocks (a worsening in the terms of trade and a sharp increase in international interest rates) began to generate doubts about the sustainability of the fixed exchange rate. As a result, capital inflows began to slow down, and a period of capital flight started. With the loss of external funding, the key policy issue in early 1982 was how to engineer a sharp reduction in the trade balance deficit without causing an undue increase in unemployment. Chile was already in crisis before the international debt crisis broke in August 1982; but at that point capital inflows had all but disappeared, and the speed of reduction in the trade balance deficit had to be accelerated.

With respect to the exchange rate regime, the exchange rate was unified in 1976, and a crawling peg system was put in place with the clear objective of maintaining PPP. Unhappy with the slow pace of inflation reduction, the government authorities initiated an exchange rate-based stabilization program in February 1978. At the time of the ERBSP, the fiscal fundamentals were in place, as the country had a budget surplus (Table 4.1). However, the new labor law introduced in 1979 made, for workers subject to collective bargaining, the backward adjustment of nominal wages compulsory. The minimum offer of the employer had to be at least equal to the previous nominal wage adjusted for the inflation rate since the last contract. With the sharp initial reduction of inflation that accompany ERBSPs, this wage adjustment

policy was bound to result in a sharp increase in real wages and a sharp real appreciation, and this was indeed the case (Table 4.1).

This program lasted four years when the fixed peg had to be abandoned, and the country suffered a sharp recession. The role of the exchange rate-based stabilization program of 1978–1982 in the Chilean crisis of 1982 has been the subject of heated debate (Corbo, 1985b; Corbo and de Melo, 1987; Edwards and Cox-Edwards, 1987; Morandé, 1988; Valdés, 1992). The question is essentially whether the program was bound to fail, or whether it succumbed to minor design flaws along with major external shocks.

There is no question that a forward-looking exchange rate adjustment at a decreasing rate that converged into a fixed rate could and did slow the rate of inflation. The real dispute is over the roles wage indexation and poor financial regulation played in planting the seeds for the crisis that followed. It is generally accepted today that there was much inertia in inflation in the Chilean economy after 1974. By inertia we mean, of course, that inflation was slow to respond to contractionary policy.¹³ Corbo (1985b) built a model of Chilean inflation to study inflation dynamics. From a model estimated for the period 1974:1 to 1983:2, he found that Chilean inflation had considerable inertia. Until early 1978, inertia came from both the exchange rate rule and the indexation of wages. Starting in February 1978, when the exchange rate-based stabilization program was introduced, the first source of inertia was eliminated, but wage indexation remained as an important cause of inertia.

Corbo and Solimano (1991) investigated the dynamics of Chilean inflation in this period using a small structural model. For this purpose they estimated, for the period 1976:1 to 1989:1, a three-equation quarterly model of the type used by Bruno and Fischer (1986) and Fischer (1988). The model includes a price equation, an output growth equation and a wage equation. Corbo and Solimano found that the slow pace of disinflation in the 1975–1978 program was due in large part to the exchange rate and wage rules in place. From a counterfactual simulation, they concluded that the aggressive nominal devaluations of 1975, introduced to produce a real devaluation in response to severe external shocks, slowed down the pace of disinflation. Using the same model, they found that the forward-looking exchange rate policy introduced in February 1978 had a major share—in conjunction with the indexed wages—in producing the real appreciation of 1978–1981.

Edwards (1993) examines the question of inertia in the context of the use of the exchange rate as a nominal anchor. He uses a reduced

form of an Australian model (Dornbusch, 1980). In the reduced form, inflation is a function of lagged inflation (which comes from the wage and exchange rate equations of his structural model), foreign inflation and the rate of change in domestic credit. He also introduced a dummy variable, which takes the value of one during the fixed exchange rate period. The dummy variable interacts with the coefficient of the lagged inflation variable to allow for a reduction of inertia after the fixing of the exchange rate. The results lead Edwards to conclude that the Chilean economy displayed considerable inertia during this period. He also finds that the coefficient of lagged inflation did *not* decrease after the fixing of the exchange rate.

Corbo and Fischer (1994) pursued the key question of the causes of the inertia by estimating a small structural model like that used in Bruno (1978), Corbo (1985b) and Corbo and Nam (1992).

The model is given by the following set of equations:

$$\hat{P}_t = a_0 + a_1 \widehat{PEXT}_t + a_2 \widehat{PEXT}_{t-1} + a_3 \hat{E}_t + a_4 \hat{W}_t + a_5 \hat{M}_{t-1} \quad (4.1)$$

$$\hat{E}_t = b_0 + b_1 \hat{P}_{t-1} + b_2 \widehat{PEXT}_{t-1} + b_3 D1_t \quad (4.2)$$

$$\hat{W}_t = g_0 + g_1 \hat{P}_{t-1} + g_2 \frac{1}{U_t} \quad (4.3)$$

$$\hat{M}_t = \hat{P}_t + \hat{L}(y_t, R_t, \frac{M_{t-1}}{P_{t-1}}) \quad (4.4)$$

where: (^) = Quarterly rate of change,

P = Consumer price index,

$PEXT$ = External prices in U.S. dollars,

E = Exchange rate, in pesos per U.S. dollar,

W = Average wage rate,

M = Money supply M1,

L = Real money demand,

y = Real income,

R = Nominal interest rate,

U = Unemployment rate,

$D1$ = Dummy variable that takes a value of one in a quarter, following a large nominal appreciation. It takes the value of one in 1976:3 and 1977:2 and zero otherwise.

Equation (4.1) is the price equation; equation (4.2) describes the PPP exchange rate rule. Equation (4.3) describes the wage indexation rule, and equation (4.4) is a demand for money equation.

The model was estimated with quarterly data for the period 1974:2 to 1982:1. The results of the estimate appear in Table 4.2.

The estimated exchange rate and wage equations indicate a strong response of the nominal exchange rate and wages to lagged inflation.¹⁴ Substituting equations (4.2), (4.3) and (4.4) into (4.1), we obtain the following expression for the coefficient of lagged inflation: $a_3b_1 + a_4g_1 + a_5$. Replacing the estimated values from the structural model, one obtains an estimated value of 0.998 for this expression.

From these results they conclude that inflation indeed shows strong inertia. Further, given its weight in the price equation, most of the inertia comes from the coefficient of lagged inflation in the exchange rate equation. However, the coefficient of lagged inflation in the wage equation contributes significantly to the inertia in overall inflation.

These results confirm the view that the PPP exchange rate rule was a major source of inertia. Even with b_1 equal to zero, the limit of the

Table 4.2 Quarterly Inflation Model: 1974:2–1982:1

	Equation 1		Equation 2		Equation 3
a_0	-0.004 (0.016)	b_0	-0.043 (0.032)	g_0	-0.015 (0.085)
a_1	-0.147 (0.291)	b_1	1.055 (0.104)	g_1	0.953 (0.089)
a_2	0.052 (0.289)	b_2	0.085 (0.661)	g_2	0.439 (1.027)
a_3	0.441 (0.068)	b_3	-0.209 (0.076)		
a_4	0.283 (0.070)				
a_5	0.263 (0.073)				
R^2	0.948	R^2	0.790	R^2	0.800
$D-W$	2.60	$D-W$	1.65	$D-W$	2.83

NOTE: The values in parentheses are the estimated standard errors. See text of preceding pages for definitions of variables.

SOURCE: Corbo and Fischer, 1994.

crawling peg policy when the exchange rate is fixed, the coefficient of lagged inflation in the reduced-form inflation equation derived from the model presented in Table 4.2 is equal to 0.53. That means that inertia remains, and that without a change in the wage rule, the decreasing-crawl crawling peg exchange rate-based stabilization was bound to result in a real appreciation. Thus, there is no question that the wage indexation rule played an important part in producing inflationary inertia. Inflation inertia should have been dealt with on both fronts: the exchange rate equation and the wage indexation equation.

It was the inconsistency between the forward-looking indexing of the nominal exchange rate at a decreasing rate and the backward-looking indexing of nominal wages that contributed much to the real appreciation and the ultimate crisis that built up during this period.

But this was not all. The opening of the capital account in the late 1970s without appropriate regulation and supervision of the financial system, in a system with full implicit deposit insurance, exacerbated moral hazard problems and led the banks to pursue risky lending (many times to companies owned by the banks' owners), financed by a foreign borrowing boom. This borrowing was also encouraged by the change in the exchange rate rule, as it increased the spread between domestic interest rates and the expected devaluation-augmented foreign interest rate. The large increase in foreign borrowing fueled a private expenditure boom, generating an equilibrating real exchange rate appreciation.

Now we want to study how the crisis developed. As a result of the exchange rate appreciation and the expenditure boom in 1981, the trade balance deficit reached 10.3 percent of GDP while the current account deficit reached 14.5 percent of GDP. The unsustainability of the expenditure boom sets in motion a sharp drop in the availability of external financing. The already vulnerable current account situation was accompanied by sharp unfavorable external shocks in 1982 (a decline in the terms of trade and a sharp increase in international interest rates). Indeed, there was a positive external shock of 1.2 percentage points of GDP in 1980, a negative shock equivalent to 0.5 percentage points of GDP in 1981, and a large negative shock equivalent to 3.8 percentage points of GDP in 1982 (Corbo and Fischer, 1994, Table II:2). The sharp terms of trade and interest rate shock was accompanied by a sharp reduction in external financing. Not surprisingly, the final result was a major contraction in the money supply and a reduction in aggregate expenditures. A large real depreciation was required to accompany the reduction in aggregate expenditures; otherwise, a sharp increase in

unemployment and a recession was bound to result. But this real depreciation was almost impossible to achieve with the combination of a fixed exchange rate and backward wage indexation. With increasing unemployment and a deep recession, doubts started to emerge on the capacity and willingness of the government to maintain the exchange rate policy. In turn, the resulting deterioration in credibility exacerbated the increase in domestic real interest rates and the recession. Eventually, because the fixed exchange rate was becoming very costly to maintain, it was abandoned on June 14, 1982, almost two months before the Mexican debt crisis.

We conclude that the inconsistency between the exchange rate and wage adjustment rules and the weak regulation and supervision of the financial system that fueled the large credit expansion bear most of the blame for the macroeconomic difficulties of the period.¹⁵

Mexico: The Exchange Rate-Based Stabilization Program of 1987–1994

In the period 1970–1982, Mexico followed a policy of government-led growth, where the engine of growth was the expansion of public expenditures. Although measured growth was high, major macroeconomic imbalances were building up, leading to the 1976 and 1982 balance of payments crises. From the mid-1950s to 1976, Mexico followed a policy of full convertibility and a fixed exchange rate. During this period inflation was initially close to U.S. levels; but in the expansionary years of the Echeverria administration, it increased to two-digit annual levels, building up a real appreciation. In the process a nominal devaluation was required in 1976. Then, in another political cycle, the Lopez-Portillo administration (1976–1982), in spite of benefiting from an oil discovery and an increase in the price of oil, ran a large gap between expenditures and income, resulting in a real appreciation and an accompanying deterioration in the current account of the balance of payments. As a result, there was a large buildup of foreign debt. When in the early 1980s falling international oil prices and rising international interest rates set in, the balance of payments situation became unsustainable. As short-term debt could not be renewed, Mexico had to announce that it could not serve the principal on its external debt. The balance of payments crisis resulted in a large devaluation and the introduction of severe import restrictions and capital

controls. Finally, in September 1982, the banking system was nationalized. Inflation reached almost 100 percent in 1982.

The De la Madrid administration, inaugurated in December 1982, decided early on a strategy based on stabilizing the economy and initiating its structural transformation. The structural transformation included a deep reexamination of the role of the state. Given the importance of the public sector in Mexico, public sector adjustment was an integral component of the stabilization effort. Starting in 1985, the opening up of the economy became the second priority area of reform.

In the initial years of the De la Madrid administration, the main preoccupation was the external crisis and inflation reduction. The reduction of the public sector deficit was a key reform aimed at restoring macroeconomic balances and controlling inflation. The adjustment in the public sector has been impressive. The primary deficit of the public sector was reduced from 7.3 percent of GDP in 1982 to a surplus of 4.8 percent of GDP in 1984.¹⁶ Exchange rate policy and commercial policy have also been reformed to increase the integration of Mexico with world markets. Progress was also made in the privatization of the 1,222 public enterprises that existed in 1982. After the sharp drop in oil prices in 1986, the fiscal situation deteriorated, the rate of devaluation increased, and inflation increased.

Trade reforms were not initiated until 1985. Even then, different economic authorities were sending conflicting signals. However, integration to the world economy progressed significantly in the period that followed. By 1983, 100 percent of the value of imports was subject to import permits, and there were sixteen different tariff levels with a mean tariff of 27 percent. Nontariff restrictions were also an important impediment to trade. However, by 1990, only 13.7 percent of the value of imports was subject to import permits, the average tariff had been reduced to 13.1 percent, and only five tariff levels existed (0, 5, 10, 15 and 20 percent). Furthermore, in November 1985, Mexico initiated discussions for future membership in GATT and in July 1986 achieved full membership. The current administration has made further progress in domestic deregulation and public sector adjustment.

To facilitate the opening-up process, from 1985 to late 1987 Mexico followed a real exchange rate target; but as the fiscal situation was not compatible with the real depreciation, the inflation rate accelerated, reaching 159.2 percent in 1987. Because inflation was getting out of control and indexation mechanisms were being adopted throughout the economy, the government decided to introduce a comprehensive

heterodox stabilization program in December 1987, just eight months before the presidential election. As part of the program, the primary surplus of the public sector was raised from 4.7 percent of GDP in 1987 to close to 8 percent of GDP in the following three years (Table 4.3). The heterodox part of the program included an agreement with the trade unions and the employers organization to break out of the inflation inertia, the so-called Economic Solidarity Pact (ESP). The ESP included an initial 22 percent devaluation of the official exchange rate and a managed float for the time being. The government took the compromise to reduce public spending for 1988 by 1.5 percent of GDP, while energy prices were raised 85 percent, and the prices of eighty commodities were included in the "basic consumer basket." Trade reform was accelerated, reducing the maximum import tariff from 40 percent to 20 percent while a 5 percent tariff surcharge was eliminated. Then, at the end of February, the ESP was renewed for a month including a preannounced fixing of the free and controlled exchange rates for that period. In parallel, the government assumed the compromise to achieve a primary surplus of 8.3 percent of GDP in 1988. Then the ESP was renewed periodically through December to leave room for the new administration to make

Table 4.3 Mexico: Macroeconomic Indicators, 1986–1994

Year	GDP growth	Inflation (Dec.–Dec.)	Public sector		Current account (% GDP)	Real exchange rate ^a (1980 = 100)
			Primary balance (% GDP)	Operational balance (% GDP)		
1986	-3.8	105.7	1.6	-2.4	-1.29	144.6
1987	1.9	159.2	4.7	1.8	2.83	157.1
1988	1.3	51.7	8.0	-3.6	-1.42	129.2
1989	3.3	19.7	7.9	-1.7	-2.8	118.9
1990	4.4	29.9	7.8	2.2	-3.0	118.7
1991	3.6	18.8	5.3	3.3	-5.1	108.0
1992	2.8	11.9	5.6	3.6	-7.3	101.1
1993	0.6	8.0	4.0	1.9	-6.4	97.3
1994	3.7	7.1	2.3	0.1	-7.6	107.0

NOTE: a. An increase in the real exchange rate index indicates depreciation.

SOURCE: Annual Report Banco de Mexico, 1994.

any further adjustment. Each of these renewals confirmed the fixed exchange rate policy.

The administration of Salinas de Gortari, who was inaugurated in December 1988, deepened the transformation of the economy, consolidating the stabilization and initiating a period of sustained growth. The reduction in foreign transfers was to assist good policies in achieving the growth objective (Ortiz, 1991). The Salinas de Gortari administration advanced further in the following areas: the adjustment of public finances, privatization, trade liberalization—including the negotiations on a free trade agreement with the United States and Canada, more liberal treatment of foreign investment, financial reform—including the privatization of banks, and improvements in social services.

The Salinas de Gortari administration confirmed Pedro Aspe as minister of finance. Aspe had been appointed to the same post at the end of the De la Madrid administration. Not surprisingly, the stabilization program introduced in December 1987 was continued, but this time the ESP was changed into the Economic Pact for Stability and Growth (EPSG). The first such pact introduced a forward-looking crawling peg, or *tablita*, adjustment of the nominal exchange rate of a peso a day. In successive renewals of the EPSG, the rate of crawl was adjusted downward, first to 0.80 of a peso a day (May 1990) and then to 0.40 of a peso a day (November 1990). When the EPSG was renewed in November 1991, an exchange rate band was introduced with a 1.2 percent width for the peso–U.S. dollar exchange, with the provision that the ceiling of the band was going to be depreciated at a rate of 0.20 of a peso a day while the floor was to remain fixed. Then in October 1992 all exchange controls were removed, and the rate of devaluation of the ceiling of the exchange rate was increased to 0.40 of a peso a day. The successive renewals of the EPSG also provided for the adjustment of the minimum wage and of the prices of public services.¹⁷ All through this process, the final objective of the authorities was to achieve an inflation rate closer to that of the United States.

As the exchange rate band was introduced, monetary policy recovered some effectiveness while the market exchange rate was within the band. At the end of the experiment, the band had a width of 13.5 percent.

The ESPs and EPSGs were quite successful in reducing inflation from 159.2 percent in 1987 to only 7.1 percent in 1994, but in the process a large real appreciation of the currency developed that reached 32 percent between 1987 and 1994 (Table 4.3). Although Mexico did not have a formal backward indexation of wages, as shown by Edwards (1993) and Santaella and Vela (1996), there was still much inertia in

inflation at the time of the introduction of the *tablita* and therefore a period of real exchange rate appreciation was bound to result. Of course, all through this period, Mexico was implementing reforms that were increasing the efficiency of the economy and through this process were contributing to an appreciation of the equilibrium real exchange rate. But in parallel the opening up of the economy required a depreciation of the real exchange rate.

There are by now many interpretations of the Mexican crisis (Calvo and Mendoza, 1995; Dornbusch et al., 1995; Obstfeld and Rogoff, 1995; and Sachs et al., 1996). These explanations combine the financial vulnerability of the government with a high ratio of short-term U.S. dollar debt to foreign reserves;¹⁸ the aggressive use of sterilization policy to avoid an increase in real interest rates just when the increase in country risk required this increase in domestic interest rates; the large current account deficit and associated real appreciation; and so on. Here we will concentrate on the potential role of the combination of the exchange rate and the monetary policy.

As was discussed in the second section of this chapter, the operation of an exchange rate target, or a narrow band around a target as in the Mexican system of the time, required renouncing the use of an active monetary policy. In particular, in cases of international interest rate increases as happened in early 1994 and a sudden increase in country risk as happened following the assassination of the presidential candidate Luis Donaldo Colosio, the monetary authorities should have allowed the quantity of money to decrease and the domestic interest rate to increase. The latter is required to slow down the capital outflow, to reduce the current account deficit and even more important to keep the credibility of the economic agents on the exchange rate regime. However, in a year of elections and with weak banks, the government was not prepared to allow the domestic interest rate to increase and decided to change its funding from peso-denominated bonds (*Cetes*) to U.S. dollar-denominated bonds (*tesobonos*) and to sterilize the monetary effects of the loss of foreign reserves that resulted from the capital outflows. These actions increased the vulnerability of the external account and at the same time provided important information to the economic agents that the government was not prepared to tolerate the increase in domestic interest rates and thus created the conditions for a run on the peso (Sachs et al., 1996; and Calvo and Mendoza, 1995).

Information on the increase in country risk is obtained from the differential between the three-month tesobono rate, the government U.S.

dollar-indexed bond, and a three-month U.S. Treasury bill. This differential increased from close to half of a percentage point in the second half of 1994 to close to 4 percentage points following the assassination of Colosio (Obstfeld and Rogoff, 1995).

Thus, it appears that it was the lack of credibility of the government's commitment to the adjustment mechanism associated with a fixed exchange rate or a narrow band that precipitated the crisis. The credibility of the commitment to the fixed exchange rate policy is more difficult to maintain when a country has a weak banking system and faces a large internal or external shock. Ultimately, fixing the exchange rate reduces the efficiency of the adjustment when a country receives an important internal or external shock that requires a reduction in expenditures and a real depreciation. With a more flexible exchange rate, part of the adjustment is taken by the nominal exchange rate through the arbitrage condition as a response to the increase in country risk, an increase in international interest rates or an increase in the expected future value of the nominal exchange rate.

However, Mexico was also very vulnerable to "bad news" as the short-term liabilities of the financial system that could be converted into U.S. dollars were a high ratio of total foreign exchange rate reserves, the current account deficit was close to 7 percent of GDP, there was not much growth to show, and the real exchange rate had appreciated substantially in the previous four years.

Conclusion

In the case of Chile, we found out that much of the blame for the collapse of the fixed exchange rate regime has to be placed on the inconsistency between the exchange rate and wage adjustment rules in existence at the time the exchange rate was fixed. In addition, the situation was more vulnerable due to the weak regulation and supervision of the financial system that fueled a large credit expansion and an expenditure boom that together with the much appreciated real exchange rate resulted in a large current account deficit. When a sharp external shock emerged, and in spite of playing by the rules with respect to monetary policy, the country was too vulnerable to make a credible defense of the fixed exchange rate regime.

In Mexico it was the incapacity of the government to let the adjustment mechanism to work when facing an increase in country risk

together with the financial vulnerability of the country that had a large share of the blame. It is not surprising that in an election year and with weak banks the government was not prepared to allow the domestic real interest rate to increase and decided to stop the monetary aspect of the adjustment mechanism when it decided to sterilize the reduction in the money supply associated with the loss of foreign reserves. This action provided important information to economic agents that the government was not prepared to tolerate the increase in domestic real interest rates and thus created the conditions for a run on the peso.

It appears that it is very difficult to keep the credibility of a fixed exchange rate regime or a narrow band exchange rate system when the short-run costs of a slow adjustment process in terms of unemployment and a recession start to emerge. In particular, it is especially difficult to maintain credibility when a large domestic or external shock results in a major jump in country risk, and/or it requires a large real depreciation to accompany an expenditure reduction program. In the latter case, the jump in interest rates and in unemployment make the commitment to the exchange rate policy difficult to sustain, prompting a speculative attack and the ultimate abandonment of the regime.

In countries that start with chronic inflation much above international levels and that rely on an ERBSP, there is the additional problem that due to the inertia an initial period of real exchange rate appreciation that follows the fixing of the rate will have to be undone in the future. The real appreciation will affect the profitability of tradable activities and will increase the size of the current account deficit of the balance of payments, prompting the introduction of restrictive aggregate demand policies. But given that the currency is overappreciated to start with, a protracted period of deflation would be required to achieve a real depreciation. Again, during this recession the credibility of the fixed exchange rate regime will be under stress, resulting in even higher interest rates and a deeper recession.

Thus, it appears that in a world of open capital markets it is increasingly difficult to sustain fixed exchange rate regimes that rely on a country's own currency. Therefore, a less risky option is to pursue a monetary and fiscal policy geared to achieve an inflation target while monitoring the trajectory of the real exchange rate to avoid large appreciations that could put in jeopardy the profitability of tradable sectors. In this regime, the exchange rate policy should have much more flexibility and could be of the broad band or floating variety. Still, in the initial stage of a stabilization program aimed at reducing high and

chronic inflation, there is much to recommend an ERBSP; but once enough progress has been achieved in breaking the traditional inertia, the exchange rate regime should be shifted to a floating rate or an exchange rate band with a monetary and fiscal policy aimed at achieving an inflation target.

Notes

1. This section draws on Corbo and Fischer (1995).
2. Of course, as the 1985 Argentine case shows, favorable supply shocks are not sufficient without resolute fiscal action.
3. Such as Alesina and Drazen (1991), and Mondino, Sturzenegger and Tommasi (1992).
4. World Bank (1990) examines the distributional impact of adjustment policies.
5. The role of credibility was brought home forcefully by Sargent's (1982) well-known article on the results of four hyperinflations; later work has suggested that even the hyperinflations did not end without output costs. See also Sargent (1983) and the comments by Summers.
6. See Solimano (1990) for a review of experience, including that of the hyperinflations.
7. The choice between these two anchors is analyzed in Fischer (1986) and Bruno (1991). Edwards (1993) discusses nominal anchors and, empirically, the effect of different anchors on the dynamic properties of the economy.
8. Rebelo and Végh (1995) compare alternative hypotheses with respect to the causes of the initial boom.
9. Of course, the real wage is generally endogenous, so the question arises of what is causing the real wage increase in the first place. In the Israeli stabilization of 1985–86, the real wage increase six months after the start of the stabilization was essentially exogenous, negotiated between the government and the unions six months earlier.
10. In countries that are dollarized and that are following a fixed exchange rate regime, the maintenance of the fixed exchange rate regime could require them to go all the way to replacing the local currency for a foreign currency; otherwise, the lack of credibility in the policy with its associated costs could lead to a crisis. The option of adjusting the peg could unleash a crisis in the financial system with large economic costs.
11. Much has been written on this period, see in particular Corbo (1985b), Edwards and Cox-Edwards (1987), Harberger (1985), and Corbo and Fischer (1994).
12. Some observers relate the increase in capital inflows mainly to the lifting of capital controls (Edwards and Cox-Edwards, 1987; Morandé, 1988).
13. I do not go here into the question of whether inflation responded asymmetrically to increases and decreases in demand.
14. Some aspects of the estimated equations stand out. It is surprising that foreign prices in U.S. dollars (PEXT) have so little apparent effect on both domestic inflation and the exchange rate; perhaps the relative stability of the foreign price series makes it difficult to estimate the coefficient reliably. The statistical insignificance of the unemployment rate in the wage equation is also surprising.
15. One is struck also by the difficult dynamics confronted by policy makers then and now who have embarked on a stabilization program in which success depends completely on not changing the nominal exchange rate. The more they demonstrate their commitment to their policy, the greater the costs if they fail, for the further out of line the

real exchange rate is becoming. Thus, a policy of this sort is likely to end in a crisis—with a bang rather than a whimper.

16. The primary balance excludes all interest payments. The adjustment in the operational balance was not as impressive but still very large, going from a deficit of 5.5 percent of GDP in 1982 to a surplus of 1.8 percent of GDP in 1987. A temporary increase in domestic real interest rates in 1988—resulting from the stabilization program—brought it back to a deficit of 3.5 percent of GDP.
17. For details on the ESPs and EPSGs, see Santaella and Vela (1996).
18. The share of U.S. dollar-denominated tesobonos in the total government debt outstanding increased from 6 percent at the end of February to 50 percent at the end of November.

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CHAPTER 5

Peru's Stabilization under a Floating Exchange Rate

Edgardo Favaro

This paper studies how Peru has stopped inflation since 1990, why the real exchange rate appreciated after reforms were implemented, and how vulnerable Peru's stability is to shifts in international capital flows. The main lessons from Peru's stabilization experience are as follows: First, success at stopping inflation hinged on implementing deep change in policy regime, which made credible the restrictive monetary and fiscal policies implemented after July 1990.

Second, the timing and sequencing of implementation of the reforms were less important than the clear direction of the reform in determining the recovery. While the reforms had a clear direction, especially since the second quarter of 1991, the timing and sequencing of implementation were the result of a circuitous political process rather than the product of a "master plan."

Third, the real appreciation of the exchange rate following the implementation of the first stage of the program was, in part, a permanent reaction to changes in Peru's production possibility frontier and in the policy environment rather than a temporary reaction to short-run foreign exchange abundance. Even so, the initial impact of this appreciation on nontraditional exports has been harmful and should be monitored carefully to assess Peru's medium-term balance of payments prospects.

Fourth, international capital flows have been important for the recovery of Peru and have been much more stable than normally suspected (probably because there has been a credible macroeconomic program in place). Even so, policy makers were wise to reduce the

multiplier effect of capital inflows on credit (especially in the initial phase of the reform program) and would be wise to establish clear incentives to banks to maintain prudential practices.

The government appointed to office in July 1990 took bold steps to reestablish public order, stop inflation and transform the state-dominated economy into a market-oriented one. Public expenditure was put in line with tax collection, the tax system was reorganized, and credit from the Central Bank to the public sector was eliminated. Structural reform called for liberalization at both national and sectoral levels, strengthened market mechanisms in the allocation of resources, and implicitly defined a subsidiary role for the state in the economy.

Peru's recovery since 1990 has been remarkable, with the economy improved and terrorism subdued. Inflation has steadily declined (from 7600 percent in 1990 to 10 percent in 1995), the economy has grown vigorously (GDP up 30 percent between 1990 and 1995), and enormous progress has been made in reestablishing public order. And there have been big improvements in consumption in all areas of the country: 29 percent on average and 34 percent in the poorer regions, such as the Rural Sierra.

Stabilization has been the result of a comprehensive reform program. To stop inflation, the Central Bank relied on a strict monetary rule; but, equally important, rapid implementation of a comprehensive reform program and unquenchable fiscal discipline made the sustainability of this rule credible. Thus, stabilization was the result of an abrupt change in policy regime rather than of a few restrictive monetary or fiscal measures.

Capital inflows were extremely important in the recovery of Peru's economy from 1990 to 1995. Firm steps to reform the economy made an immediate impact on international capital flows, and Peru moved from a net exporter of capital to a net recipient of significant capital inflows both short-term and long-term. Taken together, the long- and short-term net capital inflows averaged US\$2.5 billion a year in 1991 to 1995—about 5 percent of GDP. The remarkable economic growth of Peru from 1993 to 1995 has thus been to a large extent a function of the availability of foreign finance to provide for investment and for imports.

But capital inflows also caused problems. They put pressure on the exchange rate to appreciate and made stability vulnerable to shifts in investors' preferences. Following an initial abrupt appreciation of the real exchange rate, the Central Bank has been effective at preventing further significant appreciation after 1991, but at the expense of higher

domestic inflation than if it had followed only a strict stabilization objective. The trade-off between allowing the exchange rate to appreciate (thus hurting exports) or intervening (and having a higher inflation rate) has been a permanent policy problem only alleviated during lapses of high primary fiscal surplus. The vulnerability of Peru's balance of payments to shifts in international capital flows cannot be underestimated, especially after the Mexico crisis of December 1994. Even so, Peru managed to sail through the crisis while other countries in the region were suffering significant speculative attacks.

In this chapter, we will first describe the macroeconomic situation as of 1990. Then we will study how inflation was stopped. Next we will examine the real appreciation of the exchange rate and the role of international capital inflows in the recovery of the economy. The final section discusses the vulnerability of Peru's stabilization program.

Macroeconomic Situation as of 1990

Peru's hyperinflation was the result of a combination of rapidly increasing government spending, a steady decline in tax collections and in government's capacity to borrow, and a rapid increase in monetary velocity as Peruvians abandoned the domestic currency. Inflation had been part of Peru's economic life since the 1970s, when the expansionary policies of the Velazco government were not accompanied by a corresponding increase in tax collections. Even so, the need for inflationary finance had been lessened by financing the fiscal deficit through external borrowing. Reliance on inflationary finance increased rapidly when the public finances deteriorated in the 1980s with the onset of the debt crisis in 1982 and the deterioration of tax collections after 1985. The debt crisis abruptly closed the window to borrow abroad after 1982. Forced to a drastic spending adjustment, the government turned gradually to stop servicing its external debt obligations, devaluing the domestic currency and, increasingly, to finance its deficits through borrowing from the Central Bank.

The first building block of Peru's hyperinflation was in the fiscal deficits the government ran after 1985. The government that took office in 1985 blamed external debt servicing for the devaluation of the exchange rate, inflation and low growth. Instead, it put a ceiling on foreign debt service at 10 percent of the value of exports and later stopped debt servicing altogether and established a gamut of

demand-expansionary, highly distortionary policy measures. It instituted widespread exchange controls on current and capital account transactions, multiple exchange rates; increased minimum wages; expanded direct credit and subsidies; reduced the value-added tax rate; and reduced public utility prices.

While implementing these expansionary policies resulted in a large fiscal cost, this cost was never made explicit in the public sector budget and seldom made explicit in the measurement of total public spending and the deficit. For instance, as public utility prices did not keep pace with inflation, state-owned enterprises ran significant deficits and stopped servicing their debt obligations. Also, as interest rates did not adequately incorporate inflation, development bank credit programs implied large transfers to credit recipients and a significant cost. Unable to raise deposits from the public, or to borrow abroad, the development banks obtained a large part of their resources directly through rediscounting their bills at the Central Bank. And this modality of financing collaborated to hide their large cost in the measurement of total spending and the deficit.

Public sector expansionary policies resulted in a transitory recovery of the economy (GDP up 17 percent from 1985 to 1987) without a sharp increase in the inflation rate. Not surprisingly, the strategy led to a complete collapse. By the end of 1987 the Central Bank's international foreign reserves were US\$43 million (down from US\$1.493 billion at the end of 1985), and a rapid demonetization of the economy followed as Peruvians abandoned the domestic currency.

The second building block of the hyperinflation was in the financing of the large fiscal deficits by printing money (see Table 5.1). In addition to the conventionally defined deficit of the Treasury, study of the sources of expansion of base money in 1985 to 1989 highlights the importance of subsidized credit from banks (particularly development banks) to state-owned enterprises and the private sector as a source of expansion of the money base. The result of this credit expansion was a large expansion in base money and a rapid increase in inflation.

The third building block of the hyperinflation was a rapid increase in the income velocity of money and rapid dollarization of the economy (see Figure 5.1). The income velocity of money increased steadily from 1980 to mid-1985, in part, as a result of a shift in preferences from domestic to U.S. dollar-denominated deposits in the banking system. From 1980 to August 1985, Peruvian banks could issue certificates of deposits (CDs) in U.S. dollars, which were convertible and could be

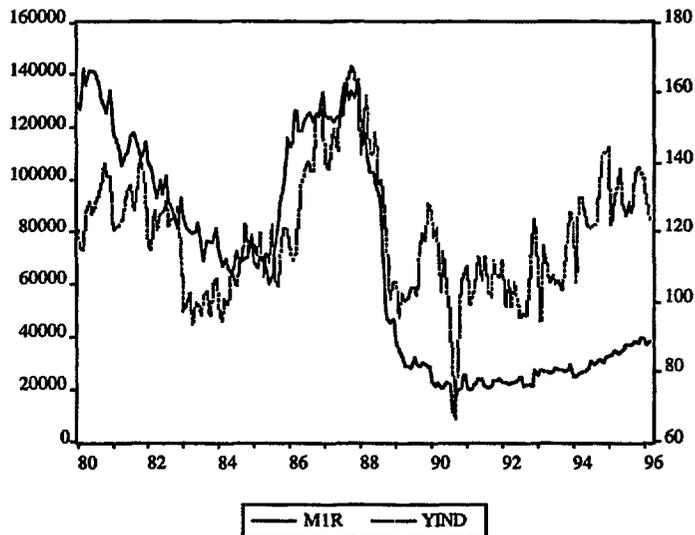
Table 5.1 Percentage of Increase in Peru's Money Base Caused by Credit Expansion to the Financial Sector, 1985–1990

Year	Increase in money base (millions of new soles)	Development banks (%)	Banco Nacion (%)	Commercial banks (%)	Other financial (%)
1985	18.6	9	1	6	4
1986	15.2	35	5	10	-1
1987	41.4	34	15	13	20
1988	260.7	38	23	27	3
1989	6,375.8	52	25	23	0
1990	33,026.9	51	17	52	—

Note: — Not available.

Source: Central Bank of Reserve of Peru (*Nota Semanal*, several issues).

Figure 5.1 The Real Quantity of Money and Manufacturing Industry GDP in Peru, 1980–1996

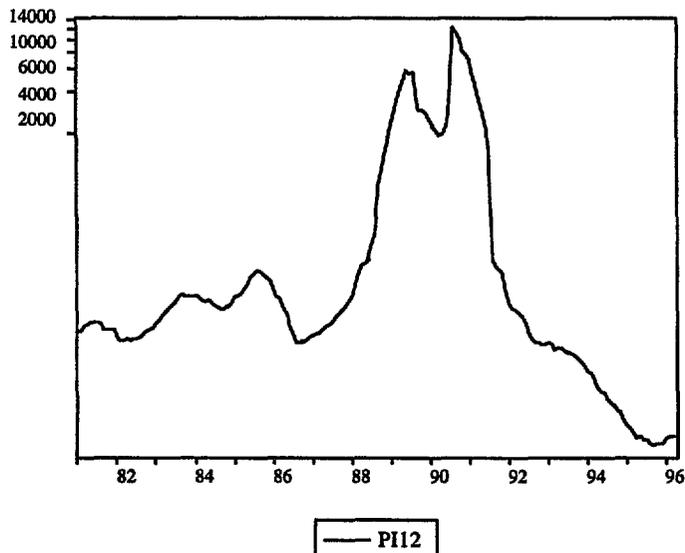


NOTE: See text for definition of terms.

negotiated at the Central Bank exchange rate. But in August 1985, the Garcia administration announced the inconvertibility of U.S. dollar deposits; CDs could only be negotiated at the official exchange rate, which departed significantly from the rate in the parallel market. The immediate impact of this partial “confiscation” of U.S. dollar deposits was a decline in the stock of (domestic-denominated plus U.S. dollar-denominated) real money. The income velocity of money fell abruptly after August 1985 as Peruvians rebuilt their desired stock of real money. This is, perhaps, why the rapid growth in the money base in 1985 to 1987 did not result in an immediate increase in inflation. In fact, inflation fell in 1986 and did not explode until mid-1988. It was only a matter of time before Peruvians caught up with the “dishonest” monetary rule; when they did, they abruptly moved away from the domestic currency, and the U.S. dollar substituted for the domestic currency as a means of exchange and payment—thus hyperinflation started.

After 1987, inflation increased sharply (see Figure 5.2), the economy deteriorated dramatically (see Figure 5.1), Peru’s international isolation

Figure 5.2 Logarithm of the Twelve-Month Rate of Inflation in Peru, 1982–1996



deepened, and governance deteriorated rapidly. The twelve-month inflation rate ranged from 127 percent in January 1988 to 5,835 percent in June 1988, and then to 1,721 percent in December; and per-capita GDP went down 27 percent between 1987 and 1990. Relations with international financial institutions, bilateral lenders and commercial banks were suspended because of the accumulation of arrears. Unable to collect taxes, borrow, or capture higher resources through inflation, the government's financing capacity collapsed and so did production of public services. Paradoxically, after three decades of government expansion, the size of the government measured as government expenditure plus revenues of the state-owned enterprises (SOEs) had decreased from about 40 percent of GDP in 1974 through 1985 to about 20 percent in 1989–90, the level it had held in 1963 to 1973 before government interventionist policies started.

Peruvian hyperinflation had all the ingredients of similar episodes in Europe (during the 1920s and after World War II) and in Latin America, but also some idiosyncratic aspects. Similar to other hyperinflationary episodes, an expansionary public spending policy was accompanied by the incapacity to increase tax collection correspondingly. Second, the resulting large deficits were financed by printing money. Third, there was a rapid increase in the income velocity of money as Peruvians flew from domestic currency holdings.

Peru's hyperinflation also had its idiosyncrasies. First, the vast majority of the increase in public spending was never subject to a budgetary approval. Second, hyperinflation was paralleled by a deep dollarization of the economy. High-cost public spending programs, such as exchange rate subsidies, credit subsidies and public utility price subsidies, were never subject to budget scrutiny. In fact, an increasingly large share of public spending programs was in these nonconventional expenditure items. This explains why once the Central Bank cut credit to the government, and particularly to the development banks, inflation fell dramatically. The high level of dollarization collaborated to increase the income velocity of money.

How Inflation Was Stopped in Peru

Inflation was stopped because the government brought together strict fiscal and monetary policies and a radical program of reforms, which made the stabilization plan credible. Following a description of the

structural reform program, this section analyzes how much credibility the stabilization plan has had, the differences between the path of the main economic variables in Peru and in exchange rate-based stabilization programs (ERBSPs), the fiscal performance after 1990, the demand for domestic money and mixed objectives in monetary policy.

The government appointed to office in July 1990 faced an economy in tatters. Peru's per-capita income was below that of 1963. Prices had increased 27 million-fold over three decades. Government provision of public goods was dismal. Tax collection amounted to only 5 percent of GDP. And political violence was claiming 3,000 lives a year. In fact, the state and the economy had all but collapsed. It was the finale to thirty years of misguided policies, economic mismanagement, and, since 1980, rampant and escalating terrorism.

Credibility in the Stabilization Plan

In August 1990, the new government implemented the first policy measures directed at reestablishing the tax base, reducing the fiscal deficit, and stopping inflation. They included: (1) a 3,000 percent increase in gasoline prices and a 1,000 percent increase in the price of electricity, water and telephone services; (2) the elimination of multiple exchange rates and of controls on foreign exchange transactions and the establishment of a floating exchange rate; (3) the introduction of a cash management committee to manage the finances of the central government on a cash basis without recourse to Central Bank credit; (4) the elimination of numerous exemptions in import tariffs and sales taxes and the introduction of temporary taxes on exports and net wealth; (5) a significant reduction in price controls, including the de facto elimination of ceilings on interest rates.

While far from timid (and a very clear signal of the government's commitment to stop inflation), these measures were short of the comprehensive structural reform program Peru needed. The drastic adjustment of administered prices and the devaluation of the exchange rate resulted in a record high 397 percent inflation rate in August 1990, but the monthly inflation rate fell below 10 percent in September and was about 6 percent in November. However, two-digit inflation popped up again in December of 1990 (24 percent) and January 1991 (17 percent). Peru's illnesses required more sweeping reforms, which came after February 1991.

From March 1991 to December 1992, the government was bold and busy. It implemented a complete overhaul of the tax system, reducing the number of taxes to five and eliminating exemptions. It eliminated public development banks, established the independence of the Central Bank, and eliminated credit from the Central Bank to the government and state intervention in the allocation of credit. It liberalized the trade regime by eliminating nontariff barriers and establishing a two-tier tariff regime with most of the import items at 15 percent and the rest at 25 percent. It abolished the monopoly rights of state-owned enterprises (SOEs) and developed a vast privatization program. It liberalized the labor market regulatory regime by addressing tenure regulations and establishing more flexible terms for probationary periods and fixed-term contracts. It facilitated private ownership of land. It eliminated the state monopoly in social security and established a framework for a private pension fund system.

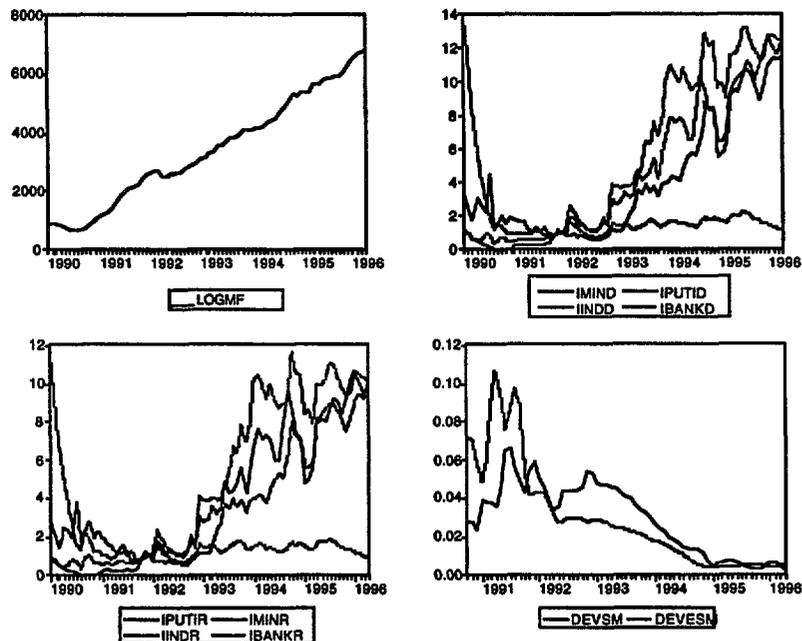
Differences and Similarities between Peru's Plan and ERBSPs

Thus, the first distinctive aspect of Peru's stabilization program is in the depth of the reforms pursued, paralleling those directly addressed to stopping inflation. Monetary and fiscal policy were only part of a radical and broad program of economic reform. Take trade policy. In July 1990 there were 139 special import regimes, quantitative restrictions and innumerable nontariff barriers. In fact, Peru had one of the most protectionist and distorted trade policy regimes in the world. As of March 1991, Peru had become one of the most open economies in the world with no quantitative restrictions and a low-average-low-dispersion tariff regime. These radical changes in policy regime must have had an impact on Peruvians' perceptions of the future of the economy.

While the government stabilization plan was credible from the onset, confidence increased significantly as implementation of the reform program evolved. Figure 5.3 presents evidence on capital inflows, stock prices and interest rates consistent with this view.

The upper-left graph in Figure 5.3 portrays the logarithm of U.S. dollar-denominated deposits in the banking system. From August 1990 to April 1992, U.S. dollar-denominated deposits in the domestic banking system increased quickly. There is an inflection point in April 1992 (which coincides with Fujimori's decision to dissolve Congress) and

Figure 5.3 Indicators of Peru's Stabilization Program Credibility



NOTE: See text for definition of terms.

again a steady increase from May 1992 to December 1994 (which coincides with the Mexico exchange rate crisis) and lasts until March 1996. Thus, U.S. dollar-denominated deposits have been sensitive to signals of political instability.

The upper-right graph in Figure 5.3 portrays indexes of stock prices measured in U.S. dollars, and the lower-left graph portrays indexes of stock prices deflated by the consumer price index (CPI). IMIND (IMINR) is the stock market index of mining firms measured in U.S. dollars (deflated by the CPI). Similarly, IBANKD, IINDDD and IPUTID are respectively the stock market indexes of banks, manufacturing industry firms and public utility companies. With the exception of the manufacturing industry index, the rest increase rapidly starting in the first quarter of 1992.

Interest rates provide valuable information about expectations for inflation and devaluation. The yield on U.S. dollar and sol assets should

differ by the expectation of devaluation and by the premium for risk of confiscation; thus, it is possible to “read” from information on interest rates how the expectation of devaluation and the premium paid for risk of confiscation varied after 1990.

This is what the lower-right graph in Figure 5.3 does. It portrays the exponentially adjusted monthly rate of devaluation (DEVSM) and the exponentially adjusted expected rate of devaluation (DEVESM). DEVESM was estimated assuming covered arbitrage between domestic bank deposit interest rates in soles and U.S. dollars. Starting in 1992, there is rapid convergence of the two rates.

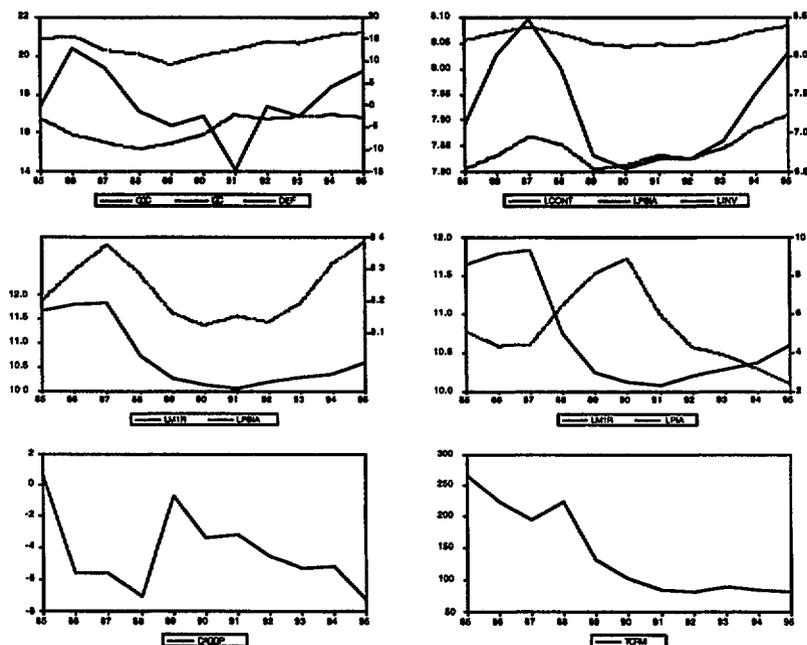
The second distinctive aspect of Peru's stabilization is in the use of a monetary aggregate rather than the exchange rate as the anchor to stop inflation. This was a major departure from the case of most stabilization programs in high-inflation countries.¹ According to Rebelo and Végh, “the choice of the exchange rate over a monetary aggregate reflects the fact that in high-inflation countries velocity is likely to be subject to unpredictable shifts—often exacerbated by a high degree of dollarization—which makes it difficult to assess the rate of monetary growth consistent with the targeted inflation rate. Moreover a pegged exchange rate has the advantage of allowing for an endogenous increase in the nominal money stock” (Rebelo and Végh, 1995, 128).

Rather than speculating on what would have happened had Peru used an exchange rate anchor, I will compare the path of some key economic variables following Peru's stabilization with that documented in Rebelo and Végh's paper for several cases of exchange rate-based stabilizations.

Rebelo and Végh discuss several stylized facts following the ERBSPs of Argentina (1991), Israel (1985), Mexico (1987) and Uruguay (1978). For purposes of the comparison with Peru, I will focus on a subset of the Rebelo and Végh stylized facts, namely: (1) an initial expansion in economic activity followed by a slowdown, (2) a real exchange rate appreciation (a decline in the relative price of tradable goods), (3) a drop in the real interest rate (in the case of orthodox programs), (4) a re-monetization of the economy, (5) a deterioration of the trade and current account of the balance of payments, (6) a large fiscal adjustment (in successful or temporarily successful programs), (7) a boom in the real estate market.

Figure 5.4 portrays the path of some key economic variables before and after the implementation of the stabilization and structural reform program. The upper-left graph presents indicators of fiscal performance. GGC is central government expenditure as a percentage of GDP, IGC

Figure 5.4 Peru: Key Economic Variables before and after Stabilization



NOTE: See text for definition of terms.

is central government tax revenue as a percentage of GDP, and DEF is combined public sector deficit as a percentage of GDP. The upper-right graph presents the logarithms of consumption (LCONT), investment (LINV) and GDP (LPBIA). The center-left graph portrays the logarithms of real money (LM1R)—defined as the sum of currency in circulation plus demand deposits deflated by the CPI—and the GDP (LPBIA). The center-right graph portrays LM1R and the logarithm of annual inflation (LPIA). The lower-left graph presents the current account deficit as a percentage of GDP (CAGDP). The lower-right graph presents the real exchange rate (TCRM).

Figure 5.4 reveals similarities and differences between the path of economic variables following stabilization in Peru and in the countries included in the Rebelo and Végh sample. Among the similarities, in both the ERBSPs and the Peru plans, there is a large fiscal adjustment and a sharp decline in inflation following stabilization. Also, in both

cases, there is an increase in the deficit in the current account of the balance of payments. Among the differences are the following: (1) In the ERBSPs stabilization is followed by an immediate expansion in economic activity, a consumption boom and a rapid increase in investment; in Peru's case the expansion of economic activity started two years after (and the consumption boom three years after) the beginning of the program. In Peru's case, investment increased from the beginning of the stabilization plan, initially at a slow pace and very rapidly after the third year of the program. (2) In the ERBSPs the real exchange rate gradually declined following stabilization; in Peru's case there is a steep drop in the real exchange rate following stabilization. (3) In the ERBSPs there was a rapid monetization of the economy after the beginning of the program; in Peru's case there was a slow increase in the demand for real domestic currency balances following stabilization.

However, there was a rapid remonetization if the money aggregate is defined to include U.S. dollar-denominated deposits—in this respect, Peru's case resembles closely that of Uruguay after 1978. Thus, while the selection of the anchor may have affected the timing of the response of some economic variables, the direction of that response has been similar.

Fiscal Performance after 1990

The fiscal deficit was drastically reduced in 1991 and 1992 (see Table 5.2). This was achieved by policy measures, including deep structural reforms. A Cash Management Committee (CMC) was set up to keep expenditures in line with tax collection. The method was simple: No payment was authorized unless the Treasury had enough funds available. This approach relied on a fundamental policy decision affirming the total independence of the Central Bank, and on the elimination of credit from the bank to the Treasury. The liquidation of development banks ended subsidized credit and prompted a rapid decline in the growth of base money and inflation.

While public sector spending was drastically reduced at the beginning of the stabilization program, the fiscal squeeze did not cause a significant decline in the provision of public goods because the core of the adjustment was closing development banks and eliminating subsidized credit. Government spending—excluding credit subsidies—dropped from 16.9 percent of GDP in 1990 to 12.1 percent in 1991 but recovered later in line with the increase in tax collection—it was 14.9 percent of

Table 5.2 Peru's Public Sector Operations, 1990–1995 (percentage of GDP)

	1990	1991	1992	1993	1994	1995
Central administration						
Current revenues	9.9	9.4	11.3	11.3	13.0	13.5
Current expenditure (excluding interest)	8.5	6.5	7.9	6.9	7.9	8.5
Current account (excluding interest)	1.4	2.9	3.4	4.3	5.1	5.0
Rest of nonfinancial public sector current account	0.5	0.7	1.0	1.1	0.8	0.3
Nonfinancial public sector current account (excluding interest)	1.9	3.6	4.4	5.5	5.9	5.3
Capital revenues ^a			0.1	0.3	4.5	1.5
Capital expenditures	2.8	2.8	3.9	4.3	4.9	5.0
General government	1.7	1.9	3.0	3.6	4.4	4.6
Public enterprises	1.0	0.8	0.9	0.7	0.5	0.4
Public financial institution	1.1	0.4	0.2	0.2	—	—
Primary balance	2.1	0.4	0.3	1.0	0.9	0.3
Interest	5.6	2.8	3.1	3.6	3.2	2.9
Combined public sector deficit (before privatization)	7.6	2.4	2.8	2.6	2.3	2.6
Financing	7.6	2.4	2.8	2.6	2.3	2.6
External financing	4.4	4.1	1.9	2.6	1.9	1.9
Domestic financing ^b	3.3	-1.7	0.9	—	0.4	0.7

NOTES: — Not available.

a. Corresponds to proceeds from public asset sales.

b. Includes statistical discrepancy and accumulation of domestic arrears.

SOURCE: BCRP (*Nota Semanal*, several issues).

GDP in 1992, 16 percent in 1993 and 1994, and 16.4 percent in 1995. The combined public sector deficit fell from 7.6 percent of GDP in 1990 to about 2.7 percent of GDP in 1991 to 1994. It was 2.6 percent in 1995 and has been fully financed since 1991 by external funds (see Table 5.2). Privatization receipts have become an important source of financing since 1993—they were 0.3 percent of GDP in 1993, 4.5 percent in 1994 and 1.5 percent in 1995. Most of these proceeds have been kept as foreign exchange reserves at the Central Bank.

The Demand for Money

Peru's stabilization program caused neither a decline in income nor a significant increase in the real quantity of domestic money. Even so, stabilization was accompanied by a big increase in real liquidity. Peru's experience differs from that of European countries following the end of their hyperinflation in the 1920s and 1940s—but then so do the institutional circumstances. Most, if not all, stabilization in Europe proceeded in the context of severe exchange controls—that is, preserving the state of monopoly over issuing money. Where this has been absent (stabilization in Uruguay since 1990, Argentina since 1991, and Bolivia since 1985), there has been a steady decline in inflation and an increase in real liquidity, but a much less significant increase in the real quantity of domestic money.

U.S. dollar deposits in Peruvian banks have increased quickly since the beginning of the stabilization program in 1990. Because part of this increase has been the result of transfers by Peruvian residents of U.S. dollar deposits from overseas banks to Peruvian banks, it should not be interpreted as evidence of deep changes in the portfolio of financial assets held by Peruvians. Rather, it is largely the result of accounting procedures. However, the increase in U.S. dollar-denominated deposits is evidence of Peruvians' confidence in the program launched in August 1990. And the path of U.S. dollar-denominated deposits has been a sensitive indicator of the perceptions of Peruvian investors to important news on the political and economic fronts.

Despite dollarization, the demand for domestic money has been far more stable than one would have expected. Table 5.3 reports statistical results from the estimation of equation (5.1) for the period 1991:03 to 1996:03. Figure 5.5 presents the actual and projected values of the dependent variable and the residuals. Figure 5.6 presents the forecasted values for 1995:11 to 1996:03 from the estimation of the equation (5.1) for the sample period 1991:03 to 1995:10. The forecast indicates a decline in velocity over the end of the sample period. This fall may be associated with the increasing importance of the demand for domestic currency-denominated deposits from the pension funds.

$$LM1R = C(1) + C(2)*LM1R(-1) + C(3)*PI + C(4)*LPBI \quad (5.1)$$

where: $LM1R(i)$ = the logarithm of domestic real balances at time i defined as the sum of currency plus demand deposits deflated by the CPI,

Table 5.3 Demand for Domestic Money after Stabilization in Peru (from 1991:03 to 1996:03)

	Coefficient	Std. Error	T-Statistic	Prob.
C(1)	1.201944	0.532409	2.257560	0.0278
C(2)	0.762383	0.065383	11.66027	0.0000
C(3)	-0.873446	0.453455	-1.926201	0.0591
C(4)	0.261369	0.099099	2.637444	0.0107
R-squared	0.925673	Mean dependent variable	10.22128	
Adjusted R-squared	0.921761	S.D. dependent variable	0.197596	
S.E. of regression	0.055270	Akaike info. criterion	-5.727718	
Sum squared residual	0.174123	Schwartz criterion	-5.589300	
Log likelihood	92.14014	F-statistic	236.6262	
Durbin-Watson statistic	2.251644	Probability (F-statistic)	0.000000	

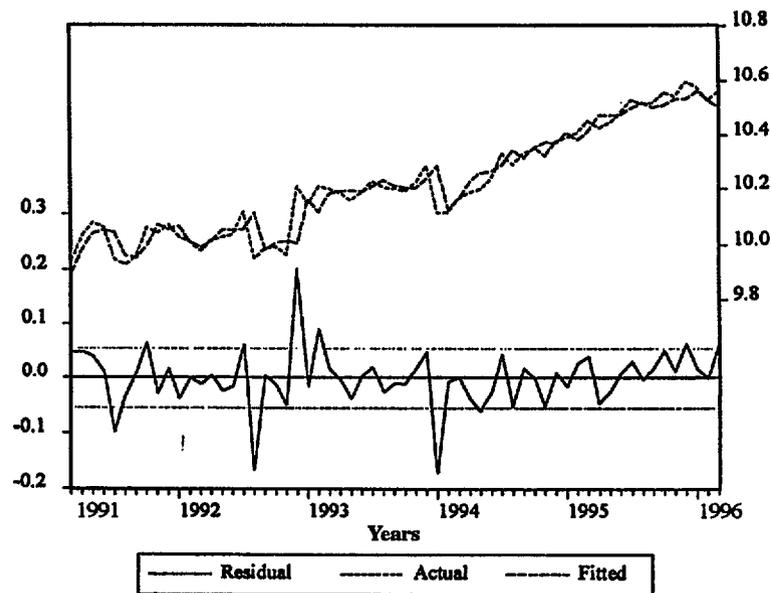
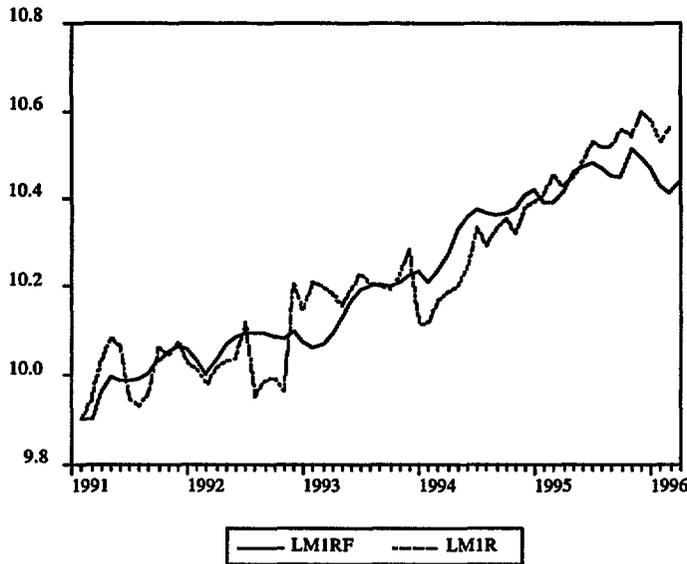
Figure 5.5 Residuals from the Estimation of the Demand for Money in Peru, 1991–1995

Figure 5.6 Forecasted in and out of Sample Value of LM1R in Peru, 1991–1996.



NOTE: See text for definitions of terms.

C(i) = constant coefficients,
 PI = the monthly inflation rate,
 LPBI = the logarithm of the monthly GDP.

Mixed Objectives in Monetary Management

While monetary policy pursued price stability and encouraged a re-monetization of the economy, it has also tried to avoid a real appreciation of the sol. Open market operations have been conducted through the purchase and sale of foreign exchange; thus, while following a managed floating exchange rate, the Central Bank has operated, in practice, as a currency board. These policies have resulted in a rapid monetization of the economy—both in soles and U.S. dollars—and a steady increase in Central Bank international reserves.

While inflation plummeted in 1991, it remained relatively high in 1992 (57 percent) and 1993 (40 percent). Why? Because the rate of

Table 5.4 Inflation, Devaluation and Growth of Peru's Money Base, 1981–1995 (percent)

Year	Inflation	Devaluation	Money base
1981	72.2	45.9	47.2
1982	72.4	90.0	17.0
1983	124.9	140.4	96.8
1984	111.4	134.6	92.7
1985	158.2	223.1	530.5
1986	63.3	15.2	68.9
1987	114.8	359.3	111.0
1988	1,721.6	1,704.3	438.2
1989	2,778.5	672.4	1,783.3
1990	7,639.5	4,170.2	5,214.0
1991	139.2	75.3	96.2
1992	56.3	69.8	62.1
1993	39.5	32.5	33.6
1994	15.4	-1.4	48.2
1995	10.2	9.4	36.9

Note: All variables are expressed as rates of growth over twelve-month periods.

Source: "Peru en Numeros." 1992. *Cuanto* and *Nota Semanal*, several issues. BCRP.

expansion of the money base was inconsistent with a lower rate of inflation. In 1992–93 monetary policy was extremely sensitive to a possible real appreciation of the sol. Thus it followed two (not very consistent) objectives: to lower inflation and to avoid a further real appreciation of the sol. To lower inflation, the Central Bank had to reduce the rate of expansion of the money base and thus its purchases of foreign exchange. To avoid a real appreciation of the sol, the Central Bank had to buy more foreign exchange. As a result, the money base grew at a rate inconsistent with price stability during 1992–93.

Given the reduction in the fiscal deficit, this "erratic" monetary policy may not have been conducive to lowering inflation. Even so, any evaluation of Peruvian stabilization should be based on the circumstances under which the policies were pursued, not on hindsight. In particular, if the credibility of the administration's commitment to stabilization was low at the beginning, a rigid monetary rule could have resulted in higher adjustment costs.

Capital Inflows, Demand and Supply, and the Real Exchange Rate

This section studies international capital flows and the real exchange rate after 1990. First, it describes the size and composition of capital inflows. Second, it assesses the importance of these inflows on aggregate demand, output and the current account. Third, it describes the parallel real appreciation of the exchange rate and discusses the impact on exports and imports. Fourth, it discusses the effect of the reforms on the supply side of the economy and the impact of these changes on the real exchange rate.

The Size and Composition of Capital Inflows

While Peru's formal reentry into the international capital market has taken several years, firm steps to reform the economy had an immediate impact on international capital flows and Peru moved from a net exporter of capital to a net recipient of significant capital inflows both long and short term (Table 5.5). Short-term capital inflows during 1991 to 1995 were over US\$5.7 billion, or about US\$1.2 billion a year. Long-term capital inflows were about US\$6.7 billion, with a big increase in

Table 5.5 Peru's Current Account Deficit and Capital Flows, 1991–1995
(US\$ millions)

	1991	1992	1993	1994	1995
Current account deficit	1,320	1,907	2,145	2,539	4,223
Long-term capital inflows	1,109	1,061	2,106	4,892	3,464
Privatization	0	6	168	2,217	636
Private	108	206	1,204	3,826	2,248
Public sector	-117	-395	491	-384	-194
Short-term capital inflows	1,048	1,541	786	685	1,697
Total capital inflows	2,157	2,602	2,892	5,577	5,161
Increase of (net) international reserves	837	685	747	3,038	938

1994, mainly due to exceptional proceeds from privatization. Taken together, the long- and short-term (net) capital inflows average US\$2.5 billion a year, about 5 percent of the GDP.

Capital inflows, while important, have not been the most important source of financing for the increase in investment after 1990. The investment-to-GDP ratio increased by 8.5 percent from 1990 to 1995, reaching 24.2 percent of GDP in 1995, up from the 15.7 percent of 1990 with domestic savings rising from 12.3 percent to 17 percent of GDP. Thus, the increased investment since 1990 has been financed also in large part through higher domestic savings (see Table 5.6)

Aggregate Demand and the Real Exchange Rate

High capital inflows have been extremely important for the recovery of the economy since 1992. In 1993 GDP went up 6.4 percent while aggregate demand increased by 6 percent (investment up 13.4 percent and consumption up 3.7 percent), and exports increased by 3.3 percent. In 1994 recovery took a faster pace (GDP up 13.1 percent) boosted by a 14.9 percent increase in aggregate demand (investment up 30 percent, consumption up 9.6 percent) and a 17.5 percent increase in exports. As a result, by the end of 1994, the economy was operating close to full capacity.

Table 5.6 Peru's Investment and Saving, 1986–1995 (% of GDP)

Year	Domestic saving			Foreign savings	Domestic investment
	Private	Public	Total		
1986	15.9	-1.2	14.7	5.6	20.3
1987	19.3	-3.7	15.6	5.5	21.1
1988	20.9	-5.9	15.0	7.0	22.0
1989	21.9	-4.8	17.1	0.7	17.8
1990	16.0	-3.7	12.3	3.4	15.7
1991	12.6	1.0	13.6	3.1	16.7
1992	10.9	1.1	11.9	4.5	16.5
1993	11.4	1.9	13.3	5.2	18.5
1994	14.0	2.9	16.9	5.1	22.0
1995	14.6	2.4	17.0	7.2	24.2

SOURCE: Central Bank of Reserve of Peru, Memoria, 1995.

In 1995 aggregate demand continued increasing (11.4 percent) boosted by rapid credit expansion to the private sector (30.7 percent real) and a 13.4 percent increase in public spending. The increase in public spending in the runup to the election further encouraged a bullish private sector attitude and large capital inflows financed the increase in absorption. As the economy reached full capacity (in the first months of 1995), economic growth slowed down considerably (year average of 7 percent) and the deficit in the current account of the balance of payments widened from 5.1 percent of GDP in 1994 to 7.2 percent in 1995. The rapid fall in public spending in December 1995 and strict fiscal discipline in the first half of 1996 has contributed to the return of Peru's economy to a more sustainable path. In the first quarter of 1996, aggregate demand fell 3.9 percent (compared to the same period of 1995); the current account deficit narrowed to about 6 percent of GDP; and the rate of economic growth fell to 1.3 percent in the first half of 1996 (compared to the same period of 1995).

Capital inflows have also been accompanied by a real appreciation of the exchange rate. The exchange rate had a rapid appreciation in the second half of 1990, following the beginning of the stabilization program. From that period on, there was a substantial decline in the rate for about a year, followed by fluctuations but no change in trend. But in 1995 the dollar had a 5 percent real appreciation (see Table 5.7). The real appreciation of the exchange rate, particularly since 1993, must have been of some significance for both export and import performance during the period.

Table 5.7 Peru's Real Exchange Rate, 1990–1995

Year	Estimate (a)	Estimate (b)
1990	111.8	110.8
1991	85.5	85.0
1992	81.1	83.4
1993	88.8	91.2
1994	82.4	84.1
1995	78.2	82.0

NOTE: Estimate (a) is based on Peru's and the U.S. consumer price indexes. Estimate (b) is based on Peru's CPI and the CPI of its seven major trade partners.

Exports, Imports and the Real Exchange Rate

From 1990 to 1995, aggregate exports increased by 67.9 percent in current U.S. dollar terms, while imports increased 163.1 percent. Exports as a percentage of GDP fell from 10.4 percent to 9.5 percent in 1995, while imports increased from 9.2 percent to 13.1 percent in 1995. An increase in export and import share should be expected with the opening of the economy, which was as radical in Peru during this period as may be found anywhere. This phenomenon did occur. Even so, export performance was below that in other episodes and in other countries with less radical policy changes, while import expansion was overwhelmingly greater than export expansion. This is most probably due to the real appreciation of the exchange rate and to a remaining bias against exports.

The structure of exports provides a similar indication. Exports which are likely to be more dependent (within a span of just a few years) on the exchange rate are nontraditional rather than traditional products. Nontraditional exports increased during the period by 45.4 percent and traditional exports increased 76.2 percent, whereas commonly in periods of liberalization there is a relative increase of nontraditional exports. Within the nontraditional sector, there is a remarkable difference between agro-processing branches, on one hand, and the manufacturing branches (of which half the exports are textiles), on the other hand. Exports of the former group increased 130 percent from 1990 to 1995. In contrast, exports of the latter group increased 23.3 percent.

Performance has varied radically among the major categories of imports. Imports of final consumer goods increased 419 percent from 1990 to 1995, whereas imports of intermediate goods increased 142 percent and those of capital goods increased by 166.7 percent. The share of consumer goods in total imports increased from 11.6 percent to 22.8 percent, while the share of intermediate goods fell from 45.6 percent to 42 percent. This is fully compatible with both expectations from a liberalization policy and with import performance in liberalization episodes in other economies.

Aggregate Supply Changes and the Real Exchange Rate

Assessing the impact of the structural reform on the supply side of the economy is critical to discussing the real exchange rate in Peru. The supply side has been largely ignored in the literature,² mostly because

of sample selection bias. Because demand side events have dominated most of the dynamics of unsuccessful stabilization experiences, this approach has been reasonable for the study of these experiences. However, ignoring the supply side of the economy in the case of Peru would be completely misleading.

After three decades of mismanagement, the measures adopted on August 1990 had a profound impact on expectations. They convinced Peruvians to gradually return part of the stock of assets held abroad and invest in domestic assets. As a result the price of domestic assets (including human capital) had to increase in U.S. dollar terms so as to reestablish market equilibrium. But the change in policy went deeper. It gradually broadened the possibility of exploiting natural resources such as minerals and land, which were extremely costly to exploit under the previous legal and regulatory framework and prevailing violence. It reestablished public order, thus encouraging both on-farm and off-farm work in the countryside. It rehabilitated the basic infrastructure, reducing the cost of transporting people and goods and causing an across-the-board increase in economic activity. In general, it facilitated the exploitation of existing resources and permitted a rapid increase in output and productivity.

As the reform program strengthened its roots with the fall in inflation, the gradual reintegration of Peru into the international financial market and the implementation of privatization, the prices of assets in Peru increased sharply in anticipation of better future possibilities. This induced people to disinvest foreign assets (that is, induces capital inflows) and to invest in domestic capital. This, in turn, resulted in a deterioration of the trade balance. The wealth effect associated with the reform also resulted in an increase in consumption. To reestablish equilibrium, the relative price of tradable goods had to fall.

How Vulnerable Is Peru's Balance of Payments?

Economic forecasting can be at best an intelligent extrapolation of past trends. This is why anticipating an economic turnaround is so difficult. If anybody had forecasted in June 1992 that over the next three years Peru's economy was going to grow at an 8.5 percent annual rate, nobody would have listened. The conventional wisdom was that the economy could not grow so fast after three decades of stagnation, yet it did grow. When the Mexican economy went into a deep balance of payments

crisis in December 1994, many anticipated the immediate collapse of the overvalued Argentine peso and possibly of Peru's currency as well. But the Argentine peso survived (against my predictions) and the Peruvian sol survived (according to my predictions). Those who anticipated a general collapse following Mexico's peso debacle extrapolated from the past. After all, it was Mexico's early 1992 request to reschedule external debt payments that prompted the Latin American debt crisis, but such a general collapse did not occur. Argentina's peso resisted and Peru's GDP grew 7 percent in 1995. Many considered possible a slowdown of Peru's economy following the 13 percent growth in 1994, yet the forecast of 3 percent GDP growth for 1996 that I made in November 1996 was too gloomy to be taken seriously by the authorities. With these caveats in mind, this section discusses the source of Peru's vulnerability and what indicators are relevant to assessing that vulnerability.

Peru's vulnerability is inherently related to the existence of a unified exchange rate and the lack of restrictions on capital inflows and outflows. In that respect Peru shares common features with countries which have had a similar institutional setting, such as Argentina (since 1991) and Uruguay (since 1974). Thus, Peru's vulnerability is associated with the possibility of a speculative attack on the sol first and on the banking sector next.

How would a change in investors' perceptions about Peru affect the sol? The most basic expectation of economic agents would be, under such circumstances, for a substantial devaluation of the sol. Sol-denominated and U.S. dollar-denominated deposits in Peru are such close substitutes, and so easily transformed from one to the other, that the expected reaction would then be a massive shift from soles to U.S. dollar deposits together with a move from holding cash in soles to holding U.S. dollars. The latter move would have implications for the country's foreign exchange reserves and the foreign exchange rate, but not for the banking system. On the other hand, the first element—the substitution of deposits—would have a significant impact on the financial system. This is due to the fact that required reserve ratios are drastically different between the two: 9 percent for sol deposits versus 45 percent for U.S. dollar deposits. A shift from soles to U.S. dollar deposits thus creates a requirement for additional reserves (at the ratio of 35 percent of the size of the shifted deposit). Since the banking system has been working with practically no excess reserves, an increase of required reserves (or a decline of the size of reserves) implies, inevitably, the creation of a shortage of reserves.

This would be the mildest form of reaction. A withdrawal of deposits from the banks altogether (transforming the deposits mostly to foreign liquid assets, rather than to just U.S. dollar-denominated assets) would be far more difficult to manage. This is a scenario of a run on the banking system. It could be the result of a suspicion that either the banks would not be able to allow the withdrawal of deposits, or, a milder expectation, that they would not abide by the commitment to index the deposits to the rate of exchange. Such behavior is partly endogenous: If depositors face the unwillingness of the banks to just allow the transformation of soles to U.S. dollar deposits, the credibility of banks' commitments in general would suffer.

How likely is a speculative attack? If the government stays the course and maintains its current foreign reserve position, the likelihood of a run scenario is very low. Peru's foreign reserve position is very strong. The stock of net foreign international reserves of the Central Bank was, as of July 1996, US\$9.6 billion. This includes US\$3.3 billion of commercial bank reserve requirement deposits and about US\$3.4 billion of Treasury privatization receipts deposits. At US\$9.6 billion the Central Bank net reserves amount to 79 percent of the total monetary liabilities of the banking system.

What events would indicate the proximity of a balance of payments crisis? Many observers rely excessively on the current account deficit when they should look at exposure to shifts in investors' preferences. The current account deficit measures the change in the stock of net foreign assets, and what is relevant is the stock of net short-term assets. A current account deficit financed by foreign direct investment or long-term debt should not be a source of concern. Even when the deficit is financed by short-term capital inflows, it should not be a major concern if the stock of short-term debt is low. Crises do not occur in a vacuum in most cases, and investors are far less irrational than usually portrayed.

Notes

1. See Rebelo and Végh (1995).
2. Most of the literature on the real exchange rate has studied this relative price within a monetary model. While this approach highlights some short-run dynamics that are extremely important, it is mostly useful in analyzing failed cases of liberalization. Roldós (1995) is an exception in that he focuses on the supply side effects of disinflation. When stabilization has been implemented in the context of a deep reform of the state's role in society as in Peru's case and market allocation substitutes administrative

rules, there are necessarily major changes in incentives well beyond those that Roldós highlights which also impact the production possibility frontier of the economy and the real exchange rate.

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CHAPTER 6

Exchange Rate, Capital Flows and Reform Sequencing in Indonesia: Policy Trend and CGE Model Application

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Until the mid-1990s, before the 1997 financial crisis erupted, Indonesia had made great strides in the previous thirty years to achieve a growth performance on par with that of the East Asian economies. The policy episode began with a series of stabilization programs undertaken during the late 1960s (rehabilitation period). Through the programs the economy rebounded from a chaotic situation. The decision of the new government to let capital freely flow in (liberalized capital account) was a surprise, in that it was taken at such an early stage of development. The open capital account regime prevailed throughout the subsequent years until today. This produces a number of intriguing questions related to the country's macroeconomic policies, particularly with respect to the management of the exchange rate and inflation. The stabilization and structural adjustment (SSA) program in the 1980s, including two major devaluations, also provides a number of interesting issues. No less interesting is the question as to whether the sequence of reform the country has taken, known to be dissimilar to what most standard analysis suggests, has produced an unfavorable outcome in terms of some specified objectives.

This paper deals with exchange rate and macroeconomic policies in Indonesia from the early 1970s until the mid-1990s. The discussions do not include the episode after the 1997 financial crisis. The following two sections are devoted to the discussion of economic performance

and policy trends. This is followed by an examination of a more specific aspect of the policies—that is, exchange rate management. Next, the flood of capital flows in the last few years, combined with the country's unique position of having an open capital account system since its early stage, leads to further probing of the effects of capital flows on the real exchange rate. The analysis in that section is done by making use of a computable general equilibrium (CGE) model. In the last section, the concept of reform sequencing is critically analyzed, and is tested in Indonesia's case by employing an extended CGE model that includes a fairly comprehensive financial sector.

Economic Performance from the 1960s to the 1980s

With the inception of a new government in the mid-1960s, Indonesia had a major overhaul of its economic policy. The rehabilitation period began with a stabilization program in 1966. The implementation of an orthodox macroeconomic policy during that period managed to bring down the inflation rate from a three-digit figure to a mere 12 percent in 1970 and even less than 5 percent in 1971.¹ The balance of payments deficit was also relieved. While the ratio of imports to GDP remained stable, despite the abolishment of quantitative restrictions on imports, the exports ratio went up from 9 percent in 1967 to 14.4 percent in 1971. The fiscal imbalance had been reduced from 6 percent of GDP in the first half of the decade to around 3 percent in the 1967–1970 period. At the same time, government saving had increased, albeit still very low, to reach 2.5 percent of GDP in 1971.

Most remarkable about the whole stabilization program was the fact that the sharp reduction in the inflation rate was not at the cost of economic growth. After suffering from stagnant growth during 1964 to 1966, the country's GDP growth rate had been steadily increasing. By 1971 a 7 percent growth rate was achieved. Clearly, improvement in the country's macroeconomic situation had paved the way; but the critical role of external resources, largely from Western countries, should not be overlooked. The early success of the rehabilitation and stabilization policy had played a major role in the decision of Western creditors to form the Inter-Governmental Group for Indonesia (IGGI).² Equally important was the government's decision to embrace market-oriented policies, particularly in microeconomic areas.

During the first five-year development plan (*Repelita I*, 1969–70–1973–74), some promarket policies, led by economic technocrats,

prevailed along with dirigist programs championed by those representing economic nationalism. The latter—which appeared to gain support from the president, especially towards the end of Repelita I—were reflected in the kind of policies promoted by the state-owned oil company Pertamina, whose funding came not only from oil earnings but also from commercial bank loans. Overall, during the period, the economy grew above 6.5 percent annually, exports expanded strongly—despite the fixed exchange rate system, and inflation was steadily decreasing.

But 1973 was a turnaround year. The quadruple increase of oil prices produced an atmosphere in which Pertamina actively expanded its operations and easily borrowed in the international credit markets. Unfortunately, many operations were economically unjustified, and the company began to perform various activities unrelated to the oil sector, making it similar to a development agency.³ When the company was finally forced to default in 1975, the Central Bank had to take over the debt, resulting in a drawdown of foreign reserves which, by September 1975, amounted to only US\$0.5 billion.

The windfall from the oil boom in 1974 (“oil shock” for oil importing countries) certainly helped to improve the balance of payments position: Both the trade surplus and foreign exchange reserves reached an all-time high. In 1974, the current account was, for the first time, in surplus (US\$0.6 billion). More encouraging was that oil prices showed no sign of declining. But the boom had also led the country to experience, albeit at a very mild degree, a “Dutch disease” phenomenon, in which prices of tradables relative to nontradables declined. A nominal increase in the domestic demand, due to the boom, had caused nontradables’ prices to rise. The predicted outcome would be: real appreciation of currency and less competitive exports. Such indications of trouble were indeed present. A quick reversal of the current account, from surplus to deficit, occurred in the following year (a more than US\$1 billion deficit in 1975).

But in 1976 GDP growth had already rebounded and accelerated in 1977. The deficit on the current account was also on a declining trend, reaching almost zero in 1977; and the price of oil was on the rise, even higher than its 1974 level. It was with such a background that many people were caught by surprise when in November 1978 the government decided to devalue the currency and chose to adopt a managed floating system.⁴

With the improved price of tradables following devaluation, non-oil exports received a strong boost. For the second time, the country’s

current account showed a surplus of close to US\$1 billion and US\$2.8 billion in 1979 and 1980 respectively. Hence, the Dutch disease effect that would have been experienced during the oil-boom period was somewhat ameliorated by the 1978 devaluation.

Following the Iran-Iraq war, Indonesia had a second oil boom in 1979–1980. Like in the first oil-boom period, the current account had improved dramatically to reach a surplus of US\$2.8 billion in 1980. Strong GDP growth was recorded during that period. But in 1982 the signs of world economic recession had become visible. When prices of many commodities in the international markets collapsed, the country's terms of trade deteriorated, widening the deficit on the current account enormously, and economic growth became negative—for the first time under the new government.⁵

The year 1983 marked the beginning of a new era in Indonesian economic policy. In March of that year, another major devaluation (28 percent) was announced. Unlike the 1978 devaluation, this time the fear of a balance of payments crisis was reasonable. Efforts to boost non-oil exports were clearly stressed, and at the same time the government imposed import restrictions. A number of public investments were either delayed or postponed, and the government tightened monetary policy. But the most dramatic policy change was in the financial sector. In June 1983 a major financial deregulation was announced, aimed at dismantling the old system of direct monetary control, to be replaced by a more indirect approach based on reserve management through open market operations.

Another blow hit the economy in 1986, when the price of oil plunged to less than US\$10 per barrel. As expected, the deficit on the current account widened, forcing the government to take another major devaluation (31 percent). A relatively extensive trade deregulation was also announced in May. After that, a series of trade and investment reforms were made. As a result, the growth of non-oil exports was very impressive, almost tripling from US\$5 billion in 1983 to US\$14.4 billion in 1990. For the first time, export composition was dominated by the non-oil category, whose share in total exports increased dramatically from 25 percent in 1983 to 56 percent in 1990. Economic growth was strong, reaching more than 7 percent, and no serious inflationary pressure emanated.⁶

Overall, the macroeconomic performance of the country has been remarkable. The stabilization and structural adjustment program went relatively smoothly, with no serious challenge from those who favor protectionism. Table 6.1 summarizes the achievement. How did this

Table 6.1 Selected Indicators in Indonesia, 1965–1990

	1965	1966	1967	1968	1969
Annual growth rate					
Real GDP ^b	0.11%	0.23%	0.23%	11.10%	7.10%
Inflation	593.70%	635.40%	112.20%	84.80%	17.40%
Fiscal balance/GDP ^a	-6.60%	-5.20%	-3.20%	-1.70%	-3.40%
Value					
Current account (US\$ billions)	-0.222	-0.108	-0.254	-0.255	-0.336
	1970–1973	1974–1979	1979–1983	1983–1986	1986–1990
Average annual growth rate					
Real GDP ^b	11.05%	6.54%	4.29%	5.09%	6.35%
Inflation	13.19%	15.59%	12.96%	6.97%	7.81%
Non-oil exports ^c	34.26%	24.85%	-2.05%	9.16%	22.10%
Yearly average value					
Current account (US\$ billions)	-0.476%	0.952%	-6.442%	-4.099%	-2.242%
Fiscal balance (Rp. billions)	-118	-540	-1,218.2	-1,303	-2,322
Foreign borrowing (Rp. billions)	114.25	569.2	1,069	1,220.75	2,219.2
(Gap between fiscal balance and foreign borrowing)	-3.75	29.2	-149.2	-82.25	-102.8
Fiscal balance/GDP	0.58%	0.43%	0.41%	0.35%	0.32%
End of period					
Exchange rate (Rp/US\$)	415	627	994	1,641	1,901
Price of oil (US\$/barrel)	3.73	18.35	29.53	13.64	22.22
Non-oil exports share	25.23% ^d	34.80%	23.60%	43.90%	56.20%

NOTES: Fiscal balance equals domestic revenue minus total expenditures, in Rp.billion.

a. Fiscal year since 1969–70; 1965 and 1966 data are in old rupiah; 1967–1970 are in new rupiah.

b. 1965 data are at 1960 prices; 1966–1970 data are at 1973 prices; 1970–1990 data are at 1983 prices.

c. 1970–1973 and 1974–1979 data include exports of natural gas and its products.

d. 1975 data.

SOURCE: Central Bureau of Statistics (CBS), various publications; Woo et al., 1994; Azis, 1992; and World Bank, 1996.

actually happen? What was the coordination between monetary, fiscal and exchange rate policy?

The Trend of Macroeconomic Policies

From the standpoint of trade and exchange rate policies, October 1966 marked the beginning of a rational policy regime, albeit still far from a market-determined type. The abolition of quantitative restrictions on imports and the elimination of the multiple exchange rate system were both important in paving ways for the policy changes that followed. Foreign exchange certificates under the *bonus ekspor* (BE) system, which with some conditions are negotiable, were used quite flexibly. The amount of foreign exchange retainable to exporters through the “overprice” mechanism was raised a number of times to reach 36 percent in 1969 (in 1965 it was still 15 percent).⁷ In effect, the move was very similar to devaluing the currency. During 1969 to 1971, rupiah had depreciated by roughly 10 percent each year.

While the system tended to make the official export figures understated, export earnings grew considerably, doubling during the 1967 to 1971 period and relieving the balance of payments crisis that would have occurred had a drastic policy change not been made. The new incentives for exporters had also produced a dramatic reduction of illegal exports.

Along with the removal of quantitative restrictions, a major monetary stabilization program was conducted. Credits issued by the central bank (*Bank Indonesia*, hereafter BI) were tightened. Only selected key sectors—that is, food, basic commodities and some foreign exchange-generating sectors—were entitled to receive such credits. The controlled interest rate was raised to more than double, and state enterprises were no longer shielded from competition with private enterprises. As expected, growth of money stock, measured by M1, dropped from more than 700 percent in 1966 to less than 40 percent in 1970. Inflation dropped dramatically from three-digit to two-digit rates, despite the fact that twice during the 1966 to 1969 period the government raised the unrealistically low price of gasoline.

On the fiscal side, the balanced budget episode began in 1967. The concept of “balanced,” however, was different from the conventional understanding in that the deficit between revenue and spending must be matched by foreign borrowing. The latter played a significant role,

particularly in the rehabilitation and development of infrastructure needed to relieve the existing supply bottlenecks. Having seen the effectiveness of the principle, the new government was determined to declare it more formally by issuing a Presidential Decree No. 13/1969.

Although the definition of balanced budget is rather unusual, theoretically no significant monetary disturbance would be created by such a practice since the sale of foreign exchange funds from borrowing will take out the addition of base money due to the spending-revenue gap. Indeed, together with the austere credit program, the balanced budget principle played a major role in bringing down the inflation rate during the period.

Two policy changes in 1970 were very important: first, the adoption of a fixed exchange rate system, that is, Rp. 415 per U.S. dollar; and second, the elimination of any controls on capital movement. As will be shown, the latter played a major role in shaping the country's monetary and exchange rate policy, and it invites an interesting inquiry as to why such a sequence of liberalization was chosen. A more detailed analysis on this subject will be presented later.

The fixed exchange rate system went through the oil-boom period in 1973–74. In 1978 the system was changed to a managed floating one.⁸ This suggests that during 1973 to 1978 the economic policy environment largely featured a direct control system, which theoretically made it difficult for the government to contain the inflationary effect of increased terms of trade. Surprisingly, however, inflation rates were on a declining trend, reaching 8 percent in 1978.

Actually, the strain of inflation had already begun appearing in 1973, following a rice crisis in the preceding year (rice had the largest weight in the CPI's list of commodities). At the same time, monetary policy was rather accommodating, as indicated by the more than 40 percent growth of M1 and M2. When the world's oil prices quadrupled in 1973, inflation accelerated; by 1974 it reached more than 40 percent. Yet, there was still no sign of tightening money policy. Both M2 and M1 still rose by more than 40 percent, before descending in 1975.

As seen in Table 6.2, the oil boom produced a decline in prices of tradables relative to nontradables. If this leads to a resource movement favoring the nontradables, as it usually does, a Dutch disease strikes, in which the resulting real appreciation of currency will damage export competitiveness. In Indonesia, however, not all price declines of the tradables could be attributed to such a phenomenon. The production of many agriculture-related products was directly and indirectly subsidized

Table 6.2 Real Exchange Rate Movements: Going through Three Major Devaluations in Indonesia

	1971	1972	1973	1974	1975	1976	1977	1978		1979	1980	1981	1982	1983	1984	1985	1986	
<i>Measured as tradable-nontradable price ratio^a:</i>																		
Imports, non-oil wholesale prices ^b	75.0	82.2	91.6	100.0	87.2	74.5	66.3	65.3		73.7	70.5	71.9	66.1	72.6	69.2	68.3	66.2	
Exports, non-oil wholesale prices	63.9	65.8	91.6	100.0	66.4	65.6	71.7	70.4		93.3	93.8	100.6	90.7	117.8	112.1	105.9	109.9	
Agriculture, wholesale prices	63.9	74.0	88.0	100.0	93.6	93.6	97.8	97.5		102.4	106.2	111.8	109.3	109.9	108.0	105.7	107.0	
Manufacturing, wholesale prices	73.6	79.5	97.6	100.0	85.6	80.3	76.1	76.9		80.4	81.2	82.5	79.5	81.8	79.1	79.0	80.5	
									1978	1978								
	1971	1972	1973	1974	1975	1976	1977	1978	Oct	Nov	1979	1980	1981	1982	1983	1984	1985	1986
<i>Measured as nominal exchange rate deflated by domestic and foreign general price level</i>																		
Morgan Guaranty's competitiveness measure	114.1	127.1	120.3	100.0	87.3	74.8	74.2	79.6			113.3	101.1	89.0	79.5	98.4	91.8	92.7	109.7
Vis-à-vis major trading partners	116.3	132.6	122.1	100.0	91.9	80.2	82.6		108.1	162.8	119.8 ^a							
Vis-à-vis ASEAN competitors	116.3	124.4	114.0	100.0	88.4	73.3	72.1		76.7	115.1	96.5 ^a							

Notes:

a. 1978 data are January through October (pre-devaluation); 1983 data are for April through December (post-devaluation), and 1986 data are for January through August (pre-devaluation).

b. Price series normalized by housing component in Jakarta CPI.

Source: Warr, 1986; Garnaut, 1979; and Woo et al., 1994.

by government expenditures directed to rural areas for roads, irrigation, schools and other infrastructure developments (Gelb, 1988). It is important to note that the well-known *Inpres* program, designed to help foster the development of rural areas and some lagging regions, was introduced in 1975. Many subsidies to rural areas came under such a program.⁹ At any rate, the presence of a Dutch disease phenomenon could not be affirmed.

The second oil boom in 1979–80 provides a more interesting trend when viewed from the fiscal and monetary policy standpoint. As noted earlier, the balanced budget principle has been applied persistently since 1969, with no exception during the oil-boom period. But the unusual definition of balanced suggests that windfall revenues, like foreign borrowings, simply add to potential financing for more budget expenditures. In reality, the entire budgeted expenditures were not spent. The unused portion appeared in the government account in the central bank, reflecting an increase of government deposits. As shown in Table 6.3, in 1979–80 and 1980–81 the government net position increased dramatically while the balanced budget principle remained intact. Hence, in effect, the government

Table 6.3 Indonesia's Government Net Position, Going through Two Oil Booms

	Claims on gov't. (Rp. billion)	Gov't. deposits (Rp. billion)	Gov't. net position (NP) (Rp. billion)	NP as % of gov't. exp.
1971–72	18	2	-16	-3
1972–73	59	26	-33	-4.5
1973–74	13	0	-13	-1.1
1974–75	28	32	4	0.2
1975–76	133	6	-127	-4.7
1976–77	-33	104	137	3.7
1977–78	140	235	95	2.2
1978–79	175	193	18	0.3
1979–80	10	856	866	10.7
1980–81	267	1,318	1,051	9
1981–82	638	490	-148	-1.1
1982–83	91	164	73	0.5
1983–84	1,841	2,693	852	4.7

NOTE: Shading indicates years of oil booms.

SOURCE: Bank Indonesia, *Indonesian Financial Statistics*, various volumes.

was actually able to build up surplus under the balanced budget principle.¹⁰ As a result, despite the price jump in 1979, the inflation rate actually declined in 1980. In turn, this strengthened the exchange rate competitiveness, as indicated by the improved real exchange rate shown in Table 6.3. To a large extent, this explains why non-oil exports still grew strongly in 1980 despite the potential Dutch disease.

Another significant factor was the 1978 devaluation. As indicated earlier, the announcement took many people by surprise, since there were practically no signs of an emerging balance of payments crisis at that time. The strong performance of non-oil exports had certainly received a strong boost from the devaluation. This is explained by the depreciation of the real exchange rate in 1979 (Table 6.2). But why did the real exchange rate depreciate when some nontradable prices also increased? It appears that the expansionary effect from increased income, which raised the real money balance, outweighed the inflationary effect of increased money supply. In other words, excess liquidity was reduced, which suggests that a further increase in the prices of nontradables was somewhat prevented. The surplus accumulated by the government sector related to the balanced budget practice also helped to dampen the inflationary effect of devaluation.

The decision to devalue the currency in 1978 was considered brave and timely. Furthermore, it was effective. A competitive price ratio was maintained, which led to a strong boost of exports. What explains such nonmyopic behavior by policy makers? Woo et al. (1994) offered two explanations: concerns over resource (oil) depletion and fear of increased unemployment in the tradable sector. Indeed, as argued in Azis (1990) and Paauw (1977), the employment effect of declining labor-intensive exports could have been devastating. While both arguments may be right, another factor deserves recognition. A perception was already in place that relying too much upon one source of revenues, be they exports or government revenues, is too risky of an approach. Furthermore, there was no assurance that the high price of oil would endure. As it turned out, on this point the policy makers' judgment was unsupported by the actual price trend. Oil prices weakened only slightly, and the Iran-Iraq war produced another big jump in 1979–80.¹¹ But the decision to devalue was absolutely a salutary one.

To claim the Dutch disease was not present, however, is not entirely correct. An important addition to Dutch disease theories is the inclusion of the construction sector's behavior (see Bevan, Collier and Gunning, 1989). Basically, it predicts that the increased demand following the

shock will cause a higher price rise in nontradable capital goods than the price rise in tradable capital goods. Calculations using data from 1971 to 1991 indicate that such a prediction indeed holds in the Indonesian case (Warr, 1994). Hence, the assertion as to whether Indonesia experienced a Dutch disease is not easy to confirm, depending on the specific indicators being used. This author is more inclined toward the presence of the phenomenon, albeit at a very mild degree due to early correct response by the government, notably to create surplus out of the balanced budget and to undertake devaluation.

When the price of oil dropped in 1983, resulting in a swelling of the current account deficit to US\$6.4 billion, the government was forced to devalue the currency again (by 28 percent). The strong growth of exports following the devaluation, however, was short-lived. In fact, in 1985 non-oil exports declined in value, before reviving slightly in 1986 only because still another major devaluation (31 percent) was taken in that year.

At this juncture, it is worth re-stressing the comparison between the three devaluations. A real reason for the 1978 devaluation is probably the most difficult to elucidate mainly because a number of reasons could be posed. Certainly, concerns over the balance of payments (BOP) position were not a major factor. The 1983 decision, on the other hand, was primarily based on the fear of a balance of payments crisis. Having negative growth of non-oil exports during the two consecutive years, the current account deficit increased enormously. What about the 1986 devaluation? It was related more specifically to the plunge of oil prices. When in August the price hit rock bottom (below US\$10 per barrel), policy makers were alarmed. In fact, in the same year a major trade and investment deregulation was also announced, aiming at boosting the non-oil exports.

Meanwhile, a new era of monetary policy began in 1983. The early sign of government's intention to reform the financial sector had actually emerged in mid-1982, when the central bank, BI, cut back on the provision of credits that, for several years, had been directed toward activities with low priority. But it was the June 1983 package that produced a considerable impact on the financial sector. Practically all credit ceilings were eliminated, resulting in an increased degree of pricing (interest rate) and quantity (credit) flexibility. At that point, however, no provision on the ease of entry condition was made. The dominance of the state-owned banks, an important sign of the country's financial repression, remained overwhelming.

Realizing the need for competition, in October 1988 the government promulgated another major policy change aimed at increasing bank competition by allowing entry of new private banks, including foreign bank branches outside Jakarta. Such a policy route was deemed necessary, given the high degree of financial repression at that time. Loans were often made by the dominant state-owned banks to state-owned enterprises (SOEs) at lower rates. (SOEs are commensurate with those carrying the status of agent of development.) Combined with the effects of the June 1983 reform, the 1988 package brought increased competitiveness in the financial system.

But these two major financial reforms did not succeed in creating vibrant financial markets. Case after case indicated that with lack of supervision over financial institutions the number of troubled banks increased. There was clearly a sharp contrast between quantity and quality—that is, lack of professionalism existed in a growing number of banks.¹² Incidentally, this occurred while economic growth was strong, between 6 percent and 7 percent, higher than the Repelita V target. Despite the swelling quantity, however, only a few commercial banks controlled a large share of an oligopolistic market structure, and their shareholders are large industrial groups (conglomerates). In general, the structure of banking and nonbanking financial institutions corresponds very closely to the pattern of distribution of economic power.¹³ As expected, these industrial groups, either in a quasi or direct way, are the largest borrowers. From this perspective there seems to be a strong indication that the country's industrial organization structure—a high degree of industrial concentration—determines the nature of the financial structure, not vice versa.

It took less than a year after the promulgation of the 1988 reform for the economy to start overheating. By 1989, GDP growth accelerated to 7.5 percent, up from 5.8 percent in the previous year. Non-oil exports grew fairly fast, and private investment surged. Signs of an investment boom were clearly detected.

As reported in Table 6.4, investment grew persistently at a double-digit rate, reaching 13.4 percent in 1989. In Figure 6.1 such an event is shown by a rightward shift of the IS-curve to IS_1 .¹⁴ To accommodate the increase in private demand, the government loosened its monetary policy by accelerating the pace of monetary expansion. By 1990, the growth of M2 reached an unprecedented level (44 percent), supported by heavy flows of credit allocation (54 percent). Such a relaxed monetary policy is depicted by a shift of the LM curve to the right, bringing the interest rate down to $i_2 = 17.30$ percent.

Table 6.4 Basic Indicators of Monetary Sector in Indonesia, 1988–1995

	i	Credit	I	MS2	CA	CPI	GDP	NER	RER
1988	17.72	33.94	11.52	23.94	-1.40	8.05	5.78	2.55	-1.28
1989	18.63	44.56	13.36	39.78	-1.11	6.42	7.46	5.01	3.47
1990	17.30	53.60	14.58	44.16	-2.99	7.76	7.24	4.11	1.8
1991	23.27	16.29	6.52	17.05	-4.26	9.40	6.95	5.83	0.8
1992	20.37	8.87	4.94	20.18	-2.78	7.59	6.46	4.08	-0.29
1993	16.00	19.90	5.69	21.96	-2.11	9.60	6.50	2.82	-3.39
1994	14.30	27.16	13.76	20.19	-2.79	8.53	7.48	3.53	-2.19
1995	17.10	26.30	12.87	27.58	-7.90*	9.43	8.10	4.06	-2.22

NOTES:

i = deposit rate (% p.a.), midpoint of range: IFS-IMF (1995 figure is for three-month deposit rate).

Credit = growth rate (%) of credits outstanding in Rp. and foreign exchange at end of period, including Kredit Investasi Kecil (KIK) & Kredit Modal Kerja Permanen (KMKP): Bank Indonesia.

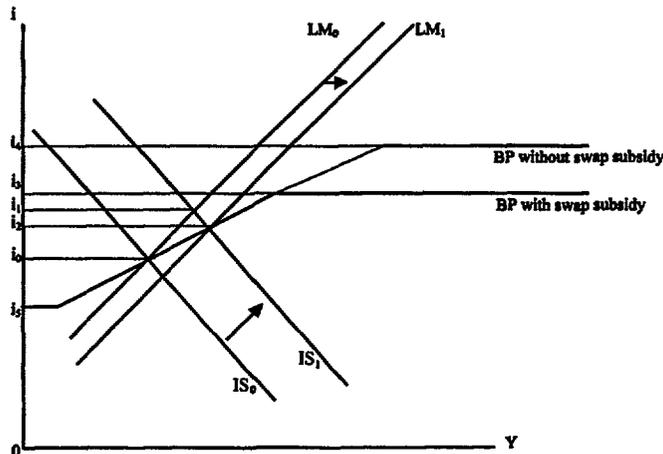
I = growth rate (%) of gross fixed investment, at 1983 price, except for 1994 and 1995 at 1993 price: CBS.

CA = current account balance (US\$ billion): IFS-IMF; 1995 data for fiscal year, from Bank Indonesia.

GDP = growth rate (%) of GDP at 1983 price, except for 1994 and 1995 at 1993 price: CBS.

NER & RER = nominal and real exchange rate, respectively.

SOURCE: Azis (1996), CBS and Bank Indonesia.

Figure 6.1 Impact of Monetary and Fiscal Policies, and the Degree of Monetary Autonomy

NOTES: i = interest rate; Y = output level; BP = balance of payments curve. The equilibrium i can vary provided the IS and LM curves intersect because capital mobility is imperfect.

SOURCE: Author.

The first impact was on price levels. Inflation soared to 7.8 percent, and continued increasing to 9.4 percent in 1991. Not surprisingly, exchange rate competitiveness was damaged (see the reverse direction of the real effective exchange rate [REER] from 1990–91 to 1991–92 in Table 6.5).¹⁵ The second pressure came from greater demand for imports to support booming investment. While the growth of non-oil exports dipped to a one-digit rate, non-oil imports grew at an unprecedented rate, that is, more than 31 percent. Consequently, the deficit on the current account swelled to US\$3 billion and US\$4.3 billion in 1990 and 1991 respectively. The end result was quite foreseen: Expected devaluation was imminent and this led to a series of capital outflows!¹⁶

Actually, exchange rate policy has been guided by considerations of external competitiveness since 1986, albeit with occasional interruptions. Rupiah has depreciated continuously against the dollar at approximately 3 percent to 5 percent annually (Table 6.4); and on annual average, the REER remained relatively stable, despite the drastic change during the 1990–91 to 1991–92 period. Using the IMF measure, since 1987 the REER has depreciated by an average of about 1 percent per year.¹⁷ Supported further by a series of trade and investment deregulations, actively promulgated since 1986, the growth of non-oil exports was dramatic: During 1986 to 1989, the annual growth was continually at double-digit rates, before dropping to around 8 percent in 1990.

Indeed, one of the most important structural adjustment programs during the 1980s was in the area of trade policy. In addition to the 1983 and 1986 devaluations discussed earlier, policies of removing trade barriers in tariff and nontariff categories, through a series of deregulations, were also taken. The first package, announced in May 1986, covered trade and investment deregulation. Since then, a series of policy reforms were launched, primarily, though not exclusively, aimed at removing structural rigidities in order to encourage exports and export-oriented foreign investment.¹⁸

The resulting outcome of the structural adjustment policies was encouraging. Private investment increased significantly following the announcement of the May 1986 package. In the case of foreign investment, the trend was also accelerated by a “push” factor coming from the realignment of some currencies (for example, yen, Taiwanese dollar, Korean won), prompting investments from these countries to pour in.¹⁹ The establishment of a growth triangle, linking Singapore, Johor and Batam Island, helped increase foreign investment flows, albeit largely from Singapore.

Before closing this section, there are two other important policy changes to be mentioned: One was announced in December 1987, and

Table 6.5 Changes in Financial Variables in Indonesia, 1989-90-1994-95

	Non-oil export	ER index	Interest rate		NFA			OMO		Others	Monetary policy	Government		Fiscal policy	RM
		REER	SBI	LIBOR	Spot	Swaps	Ex. Credit	SBI/SBPU	Special			Budget	Nonbudget		
1989-90	17.2	2.3	13.1	8.4	-2.3	-4.1	4.1	0.4	0	3.7	1.8	-0.1	-0.1	-0.2	1.6
1990-91	7.7	-6.3	23.7	6.3	-5.6	7.3	5	1.8	-2.5	-1.8	4.2	-2.8	-0.8	-3.6	0.6
1991-92	22.1	1.3	18	4.3	7.2	-10	7.8	0.8	-5.2	3.2	3.8	-1	0.8	-0.2	3.6
1992-93	31.9	1.8	12.5	3.2	-1.2	-0.4	12.2	-14.3	1	3.1	0.4	-1.4	2.1	0.7	1.1
1993-94	9.7	-0.8	8.5	3.1	-2.8	-0.1	7.6	1.9	1.5	1.4	9.5	-4.4	-1.8	-6.2	3.3
1994-95 ^a	16.5	-3.8	12.8	6	-6.3	2.6	2	8.1	-0.6	0.9	6.7	-5.2	1.3	-3.9	2.8

Notes: Except for REER index export growth and interest rate changes (in %), all are in Rp. trillion.

OMO = open market operations.

"Special" refers to special SBI/SBPU.

Others = including BI's domestic credit.

a. As of January 1995, except for non-oil export growth.

Source: Azis, 1996; and Bank Indonesia.

another was the replacement of the priority industry list (DSP) with the negative industry list (constituting 64 sectors); any sector not in the list is open for foreign investment. Multitudes of objectives were behind the December 1987 package. Pressures to further open up the economy in order to compete with neighboring countries were imminent. There was also a need to expand capital markets, to earn maximum foreign exchange in the face of mounting debt services, and to safeguard income inequality, both between income groups (small versus large-scale businesses) and between regions (the western versus eastern region). To be entitled to national treatment, the requirement for percentage of Indonesian ownership in the establishment was reduced from 75 percent to 51 percent. In order to boost the capital market, the percentage was lowered further to 45 percent if 20 percent of the share was sold in the capital market. No further obligation was made with respect to the 5 percent minimum requirement of Indonesian ownership for export-oriented investment.²⁰ Such a requirement was also applied to those with only a 65 percent export requirement (not 85 percent), as long as they are located in one of the provinces in the eastern part of Indonesia.²¹ Concern about income disparity was reflected in the new DSP list, in which small-scale industries remained closed to foreign investment.²²

To conclude, a major overhaul of economic policy accompanied the change in government in the mid-1960s. From 1970s to 1980s, the conduct of exchange rate and monetary policy has evolved toward a more market-determined type. Overall, the change in the growth of money supply has been less visible than the reduction in the inflation rate. The real exchange rate fluctuated as the country experienced three major devaluations. Since 1986, however, annual changes in the exchange rate are more predictable as the government was more determined to defend the exchange rate, guided by considerations of external competitiveness. Improvements in real sector, through a series of trade and investment deregulations, also played a significant role.

How persistent was such a trend in the 1990s, taking into consideration the enormous amount of capital inflows that occurred during this decade?

Defending the Exchange Rate in the Wake of Capital Inflows

Toward the end of the 1980s, monetary policy was loosened to accommodate the increase in private demand. As a result, the inflation rate soared to almost a two-digit rate in 1990. To counter, a reversal in

monetary policy was implemented in 1991. This marked the beginning of a tight money policy (TMP). It took almost a year before one could see the impact of such a policy on some major indicators, albeit not necessarily on the inflation rate. With the interest rate hovering at more than 23 percent—which is excessively high—the growth of credits was immediately contained, dropping to 16.3 percent and 8.9 percent in 1991 and 1992 respectively. Curiously enough, however, the target growth of the money supply, that is, 20 percent, could not be met, although the actual rate (around 25 percent) was already half of the rate in 1990. In terms of Figure 6.1, the LM curve moves back to the left, but not far enough to make the inflation rate come down (which remained high at 9.5 percent). This brought up the question of policy effectiveness. With GDP growth around 7 percent, and the income-elasticity of demand for M2 roughly 1.6, M2 expansion of 20 percent seems inconsistent with the inflation target of 5 percent. Yet, the actual growth of M2 was greater than 25 percent.

Why did the monetary authority fail to cut money growth to meet even the high target despite an extremely high interest rate? A fear of recession did not seem to be a credible reason: Non-oil exports grew by 24 percent, and by all accounts the Repelita V target for GDP growth did not seem difficult to attain at that time. Could it be that there was not enough support from the fiscal policy front? A closer observation indicates that the budget, either the planned or the realized one, was already contractionary (it was even considered extremely contractionary).²³ The next target of suspicion is the nonbudget item, which is another important component of net domestic assets (NDA). But even this item did not show any sign of loosening money policy. This suggests, therefore, that there was clearly a strong intention on the part of government to contain inflation.²⁴ So, what was the real reason money growth was not cut?

Looking at monetary data in more detail, one notices that the primary source of growth of base money was the swelling amount of net foreign assets (NFA), the breakdown of which is reported in Table 6.5. The high interest rate prompted many private sector and commercial banks to borrow from abroad, as indicated partly by a dramatic increase in the swap transaction, that is, Rp7.3 trillion. While it is not possible to derive the exact amount of foreign private borrowing,²⁵ three factors support the prediction: first, a lower world interest rate, as shown among other things by a drop in Libor from 8.4 percent to 6.3 percent; second, a swelling amount of other sector under the other capital item in the

BOP capital account, reaching US\$3.4 billion in 1991; and third, a record level of swap transactions, reaching Rp7.3 trillion. Even the money contraction resulting from open market operations (OMO), that is, the selling of SBI (central bank certificates), could not offset such enormous inflows.

But not much could be done in this area because an open capital account system had been adopted by Indonesia in the early 1970s. Hence, alternative explanations are still warranted. It turns out that the determining component is the provision of *subsidized export credit*, which amounted to Rp5 trillion in 1991 (Table 6.5). This subsidized credit was provided to finance export transactions. Indeed, originally the program was designed to enhance the competitiveness of the nation's exporters vis-à-vis those in the trading partners. But such a policy distorted market resource allocations, and, as the present discussion indicates, it also hurt the effectiveness of intentionally tight monetary policy.

Hence, the experience of the first TMP in the 1990s was a failure, because control over NFA, particularly on export credit, was ineffective. Frustrated by such developments, in March 1991 the government imposed a shock measure, that is, redeeming a significant part of SBPUs purchased from state-owned companies, particularly from state banks.²⁶ As it turns out, this was capable of providing a Rp5.2 trillion monetary contraction. Unfortunately, the growth of export credits could not be restrained; it increased even faster (7.8 percent) during 1991–92. Therefore, another move was needed.

One such move was announced in November 1991, that is, to liquidate the swap mechanism. In addition to a direct spot market intervention, until 1991 BI could use its swap mechanism to intervene in the FOREX market. This mechanism was introduced in 1979 to enhance foreign capital inflows by reducing exchange rate risk. Through the system, basically BI buys foreign currencies at the spot rate, and sells them through a contract at a specified future point in time using the then-current spot exchange rate, with some charged margin. Since the inception of this mechanism, the swap margin has been raised several times, primarily to counter short-term speculative movements that are likely to occur during periods of high interest rates (wider interest rate differential). From the original 2.5 percent per annum with the maturity ranging from thirty to eighty days, the swap margin settled at 9 percent in 1987. Obviously there is a risk of BI's financial loss if the interest rate differential falls. However, rather than making

an announcement about the swap margin several times, in 1988 the government finally decided to follow the market by adopting the covered interest parity condition.

In response to the abolishment of the swap mechanism in 1991, there were huge spot foreign exchange purchases from BI by commercial banks throughout 1991–92 (see Table 6.5), although this was countered by an even larger contraction through the last transaction of BI's swap, such that on the net basis the swap-spot operations managed to reduce the NFA by some Rp2.8 trillion.

It was not clear which of the following reasons really led the government to decide to abolish the swap mechanism: enormous amount of capital inflows (swelling current account deficit), the risk of suppressing growth of private forward markets, the inability of the monetary authority to constantly adjust the swap margin, or the high moral hazard involved in the mechanism. What is clear is that the growth of the NFA was reduced by swap elimination, even taking into account the expansion of the spot operation (Table 6.5).²⁷ The growth of M2 was dramatically cut to 26 percent, still high, but almost half of the rate in 1990. The effectiveness of swap elimination in restricting monetary expansion was further demonstrated when it was combined with reduced operations in the FOREX spot market, such as occurred in 1992–93. Another notable case was the dramatic size of liquidity absorption through open market operation that reached more than Rp14 trillion. Also, the growth of domestic credit sharply decelerated, dropping from 16 percent to less than 9 percent in 1991 and 1992 respectively.²⁸ Such a tight monetary trend, however, was countered by the following two sources of monetary expansion.

For the first time the fiscal sector has increased, not reduced, the size of base money. What is more worrying is the fact that the increase occurred while the government budget was, as usual, contractionary. Hence, it was the *nonbudget expenditures* that led to the increase. Such an item is linked to the funding of several sectors considered strategic yet too sensitive to be discussed in parliament (off-budget expenditures). Clearly, in that year there was no consistency between (tight) monetary policy and (expansionary) fiscal policy.²⁹ Another source of concern was the continued increase in export credit, which reached an all-time high of Rp12.2 trillion.

It is obvious that the sharp drop in the growth of base money in 1992–93 that contributed to the low inflation rate (less than 5 percent in 1992) was primarily due to the government's heavy open market opera-

tions. From the macroeconomic perspective the results were encouraging, but the micro impact on the BI's profitability was devastating.³⁰

The process of cooling down had practically ended by 1993. Having experienced slower growth of credit, investment and GDP in the preceding years, the government began to loosen monetary policy, as indicated by an expansionary market operation (Rp3.4 trillion) and reduced interest rate.³¹ The growth of credit surged, upheld by the relaxation of prudential regulations. Many signs of expected trends in the monetary sector during an election year (1993) could indeed be found. All these facts, however, did not contribute to an excessive growth of base money (the increase, Rp3.3 trillion, was still lower than that in 1991–92), primarily because economic policy makers succeeded in convincing political leaders to impose a limit on nonbudgetary expenditures.³² Furthermore, although export credit still increased by Rp7.6 trillion, the government finally decided to terminate this subsidized credit, despite increased pressures from potential and existing credit users.

Hence, 1993–94 was characterized by an expansion in the monetary sector but a contraction in the fiscal sector. The phenomenon continued to take place in 1994–95. Although some nonbudgetary expenditures reappeared in that year and the loosening of monetary policy continued, whereby credit growth expanded by 27 percent, the combination of a very contractionary fiscal policy and spot operation had led to an even lower growth of base money (2.8 percent).

But inflation was persistently high, greater than 9 percent; the current account deficit increased to US\$3.6 billion; credit grew very fast, more than 27 percent; and GDP growth was very strong, 7.3 percent. Data on approved investments, including direct foreign investment also showed a more than 100 percent increase. Enormous flows of short-term capital toward the end of 1993 made the central bank face a classic dilemma of preventing the exchange rate from appreciating and attempting to stabilize prices at the same time.

In the end, the REER appreciated during the last few months of 1993. The growth of non-oil exports dropped sharply from 32 percent in 1992–93 to less than 10 percent in 1993–94. BI's attempt to defend the exchange rate has been strengthened ever since. While the official rate continued to depreciate by about 4 percent, throughout 1994 both real and nominal effective rates also depreciated, the former at 3 percent or 3.8 percent if measured by fiscal year (see Table 6.5), and the latter at 9 percent. Although the growth of non-oil exports started to pick up,

increasing bottlenecks in the real sector seemed to begin producing more formidable impacts than the exchange rate.

Hence, while in general the Indonesian government prefers to defend the exchange rate, a market-determined rate is occasionally allowed, as shown in the 1993 case. But as soon as concerns over the slowdown of non-oil exports' growth arose, the trend was immediately corrected by accelerating depreciation, as happened in early January 1994.

This brings up the ongoing debates as to whether defending the exchange rate is a suitable task of the central bank. But the influx of capital flows continued. Determined to reduce speculative movements, and at the same time hoping to encourage foreign exchange trading among market participants (the country's foreign exchange market was very thin), in late 1993 BI widened the exchange rate band from Rp6 to Rp20 per U.S. dollar, then to Rp30 per U.S. dollar in 1994, or equivalent to 1.5 percent of the currency's value.³³ In December 1995, the band was further widened to 3 percent, that is, Rp60 per U.S. dollar. In announcing the latter, it was explicitly stated that the move was meant to improve the effectiveness of monetary control and the stability of the exchange rate in order to anticipate future growth of capital flows.³⁴ Unfortunately, such a spread between BI's buying and selling rates was still much too low to provide enough room for price adjustment in the foreign exchange market. As a result, a potential instability due to short-term capital flows is still high, and the FOREX market remains thin (less than US\$5 billion a day in 1995, while transactions with BI were only US\$24 million a day). In terms of BI's flexibility to set the interest rate, if the market exchange rate is in the middle of the band, short- and medium-term interest rates can be adjusted to reach around only one to two percentage points above or below the world interest rate.

Concerns over an overheated economy mounted in 1995. While the inflation rate was still high, between 8 percent and 9 percent, and the economy posted a strong 7.5 percent growth, the current account deficit increased dramatically, reaching more than US\$7 billion, or between 3 percent and 4 percent of GDP.³⁵ When the economy enters a stage of overheating, another TMP is just around the corner. Indeed, TMP was implemented through the entire year. But to make TMP effective is another story. In the wake of massive capital flows, BI had to intervene heavily in the currency markets. In so doing, additional liquidity was pumped into the money market, making the monetary target impossible to achieve.

A case in point was the experience during the first two weeks in June 1996. In that period alone, BI had to intervene three times, involving

some US\$800 million. Unless sterilized, that would mean an inducement of fresh rupiah supply in the market. Yet, growth of the money supply had already been far beyond the 17–20 percent target, that is, 30.8 percent in May and 29.8 percent in June.³⁶ As a result, there was a high liquidity in the economy. A downward trend of the interest rate can therefore be expected.³⁷ Such a trend was foreseen to continue throughout 1996, due to a likely injection in the liquidity that would come from an estimated US\$1.2 billion worth of initial public offerings (IPOs) and rights issues in the local stock market among other reasons. However, the trend of a narrowing interest rate differential is unlikely to continue, at least not in the short term, since consumption and investment remain robust.³⁸

The policy on an exchange rate band that was announced in June 13, 1996, took the market by surprise. BI decided to widen the band, allowing rupiah to fluctuate by 5 percent. The new range is set to Rp2,315–Rp2,433. It appears that the major impetus for such a substantial increase was the continued flood of capital inflows, most of which came from Japan.³⁹ Although the immediate reaction was a surge of rupiah against the U.S. dollar (more rupiah needed to buy one U.S. dollar), the currency was still expected to depreciate during the rest of the year, since the current account deficit was still large.

In effect, increasing the spread means shifting the risk to the market, such that BI will purify its role as a lender of last resort. The number of interventions needed in the FOREX market will also be reduced. The less frequently BI has to intervene, the less the amount of rupiah that should be pumped into the market, which means that serious consequences for inflation could be avoided.

Flooding capital inflow was not uniquely experienced by Indonesia. Neighboring countries such as Malaysia and Thailand faced the same problem. In retrospect, this factor contributed to the exchange rate crash in the second half of 1997, when massive capital outflows occurred following the collapse of the Thai baht. Short-term portfolio investment obviously presents more problems in meeting the target of currency depreciation and the inflation target.⁴⁰ In the Indonesian case, such a task has proven very costly. In the last several years, the inflation target has been set at 5 percent, but more often than not such a target could not be met. As indicated earlier, in order to maintain the competitiveness of the exchange rate and simultaneously contain the growth of base money, a massive sterilization needs to be taken. Enormous quantities of foreign exchange must be bought if the exchange rate is to be defended.⁴¹ The expansionary effects of NFA can be sterilized by an

open market operation, that is, the selling of SBIs. Such actions are almost “menu of the day” whenever short-term capital inflows increased. But the BI’s own profitability can be severely hurt. As an illustration, in 1992–93 when the short-term capital continued to flow in, BI purchased more than US\$14 billion foreign exchange to defend the exchange rate. To sterilize potential money growth, an open market operation was conducted, involving some US\$11 billion of SBI sales. This has contributed to the swelling of BI’s foreign reserves (the reserves remained high in 1996). With Libor stabilized at 3.2 percent, the SBI interest rate at 12.5 percent and the nominal exchange rate depreciated by 5.3 percent, this would mean a 4 percent negative spread, or a between US\$0.4 billion and US\$0.5 billion loss on BI’s portfolio.

Should the country have implemented a completely floating exchange rate mechanism during that time? Both proponents and opponents of such an alternative have their own arguments. But coupled with a series of widening exchange rate bands, a managed floating system has been adopted since 1978 until August 1997 with practically no disastrous implications. This warrants further arguments. The sizable external debt and its implication on the urgency for raising foreign exchange revenues (exports) seem to be among the most important motives to defend the exchange rate.⁴² But the cost is also clear: Targeted inflation is hard to meet.

In summary, management of Indonesia’s macroeconomic policies during the first half of the 1990s was crucially affected by occasional floods of capital inflows. While it is difficult to predict the exact size of the flows, BI’s task is unlikely to ease, especially when defending the exchange rate is the (revealed) preference of the government. McLeod (1996) argues that the cost of keeping exchange rate and inflation targets at the same time is excessively high. A floating exchange rate system is therefore proposed. The discussion in the next section is meant to demonstrate, through the use of a model, the general equilibrium impact of increased capital flows in Indonesia, when the government allows the exchange rate to fluctuate freely according to market forces.

Modeling the Effects of Capital Flows on the Exchange Rate: A CGE Framework

This section analyzes the impact of capital flows. For that purpose, a computable general equilibrium (CGE) model is used to enumerate the general equilibrium impact of the flows. One of the major characteristics

of CGE models is to allow the adjustment process in the system to be governed by the behavior of incentive variables, that is, commodity and factors prices, exchange rates, and interest rates (endogenous price model). While these variables are treated endogenously in the model, they can be indirectly influenced by government policies. It is also worth noting that since elaborate social accounting matrices (SAM) are used as the main database for the model, impacts on social issues such as employment and income distribution can also be investigated by model simulation.

But perhaps the most compelling argument for using a CGE framework is related to the task of finding the so-called exchange rate equilibrium. Two alternative approaches can be noted for comparison. First, there is the simple PPP approach. Despite its ease of use, it is known that the PPP approach neglects changes in economic structure that have likely occurred since the last time the current account—hence the exchange rate—was in equilibrium. Second is the neoclassical concept of the real exchange rate. Such a rate is defined as the relative price of tradable to nontradable goods. In the empirical application, the usual practice is to measure domestic and international prices in terms of an aggregate index, that is, CPI or GDP deflator, which implicitly suggests that both tradables and nontradables are included in the measure. In a more refined way, prices for tradables and nontradables are measured separately, by applying, for example, the Salter-Swan definition of a nontradable sector (that is, a sector with no competing imports and exports). The problem with such an approach is that it does not take into account the degree of substitution between intermediate or capital goods (the largest component of most developing countries' imports) and domestic products, which can be very different from the degree of substitution between domestic products and light manufactures or primary products (the largest category of most developing countries' exports).⁴³ Consequently, the impact analysis of external shock and the corresponding policy response is likely distorted. By allowing imperfect substitution in a multisectoral framework, the CGE approach would be more appropriate.

The following are some of the core equations in the Indonesian model.⁴⁴ In the production side, a nested production function specifies two-level production relating output and two categories of inputs, primary and intermediate inputs. Primary inputs enter the production function for value added, and along with the composite intermediate inputs, this value-added component appears on the right-hand side of the production function for output.

What is the optimal composition of value-added and the composite intermediate inputs? With a constant elasticity of substitution (CES) form of production function, a standard optimization program will give the following form of demand for intermediate inputs:

$$INTM_i = VA_i / [(PINTM_i / PVA_i) \cdot (d_i / (1 - d_i))]^{1/(1+n)} \quad i \in n$$

where $PINTM$ and PVA are prices of intermediate inputs and of value added (the “net” price) respectively, d is the distributive parameter, ρ is the substitution parameter, and n is the number of economic sectors.

Cross-hauling through simultaneous exports and imports (two-way trade) at the sectoral level is allowed. The implication is seen, among others, through the specification of total domestic production X and total supply Q .

As shown in Figure 6.2, some parts of domestic production are consumed domestically (D), and other parts are exported (E). Meanwhile, total supply consists of domestically produced D and imported goods M . The allocation of sales between domestic and export markets is given by a constant elasticity of transformation (CET) function:

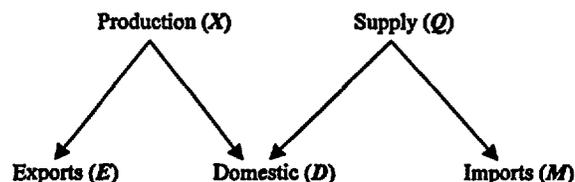
$$X_i = AT_i \cdot (g_i \cdot E_i^{\tau_i} + (1 - g_i) \cdot D_i^{\tau_i})^{1/\tau_i} \quad i \in exp$$

where γ and τ_i are the distributive parameter and substitution parameter respectively, AT is the shift parameter, and exp denotes exporting sectors. Similarly, an Armington function (Armington, 1969) is used to describe the relation between imports and domestic production:

$$Q_i = AC_i \cdot [h_i \cdot M_i^{-\epsilon_i} + (1 - h_i) \cdot D_i^{-\epsilon_i}]^{-1/\epsilon_i} \quad i \in imp$$

where imp denotes the importing sectors. An important implication of the above CET and Armington specification is that relative prices will determine the ratios of exports and imports to domestic sales:

Figure 6.2 Nested Production Function



$$E_i = D_i \cdot [PE_i / (PD_i(1 - tv_i - tx_i)) \cdot (1 - g_i) / g_i]^{1/(1-\epsilon_i)} \quad i \in \text{exp}$$

$$M_i = D_i \cdot [(PD_i / PM_i) \cdot h_i / (1 - h_i)]^{1/(1+\epsilon_i)} \quad i \in \text{imp}$$

where tv and tx are the tax rates for indirect tax and value-added tax respectively. Under the above specification, income does not play any role. Yet, this is more realistic than either the case of perfectly competitive exports and imports, or those that specify for tradable and nontradable goods (Devarajan, Lewis and Robinson, 1993).

Next is the demand side. As in a standard utility maximization program, private consumption PC can be derived given a specific form of utility function. For a Cobb-Douglas utility form, and assuming fixed expenditure shares cc , the following is obtained from a standard utility maximization program:

$$PC_i = [\sum_h cc_{i,h} (1 - mps_h) \cdot YD_h (1 - th_{hh})] / PQ_i$$

where YD denotes household incomes, mps and th are the marginal propensity to save and the household tax rate respectively, and PQ is the price of composite output supply.⁴⁵ Note that subscript h indicates household category. The output level and value added will then determine the other set of prices, and, in turn, incomes and savings of different institutions.

For the analysis of capital flows, the specification of domestic prices of imports and exports is very crucial:

$$PM_i = pwm_i \cdot ER \cdot (1 + tm_i) \cdot (1 + tv_i)$$

$$PE_i = pwe_i \cdot ER \cdot (1 - te_i)$$

where pwm and pwe are world prices of imports and exports, tm and te are the import tax rate and the export tax rate, respectively, and ER is the exchange rate.

The equilibrium between aggregate saving and aggregate investment, the core of Walras Law, is central in CGE models:

$$INVEST = SH + SG + SF + DCA \cdot ER$$

where SH , SG and SF are household, government and corporate saving respectively, and the last term denotes the foreign saving, which is the balance of current account (DCA) measured at local currency.

Unlike saving-driven models, the equation for private investment used in this model is taken from an econometric estimation as follows:

$$PINV_i = l_r VA_i^{III} \cdot (1 + rt)^{I2i}$$

where λ_s are constant and only λ_2 is negative, and rt is the real interest (lending) rate.⁴⁶ Hence, aggregate investment is:

$$INVEST = \sum_i (GINV_i + PINV_i)$$

where $GINV$ is government investment (treated exogenously). How will aggregate saving adjust to this aggregate investment? In the absence of a financial block (which will be built later for the analysis of reform sequencing, see the following section and Appendix 6.1), the domestic interest rate will operate as the equilibrating factor. With the domestic interest rate specified as endogenous, not only will saving adjust to investment, some repercussions will also be produced on capital flows ($FCAP$). The differential between domestic (deposit) and foreign interest rates ($rt-rw$) is taken as one of the determining factors in the capital flows estimation.⁴⁷ It is also sensible to include country risk ($RISK$) and exchange rate expectation (proxied by the annual change of the exchange rate) in the equation:⁴⁸

$$FCAP = s_0 + degree.s_1.(rt - rw - RISK - ((ER/OER) - 1))$$

There are several alternatives to estimate $RISK$. It is known that a number of specialized institutions regularly produced some country risk indicators. One can use such indicators to represent $RISK$, meaning that the country risk factor is exogenously determined. However, this author is more inclined to endogenize the risk by modeling it as being determined by some variables that could well represent what the public, including investors, perceive as the most important determinant. One of such variables is the debt-service ratio:

$$RISK = a_0 + a_1.[(\sum_{br} AMORT_{br} + \sum_{br} INTEREST_{br})/S_r E_r pwe_i]$$

where a_s are constant, $AMORT$ and $INTEREST$ are, respectively, amortization and interest payments on foreign debts (subscript br indicates the borrowing institutions, that is, government, public companies and private sector; note that the terms within the brackets denote debt-service ratio).

With the above specification, the change in foreign reserve, DFR , can be determined as follows:

$$DFR = \sum_{br} AMORT_{br} - BORROW_{br} - FORINV - DCA$$

Amortization and borrowing are assumed constant. Hence, any increase in foreign investment will automatically reduce DFR (an improvement in the country's foreign reserves).

We can now identify the transmission process through which the economy will respond if capital flows increase. With more foreign exchange available, imports are expected to rise. But domestic consumption could also rise, although at a less-than-proportional rate. The price ratio PD/PM will increase, and PE/PD declines. Consequently, the real exchange rate tends to appreciate, lowering exports and enlarging the current account deficit.

What happens with investment? First, the domestic interest rate tends to fall with increased capital flows. In the Indonesian case, however, the elasticity is very small (interest rate stickiness). As expected, aggregate investment rises, due to growing private investment, including foreign investment. With increased economic activity, factor income will rise, and so will incomes of different institutions. It is through such a mechanism that one will be eventually able to evaluate changes in income distribution between household groups.⁴⁹ Meanwhile, the saving-investment balance is secured because aggregate saving will also be adjusting upward following an increase in income.

Another behavioral specification is in the determination of wages. In neoclassical CGE models, widely used in developed countries, factors are assumed to be in an equilibrium state with full employment. Such an assumption is unrealistic for Indonesia. To capture the unemployment variable, one would need to have an independently estimated wage equation, from which demand for labor will be determined. In the equation, prices ($PIND$ and PVA) and changes in labor productivity are the two important determinants:

$$W_i = PIND^{n_i} \cdot (PVA_i/PVA_0)^{(1-n_i)} \cdot (X_i/L_i/OX_i/OL_i)^{p_i}$$

from which the factor price of labor can be derived:

$$FP_{il} = FP0_{il} \sum_i W_i \cdot wshare_{i,il}$$

where FPO is a constant, and so is the parameter $wshare$. The above equation is to be substituted in both factor demand and factor income equations, before arriving at household incomes (YD).

The size of unemployment can therefore be derived given the fixed labor supply ($LBSUP$):

$$UNEM = LBSUP - \sum_i L_i$$

Before moving to the model application, another indicator needs to be specified—that is, GDP in real terms:

$$RGDP = \sum_i (PC_i + INVEN_i + ID_i + GC_i) + \sum_i E_i - \sum_i (1 - tm_i)M_i$$

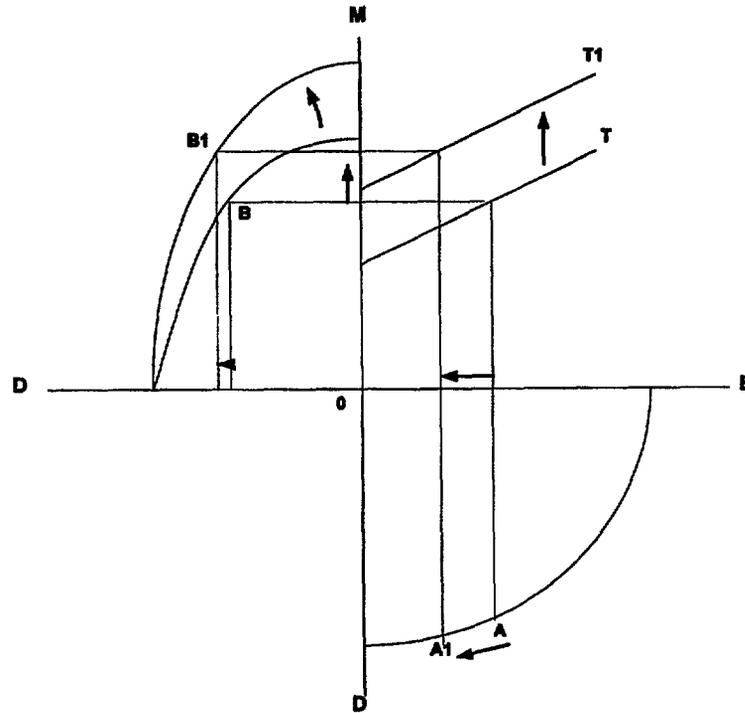
Real imports in the above equation are measured excluding tariffs, and these tariffs, tm , should be at the rate of the base year (real).⁵⁰

Theoretically, if capital inflows increase, more foreign exchange is available and demand for imported goods may increase as well. Consequently, the current account balance is affected unfavorably. Given the fact that there are some degrees of substitutability between imports and domestic production, the latter also tends to increase. More goods can now be consumed, which reflects a standard gain from trade (a greater amount of D and M as shown in the upper left quadrant of Figure 6.3). A less-than-proportional increase of domestic production, indicated by the rotation of the consumption possibility frontier, results in new equilibrium point B_1 . In the production space, the new equilibrium is at A_1 , implying higher PD/PM and lower PE/PD . As a result, RER will appreciate.

As capital continues to flow, there will be pressures on the domestic interest rate to adjust downward. Again, in the Indonesian case, this is expected to take place at a relatively slow speed. Nevertheless, increased investment and greater economic activity are likely to occur. Real GDP will increase, and so will overall income level. Who will gain the most from such an increase? Under the assumption that a large amount of imported goods are either directly or indirectly consumed more by urban rather than rural households, and most private capital flows have greater linkages with the urban area, it is expected that income distribution tends to favor urban households.⁵¹

To what extent does the Indonesian case conform with the theoretical prediction discussed above? Using 1985 SAM data, the case of increased capital flows is analyzed by adjusting upward the size of

Figure 6.3 Increased Capital Flows



NOTES: M = Imports; D = Domestic production; E = Exports; upward shift of line T to T1 reflects increased capital inflows.

SOURCE: Author.

parameter *degree* in the capital flows equation (*FCAP*). Such an adjustment reflects a policy of liberalizing the capital account, be it through removal of a rule that directly restricts the amount of capital flows, or through a provision of incentives, by way of both regulatory and nonregulatory dicta that will attract direct foreign investment and other portfolio investment.⁵²

In the Indonesian case, Table 6.6 shows that increased capital flows indeed raise imports and worsen the current account balance, but induce greater GDP. The latter is also supported by higher investment due to a lower interest rate. The presence of aggregate demand pressures will

Table 6.6 Effects of Capital Flows

	Baseline	Indonesia's capital flows
Macro data		
Real GDP (RGDP)	1.0000	1.0025
Interest rate	1.0000	0.9878
Investment	1.0000	1.0208
Imports	1.0000	1.0206
Exports	1.0000	0.9955
Current account ^a	1.0000	1.1433
Domestic prices (PD)	1.0000	1.0024
Import price (PM)	1.0000	0.9878
Export price (PE)	1.0000	0.9873
Capital flows	1.0000	1.4604
Nominal exchange rate	1.0000	0.9854
Real exchange rate	1.0000	0.9829
Micro data		
Per-capita household income	1.0000	1.0050
Per-capita composition:		
Rural		
Agriculture		
Agric. workers	1.0000	0.9997
Small farmers	1.0000	0.9997
Medium farmers	1.0000	0.9996
Large farmers	1.0000	0.9997
Rural low	1.0000	1.0001
Rural high	1.0000	0.9994
Urban		
Urban low	1.0000	1.0006
Urban high	1.0000	1.0001

NOTE:

a. Since it is a negative number (deficit), greater-than unity means a larger deficit.

SOURCE: Simulation results based on the author's model.

push the price level up, but its increase is rather minor. Yet, the strain on the exchange rate is strong enough to make the *RER* appreciate.⁵³ This explains why exports decline, albeit only by a small amount. Such a decline contributes to a slightly larger deficit on the current account.

Hence, considering the significant increase in real GDP and minor changes in prices and the current account balance, the overall macroeconomic picture is not worse than that under the baseline scenario.

One favorable feature of the CGE model is its ability to extend the impact analysis to social issues such as income distribution. The resulting income distribution of increased capital flows in Indonesia appears to favor those living in urban areas. Agricultural households are affected unfavorably by the reduction of exports due to appreciation of *RER*. In fact, in absolute terms (not shown in Table 6.6), the only nonurban households enjoying an increase in income are those under the “rural low” category.

In sum, one can infer that increased capital flows will indeed appreciate rupiah and dampen exports. But the general equilibrium analysis shows that the overall impact on the country’s macroeconomic picture is quite favorable. On the other hand, if no deliberate policy response was made, relative income distribution could have been worse. Of course, the impact of the potential and possible reversal of capital flows could be damaging, but that would be a different set of scenarios.

While the above analysis may sufficiently reflect the Indonesian case, the trade-off between macroeconomic trends and income distribution is not to be grossly misstated. As discussed in the earlier sections, a policy response has indeed been made by the Indonesian government. Such a response may not necessarily be in the form of a single policy, but rather a *mixture* of policies. One such policy is to absorb the inflows and sterilize them. Another is with respect to government expenditures, in terms of both the size as well as the sectoral and regional allocation (expenditure switching policy). To take these factors into account, however, would require a multiyear simulation, an example of which is shown in the following analysis of sequencing.

Evaluating the Sequence of Reform

As described in the earlier section, an open capital account system has been adopted by Indonesia since the early 1970s, long before the implementation of financial and trade liberalization in the 1980s. This is *in contrast* to the conventional wisdom (the so-called normal sequencing). Yet, the resulting outcomes until the mid-1990s had been exemplary. Most international organizations, including the World Bank, IMF and the OECD, acknowledged the Indonesian reform as a success story. This has prompted many discussions as to what sequence one would consider optimal.

The issues associated with sequencing in economic reform have attracted a number of scholars, each giving different emphasis on the reform components to be sequenced as well as the rationale behind it. With respect to domestic financial liberalization, McKinnon and Mathieson (1981) suggested that before such a liberalization takes place, the fiscal sector, that is, fiscal deficit, has to be curbed in order to avoid a further increase in inflation.⁵⁴ Selowsky (1990) and Fischer and Husain (1990) further remarked that for a liberalization policy to be successful, a stabilization program must be in place first. In analyzing the macroeconomic reform in developing countries, Roemer and Radelet (1991) observed:

Stabilization of an economy, either to bring inflation under control or to correct deficits in foreign payments and the government budget, is frequently a precondition to structural adjustment.

Furthermore, opening up the capital account prior to financial liberalization and trade reform can also be damaging because the problems of capital outflows could be rampant. As Sebastian (1984) put it:

Only after the initial steps toward stabilization and external adjustment have been taken and the trade account has been opened should capital restrictions be slowly relaxed.

There seem to be a number of important arguments regarding the sequence of financial liberalization. First, liberalizing this sector before everything else may carry the risks of resource misallocation due to uncorrected domestic price signals (Krueger, 1986;⁵⁵ second, real appreciation of the currency could be prompted by capital inflows that are likely to take place when the interest rate differential is large, hence damaging export competitiveness;⁵⁶ third, opening up the capital account prior to financial liberalization carries the risk of capital outflows. In effect, the suggested sequence is as follows: Conduct a stabilization program first, then trade reform, followed by financial liberalization, and only after that should international capital movement be liberalized. This is more or less in contrast with the Indonesian experience.

The puzzle seems to rest on the kind of welfare goals one would use to analyze the merits of liberalization. In a country as large and as diverse as Indonesia, defining welfare improvement is a daunting task.

For sure, the issue of equity, hence the question of how welfare improvement is managed and *distributed*, is very essential. Unfortunately, this is the area which is often neglected by most macroeconomic tools of analysis. As shown earlier, the CGE model used in the preceding analysis is capable of linking macroeconomic variables and micro indicators (that is, household income distribution).

However, for the purpose of analyzing the sequence of reform, financial and monetary variables ought to be included in the model. In other words, the CGE model discussed in the preceding section requires some modifications. A list of additional equations for financial variables is shown in Appendix 6.1.⁵⁷ Hence, the modified model being used in this section basically consists of two parts: the macro-oriented section and the micro-oriented financial block. Suffice it to note for the present that in the model specification the real sector (trade, production and labor) is closely interlinked with endogenous prices, hence with the income and financial sector of the economy.

The major purpose of the current simulation is to enable us to provide a comparative analysis of outcomes under the liberalization sequence that was actually taken and those that resulted from some counterfactual scenarios. More specifically, two countersequence scenarios are simulated: one based on what is perceived by most scholars as normal sequencing, and another based on a scenario of no liberalization. The latter is a useful reference to which other simulations will be compared.

As should be clear from the discussions in the preceding sections, there were three episodes of Indonesia's reform during the 1980s, that is, the 1983, 1985–86 and 1988 packages. Using the 1980 case as the initial condition, in each of those three periods some exogenous variables, including capital stocks, are adjusted according to the specified scenario. In the factual case, for example, the sequence of simulation was as follows. First, a financial deregulation was combined with devaluation. In such circumstances, the interest rate is freed, BI's liquidity credit is reduced, and credit ceilings are removed. In the next sequence, devaluation was combined with some reductions in tariffs (trade reform). In the last phase, international capital movement was liberalized.⁵⁸ While the no liberalization scenario is self-explanatory, the normal sequencing is almost the reverse of the factual scenario, whereby trade liberalization precedes domestic financial liberalization. It begins with a devaluation and removal of tariff barriers (trade reform), keeping financial repression in place (reflected through a pegged interest rate). The second phase

of normal sequencing is basically comprised of financial deregulation,⁵⁹ and in the last phase the capital account is liberalized.

Table 6.7 reports the outcomes of some major variables. It is clearly shown that higher GDP growth would have been achieved under normal sequencing (136.75 versus 130.71). Consequently, the employment level would have also been greater. However, the inflation rate is higher, and so is the current account deficit. More interesting to observe is the impact on income distribution. A relatively worse income distribution would have been generated by the normal sequencing scenario. While no significant changes are detected in the relative position of the rural poor (small farm, agriculture employee and to some extent also rural low), urban groups will all have significantly higher incomes under this scenario. On a net basis, the relative position of the lowest 30 percent of society is the worst among the three scenarios generated.⁶⁰

From the monetary side, lower GDP growth under the factual scenario is readily explained by the following phenomena which have

Table 6.7 Macro and Micro Indicators under Different Sequences of Liberalization

	Factual	Normal	No liberalization
(Indexes, no liberalization = 100)			
Real GDP	130.71	136.75	100.00
Inflation	125.95	130.84	100.00
Current account	120.65	92.99	100.00
Employment	107.12	109.40	100.00
Income distribution (Agriculture employee used as reference)			
Agriculture employee	1.00	1.00	1.00
Small farm	1.07	1.07	1.07
Medium farm	2.37	2.37	2.31
Large farm	3.52	3.52	3.40
Rural low	1.91	1.95	1.90
Rural high	2.34	2.36	2.30
Urban low	2.95	3.02	2.93
Urban high	4.74	4.80	4.59
Per-capita income ratio			
70% to 30% lowest	4.30	4.35	4.23

Source: Simulation results based on Azis (1996) model.

Table 6.8 Financial Indicators under Different Sequences of Liberalization

	Factual	Normal	No liberalization
(Indexes, no liberalization = 100)			
Money supply			
Broad money	108.61	119.66	100.00
Narrow money	105.49	118.36	100.00
Currency	98.60	112.61	100.00
Total foreign reserve	115.66	104.05	100.00
Inflation	125.95	130.84	100.00
Real interest rate	3.7%	-2.0%	-1.0%
Foreign capital flow			
Capital inflow	1,743.35	1,041.32	1,662.76
Capital outflow	7,161.77	5,834.23	5,838.37

SOURCE: Simulation results based on Azis (1996) model.

Table 6.9 Other Indicators under Different Sequences of Liberalization

	Factual	Normal	No liberalization
Savings = Investments	16,181.17	19,104.91	13,132.81
Total output			
Domestic output	84,286.68	85,791.21	82,565.97
Composite goods	79,124.52	81,949.73	78,282.88
Exports	17,051.89	16,685.44	16,354.44
Imports	9,442.03	10,182.51	9,603.13
Total labor employment	415.61	424.47	387.99
Average wage rates			
Agriculture labor	24.76	25.35	21.49
Manual labor	48.39	49.55	41.57
Clerical labor	51.95	53.31	44.70
Professional labor	95.60	97.78	82.65
Unemployment			
Agriculture labor	90.75	87.31	111.07
Manual labor	36.87	32.25	45.62
Clerical labor	45.88	40.57	60.72
Professional labor	12.34	9.97	13.39

SOURCE: Simulation results based on Azis (1996) model.

also been predicted by some theories: increased capital outflows, lower domestic loanable funds, higher interest rates and consequently lower investment. However, a tendency of currency depreciation induces higher exports and lower imports (Table 6.9). The growth of money supply is also lower under the factual scenario (Table 6.8). Meanwhile, lower incomes in practically all categories of households (Table 6.7) are in line with the lower average wages reported in Table 6.9. Presumably, this will result in lower consumption expenditures. Therefore, increased exports are compensated not only by lower investment but also by lower consumption (hence, lower GDP growth).

It is interesting to trace the path of income distribution as economic reform proceeds from one phase to the next. Under the normal sequencing case, an early trade reform has been conducive to income distribution improvement. Laborers with specific skills related to export-promoting activities will gain. Vice versa, those whose skills are more commensurate with import-substituting sectors tend to lose (Helpman and Krugman, 1993). In the Indonesian case, the first-round impact of early trade reform would have been positive on textile, other manufactures, food processing, and, to some extent, other agriculture labors. Translated into labor categories, this would mean that manual and professional workers will benefit the most. The earlier categories will raise the income of urban and rural low; the latter will increase the income of urban and rural high. After taking into account the second-round effect, the net outcome is a slight worsening of income distribution.⁶¹ When the financial sector is then liberalized (the second phase), the interest rate goes up, reducing demand for loanable funds, while inflation is fairly moderate. The groups that benefit most under such circumstances appear to be those working in the other agricultural and food crop sectors. Taking into account the second-round effect, small farms and agricultural employees will gain more, relative to what is accrued by other household groups. Hence, overall income distribution is improved.

As the reform proceeds with capital account liberalization, the amount of loanable funds increases, and so does the inflation rate. The resulting adverse repercussions influence the rural sector more than the urban sector. However, it appears that in the long run (recall that this is the third phase), wages in some rural sectors are more neutral to inflation and productivity changes than wages in other categories. In terms of model specification, the size of elasticities in the wage equation are lowered. Consequently, household incomes in some rural sectors, more specifically in the small farms category, grow relatively faster than those in off-farm sectors. At the end, an improvement in

income distribution can still be accomplished. Hence, while the immediate impact of a reform under the normal sequencing case tends to hurt the poor, in the long run, this household group would have been able to reap the benefits of the reform. Notwithstanding this prediction, as indicated earlier, the overall outcomes of income distribution are still *more favorable* under the factual sequencing scenario. This coupled with lower inflation and a smaller current account deficit (reported in Table 6.7) may justify the reform sequence that the Indonesian government actually undertook up to the mid-1990s.

Conclusion

Various issues related to macroeconomic and exchange rate policies in Indonesia from the early 1970s to the mid-1990s are discussed in this chapter. It is shown that from the 1980s exchange rate and monetary policies have been generally moving toward a more market-determined style. The country experienced two oil booms and underwent three major devaluations. Such occurred in the face of the open capital account system implemented since the early 1970s.

Since the mid-1980s, while the inflation target is officially set (around 5 percent), exchange rate policy has been clearly guided by considerations of external competitiveness. Consequently, the inflation target has hardly been met and a huge loss in the Central Bank's portfolio is inevitable (the "impossible trinity"). But nonmarket interventions have also been occasionally taken. When under pressure, the government exerted a rather ungraceful move by imposing a strong liquidity squeeze through repurchasing promissory notes (SBPU) before maturity, and forcing state-owned enterprises to purchase the Central Bank's certificates (SBI). This happened in 1986 when the currency was under heavy pressure and rumors of impending devaluation mounted. In early 1991, when control over the money supply was almost lost, the government once again redeemed a significant part of SBPU purchased from state-owned companies, particularly from state banks, to provide a significant amount of monetary contraction.

In the wake of massive capital flows, typically the price to be paid is the need for the Central Bank to conduct a heavy sterilization program. This occurred a number of times during the 1990s, putting upward pressure on interest rates. Consequently, the capital flows problem tends to aggravate. But a different approach has been taken under the current

monetary authority. Rather than taking nonmarket interventions, the Central Bank's policy has been more inclined to widening the intervention band, allowing market forces to take a greater role in setting the value of the currency. This has been done repeatedly since 1993.⁶² In so doing, the risk is shifted to the market, purifying the Central Bank's role as a lender of last resort. In effect, a smaller amount of rupiah will need to be pumped into the market (less intervention required). The new approach of band-widening appears to be an effective alternative to a fully flexible or completely fixed exchange rate. It does not, however, guarantee that a competitive rate will always be achieved.

An attempt is made, in a subsequent section, to measure quantitatively the effects of capital flows on the real exchange rate by using a multisectoral CGE model. The selection of such a model is based on the appropriateness of the equilibrium exchange rate definition that takes into account the imperfect substitutability between exports, imports and domestic products of different sectors. Applied to Indonesian data, the model simulation shows that, despite the possibility of real exchange rate appreciation, the overall macroeconomic impact of increased capital inflows is fairly favorable. However, unless an appropriate policy response is taken, the resulting income distribution would have been worse. Such a finding is consistent with the author's earlier work on the relations between exports and employment (Azis, 1992).

A consideration of social issues, that is, income distribution, also takes a prominent place in the discussions pertaining to the country's unusual sequence of reform. This is demonstrated by simulating two counterfactual scenarios of reform sequence, based on an extended intertemporal CGE model that includes a financial sector. It is conclusively revealed that while GDP growth could have been higher if the country had chosen to take the normal type of sequencing, vis-à-vis the factual one, inflation and the current account deficit are also likely higher, and at the same time income distribution could have been worse. This suggests that the unusual sequence of reform that Indonesia has taken can sensibly be justified.

Appendix 6.1

The Financial Block of the Indonesian CGE Model

The following set of equations, representing a financial block, is to be added to the CGE model described in the chapter. The simulation in the last section of the chapter is based on the resulting modified model.

It is specified that BI holds monetary base (RM), which consists of reserve and currencies (CUR). The reserve is collected from the commercial bank in the form of reserve requirements to deposits. CUR is indirectly affected by a number of policy instruments, namely credit liquidity (CL), reserve requirement ratios (rrd and rrt) and BI's rediscount rate (rs). The monetary base and money supply are endogenous; they vary along with the reserve requirement ratios, the behavior of commercial banks and government, the balance of trade and the exchange rates:

$$RM = rrd.DD + rrt.TD + CUR + WE_{cb}$$

$$RM = FR_{cb}.ER + \sum_i \overline{CL}_i + rs.fb2.BF - GD_{cb}$$

$$MS2 = mult.RM$$

where

$$DD = ddcur.CUR + \sum_i MD_i$$

$$TD = \sum_h TD_h + FD_h + \sum_i TD_i + FD_i$$

(Notes: cb = central bank, DD = demand deposit, TD = time deposit, FR = foreign reserves, BF = bank funds, $fb2$ = some constant proportion, GD = government deposit, WE = wealth, $mult$ = multiplier, $ddcur$ = some constant reflecting DD/CUR , and MD = money demand.

Money supply is derived from the multiplication of multiplier ($mult$) and reserve money. The money multiplier is determined not only by reserve requirement ratios, but also by commercial banks' excess reserve ($EXRES$). In this way the anticipation and behavior of commercial banks will have some roles.

$$mult = \frac{(1 + ddcur) + \frac{\sum_i MD_i + TD}{CUR}}{1 + \frac{(rrd.DD + rrt.TD) + EXRES}{CUR}}$$

Total money demand consists of total currency, demand deposits, domestic time deposits and foreign time deposits. Currency is assumed to be held only by households, while other forms of money demand are held by both households and firms. Money demand for households (MD_h) is assumed to be a function of real income, real interest rates on interest-bearing assets, and inflation rates.

$$MD_h = \alpha_0 Y D_h^{\alpha_1} e^{[\alpha_2 r + \alpha_3 PIND]} PIND^{(1-\alpha_1)_h}$$

The choice between interest-bearing assets is assumed to be determined through a pair-wise decision process: Households decide between two types of substitutable assets. The interest-bearing assets are first divided into equities and "others" according to a proportion which is influenced by the ratio of asset returns; and then "others" are disaggregated further by their own components, in which shares are determined by inflation rates, exchange rates and the ratio of asset returns. In this way, the budget constraint for asset allocation is always met:

$$\frac{g_{1h}}{(1-g_{1h})} = \Psi_{1h} \left[\frac{(1+r_{avg})}{(1+r_q)} \right]^{e_{1h}} \quad \text{financial asset share of household } h$$

$$\frac{g_{2h}}{(1-g_{2h})} = \Psi_{2h} \left[\frac{(1+rt)}{(1+r_w)} \right]^{e_{2h}} \quad \text{domestic-foreign asset share of household } h$$

$$\frac{g_{3h}}{(1-g_{3h})} = \Psi_{3h} ER^{e_{3h}} \quad \text{foreign bond-deposit share of household } h$$

$$EQ_h = \frac{(1-g_{1h})(WE_h - MD_h)}{PQ} \quad \text{equity holding of household } h$$

$$TD_h = g_{1h} g_{2h} (WE - MD_h)$$

$$FD_h = \frac{g_{1h}(1-g_{2h})(1-g_{3h})(WE_h - MD_h)}{ER} \quad \text{foreign deposits of household } h$$

$$FB_h = \frac{g_{1h}(1-g_{2h})g_{3h}(WE_h - MD_h)}{ER} \quad \text{foreign bonds of household } h$$

where r_q = average return on equity and r_t = deposit interest rate.

Finally, households' wealth are specified as a function of savings, value of the previous wealth, equity and foreign assets.

$$\begin{aligned} WE_h = & SH + \overline{OWE}_h + (ER - \overline{OER}).(\overline{OFD}_h + \overline{OFB}_h) \\ & + (PQ - \overline{OPQ}).\overline{OEQ}_h \end{aligned}$$

Firms' demand for money is a linear function of the value of output produced. Demand for time deposits (TD and FD) and bonds (FB) is specified as a fixed portion of sectoral loans received from commercial banks ($LOAN_i$) and investment by sector of destination ($INV_i = PINV_i + GINV_i$).

$$MD_i = g_{mi}.PD_i.D_i$$

$$TD_i = g_{di}.LOAN_i$$

$$FD_i = \frac{g_{fi}.PK.INV_i}{ER}$$

$$FB_i = \frac{g_{bi}.PK.INV_i}{ER}$$

where PK is the price of capital. The sectoral working capital (WK_i) is defined as total assets demanded by each sector. Along with sectoral capital formation (K_i, t), they form sectoral financing needs ($CRED_i$):

$$WK_i = MD_i + TD_i + ER.[FD_i + FB_i]$$

$$K_{i,t} = (1 - depr)\overline{K}_{i,t-1} + (INV_i + g_i.\overline{GI})$$

$$CRED_i = WK_i + PK.K_{i,t}$$

The financing needs are fulfilled by sectoral liquidity credit (CL_i), commercial bank loans (BL_i) or equity issuance (EQ_i). The sectoral liquidity credit is exogenous, since it is one of the policy instruments

used by BI to control money supply. The share of bank loans is assumed to be determined by the ratio of sectoral rental rate (rk) and loan rate (rl) along with the sectoral elasticity of substitution between bank loans and equity (θ_i). On the other hand, the average return on equity (rq), which influences households' portfolio decision, is specified as a function of the inflation rate, loan rate and total sectoral loans.

$$BL_i = f\bar{i}(CRED_i - \overline{CL}_i)$$

$$EQ_i = \frac{(1 - f\bar{i}).(CRED_i - \overline{CL}_i)}{PQ}$$

$$\frac{f\bar{i}}{(1 - f\bar{i})} = \theta_i \left[\frac{2 + rk}{2 + rl} \right] \theta_i$$

$$rk = \frac{PVA_i.D_i - \sum_l W_l.wdil.Lil}{K_{i,t}}$$

$$rq = \frac{\sum_k YK_k - (rl + P\bar{I}N\bar{D}).\sum_i BL_i + CL_i}{PQ.\sum_i EQ_i}$$

where YK is capital income. At the end, the firms' wealth equals their savings:

$$WE_f = SF = PQ.EQ_f$$

In the financial block, government decides on the amount of deposits placed in commercial and central banks (GD_b and GD_{cb}), as well as on equity purchased (EQ_g).

$$WE_g + ER.(GBR + \overline{OGBR}) = GD_b + GD_{cb} + PQ.EQ_g$$

$$WE_g = SG + \overline{OWE}_g - (ER - \overline{OER}).\overline{OGBR} + (PQ - \overline{OPQ}).\overline{OEQ}_g$$

where $GBR = BORROW_g$ denotes government borrowing. The central bank, BI, can decide on the reserve requirement ratios, rediscount rate

and liquidity credit. Reserve requirement ratios and the rediscount rate affect the amount of loanable funds of commercial banks and the money multiplier. Hence, their effects on money supply are more indirect than those generated by liquidity credit. The central bank budget constraints are expressed as follows:

$$WE_{cb} + rrd.DD + rrt.TD + \overline{GD}_{cb} + CUR = \sum_i \overline{CL}_i \\ + rs \sum_i \overline{BL}_i + ER.FR_{cb}$$

BI's wealth consists of its saving (*SCB*), previous wealth and changes in the previous foreign reserve:

$$WE_{cb} = SCB + \overline{O}WE_{cb} + (ER - \overline{O}ER) \cdot \overline{O}FR_{cb}$$

The foreign reserve varies according to the balance of payments surplus or deficit. In this way the effect of international trade activities and international flow of funds on monetary variables can be captured.

$$FR_{cb} = OFR_{cb} + \Delta FR_{cb}$$

$$\Delta FR_{cb} = \sum_i \overline{PWE}_i E_i - \overline{PWM}_i M_i - \overline{GF} + \sum_h \overline{TRW}_h + \sum_n \overline{TRW}_n \\ - \sum_k f_{kwk} \cdot \frac{YKk}{ER} + GBR + BR - \sum_h \overline{INFL}_h + \sum_n \overline{INFL}_n$$

where *INFL_i* denotes international flows of funds, and *BR* = *BORROW* by the nongovernment sector. Commercial banks collect deposits from the society and advance funds to different sectors of production. Furthermore, they are required to put some portion of the deposit in the form of reserve in the Central Bank. They can also, of course, hold some excess reserve over the requirements. The amount of excess reserve depends on the behavior of banks, demand for bank funds and hence on the whole performance of the economy. The reserve requirement ratios and rediscount rate are determined exogenously by BI, and they obviously will affect the size of loanable funds of commercial banks. Hence, commercial banks' funds are:

$$BK = (1 - rrd)DD + (1 - rrt)TD + rs.\sum_i BL_i + \overline{GD}_b + WE_b$$

After fulfilling their responsibility to BI, commercial banks have a choice of loaning the funds domestically, keeping them as foreign reserves or allocating the funds. The share of total domestic loan (fb) is determined by the ratio of domestic and world interest rates (rl and rw), as well as the elasticity of substitution between different loans (eb):

$$\frac{fb}{(1 - fb)} = \Psi_b \left[\frac{(1 + rl)}{(1 + rw)} \right]^{eb}$$

$$\sum_i LOAN_i = fb.BK$$

$$ER.FR_b = (1 - fb).BK$$

At the end, the commercial banks' wealth consists of saving, previous wealth and changes in the value of foreign reserves and total foreign deposits:

$$WE_b = SB + \overline{OWE}_b + (ER - \overline{OER}).(\overline{OFR}_b - \sum_h \overline{OFD}_h - \sum_i \overline{OFD}_i)$$

The financial account constraint of the rest of the world (ROW) is:

$$WE_w + ER.TFA = ER.(\overline{OGBR} + GBR) + PQ.EQ_w$$

$$TFA = \sum_h FB_h + \sum_i FB_i + FR_b + FR_{cb}$$

where TFA denotes total domestic holding of foreign bonds.

The following is the specification of the ROW 's wealth:

$$WE_w = \overline{OWE}_w + ER.(GBR + BR) + (ER - \overline{OER}).(\overline{OGBR} - \overline{OTFA}) \\ + (PQ - \overline{OPQ}).\overline{OEQ}_w$$

The lending rate will guarantee that total saving equals total investment. The time deposit rate is assumed to vary along with the lending rate with some margins. The average return on financial assets (r_{avg}) is defined as a function of domestic and world deposit rates, as well as the exchange rate and total interest-bearing assets.

$$r_t = r_{loan} - 0.03$$

$$r_{avg} = \frac{r_t TD + r_w ER (\sum_h FD_h + FB_h + \sum_i FD_i + FB_i)}{TD + \sum_h FD_h + FB_h + \sum_i FD_i + FB_i}$$

Finally, the following equilibriums prevail in all financial markets: money, equity and wealth-capital formation.

$$1. MS2 = \sum_h MD_h + TD_h + TF_h + \sum_i MD_i + TD_i + TF_i$$

where TF denotes total foreign currency in time and savings deposits.

2. The institutions' equity holdings have to be equal to equity issued by the firms:

$$\sum_i EQ_i = EQ_s + EQ_w + EQ_f + \sum_h EQ_h$$

3. Total wealth consists of fixed physical capital (K) and land (LD):

$$WE_f + WE_{cb} + WE_b + WE_g + WE_w + \sum_h WE_h = PK \cdot \sum_i K_{i,t} + PK \cdot \sum_i LD_i$$

Appendix 6.2

Comments on Study by Iwan Azis

Jerre Manarolla, USAID

Dr. Azis has presented a complete and accurate description of how Indonesia has maintained relative macroeconomic stability since the early 1980s, but he also noted that inflation has remained at a stubborn

10 percent per year since 1993 and the current account doubled to around 4 percent of GDP in 1996. I want to comment on the latter two points.

First, let me summarize the Indonesian approach to macroeconomic stability, especially since 1983. This approach involves:

- an open capital account
- a real exchange rate rule, which since 1986 has involved a consistent downward movement in the pegged rate operating within a narrow band
- consistent application of tight fiscal policy, partially a function of commitment to a balanced budget rule
- and since 1983 a phased liberalization of the financial sector (but no privatization of banks), which has resulted in high rates of bad debts of the banking system

Using this approach, Indonesia has been able to respond fairly smoothly to a number of severe internal and external shocks.

I want to focus on two issues. One issue is whether this approach is up to the task of maintaining a sustainable current account deficit, and if not, what actions must be taken to make it sustainable? I will return to this point later.

But before I turn to the current account, I want to discuss how Indonesia has used this approach to try to reduce inflation from 10 percent to 5 percent while having to deal with the large capital inflows that occurred during the early 1990s. This is the “unholy trinity” of exchange rate management, inflation control and central bank profitability, where the threat to central bank profitability arises because of the need to defend the real exchange rate by sterilizing the capital inflows and then mopping up the excess liquidity by selling domestic currency bonds.

An important part of Indonesia’s current account problem is that Indonesia has not been able to reduce inflation. In response to this failure, and in typically flexible Indonesian fashion, Indonesian policy makers have begun to fudge, if not abandon, both the open capital account—with ever stricter limits on foreign borrowing by the government, SOEs and state banks by means of the COLT,⁶³ as well as some recent controls on foreign borrowing by private banks—and the real exchange rate policy—by widening the band around the declining peg rate from 1 percent to 2 percent in 1995, from 2 percent to 3 percent in

January 1996, then to 5 percent in June, and in September to 8 percent. But by continuing to widen the exchange rate band, the authorities seem to be signalling that they want to place the risk of exchange rate speculation on the shoulders of the market and that they are willing to let the nominal exchange rate float upward, within that ever widening band, until the upward pressure subsides.

This means, of course, that the real exchange rate began to appreciate by around 10 percent from January 1995 to May 1996 and more rapidly in the last few months of 1996.

So even if this policy adjustment succeeds in bringing down inflation, the appreciated REER will compound the slowdown in the rate of export growth—among other things, rapid increases in the minimum wage since 1990 have already begun to create problems for Indonesia's export competitiveness.

What can Indonesia do?

- As we mentioned numerous times during the conference, the authorities can intensify fiscal policy—by raising the budget surplus to perhaps 2 percent of GDP, even if they are unable to reduce the off-budget expenditures Dr. Azis talked about.
- Both the IMF and the World Bank recommend a 2 percent of GDP surplus. With capital inflows running at around 5 percent of GDP, this would, by itself, significantly reduce the central bank's need to purchase foreign exchange.
- Using tight fiscal policy harks back to the episode when the government used foreign borrowing to create a fiscal surplus by not spending the borrowed funds. But now that the government of Indonesia (GOI) has stopped borrowing overseas, it must raise tax revenues (or cut expenditures) to create a surplus. This will relieve some of the pressure on the exchange rate and will mean that the band will not have to be widened as far as it otherwise would have to be. But even so, considerable real appreciation is likely.

What else can Indonesia do? Here, I am going to jump to the real sector.

- The GOI could speed up trade liberalization and deregulation of the domestic economy, both of which increase the efficiency of

the economy and maintain export competitiveness in the face of the appreciating real exchange rate.

- Although Indonesia has lowered trade barriers, the average tariff is still around 14 percent with lots of special surcharges and non-tariff barriers (NTBs) on agricultural goods and export controls.
- Privatization still has a long way to go; private sector monopolies are still widespread; heavy regulation is imposed through licensing requirements; the legal and judicial systems are far from transparent; and government procurement is notoriously NOT transparent—all of which may add 10 percent or more to the costs of doing business in the domestic Indonesian economy.

Now let me return to the issue of the current account. Compared to current account deficits in neighboring countries like Thailand and Malaysia (at around 8 percent of GDP), Indonesia's 1996 projected current account deficit of 4 percent did not appear to present problems. Nor did it exceed the 5 percent "rule of thumb" mentioned previously by numerous conference presenters. But the IMF argues that Indonesia's capacity to run a current account deficit is significantly less than that of its neighbors for four reasons:

1. Indonesia's net indebtedness stands at 46 percent of GDP, nearly five times that of Malaysia and 70 percent higher than Thailand; and the difference is even more marked with regard to the annual debt service ratio.
2. Indonesia's much lower export orientation—although Indonesia's export ratio of 23 percent is double that of the United States, it is far below that of its two neighbors. Since 1993 Indonesia's export growth has slowed considerably, with recent export growth (15 percent in 1995) much lower than the ASEAN average.
3. Indonesia is more dependent than its neighbors on short-term capital flows and has a weaker financial system.
4. Evidence suggests that the 1996 increase in the current account deficit was fueled by private consumption and property-related investment, thus indicating a decline in Indonesia's high private savings rate.

Indonesia has three policies at its disposal to reverse this growing imbalance in the current account:

- Even tighter fiscal policy to increase the overall budget surplus toward 2 percent of GDP
- Appreciation of the exchange rate (policies that fight both inflation and a growing current account deficit)
- Acceleration in the pace of trade liberalization and deregulation of the domestic economy in order to increase the overall efficiency of the economy and thereby compensate for an appreciating exchange rate

Stepping up the pace of trade liberalization and deregulation become all that much more important if Indonesia is unable to sufficiently tighten fiscal policy but does let the exchange float upward (which it was doing throughout 1996).

I also want to make a small comment on one of the results from the CGE model simulations—specifically, to the slightly greater inequality in the distribution of income that would have occurred had Indonesia followed a more traditional sequence of reforms. Here, I'm taking my cue from a USAID colleague who always chides me for worrying too much if a worsening income distribution accompanies rapid growth, even when that rapid growth succeeds in dramatically reducing absolute poverty, as has been the case in Indonesia. However, I continue to believe that increasing income inequality has important implications for social cohesion and therefore for political stability—justifiably important concerns for Indonesian decision makers. Nevertheless, if I read Tables 6.7 and 6.9 correctly, it does seem that the absolute level of ALL income groups would have been higher under the traditional sequencing scenario, which might outweigh the slightly more unequal income distribution that also would have occurred.

Finally, let me end by relating USAID's plans for its economic growth assistance to Indonesia. The USAID/Indonesia Mission proposes to focus its policy technical assistance on reducing trade barriers, in order to maintain the international competitiveness of the Indonesian economy; and deregulating, de-monopolizing and making government procurement and privatization more transparent. These latter changes aim to increase competition within the domestic economy, create a level playing field for those foreign and domestic businesses that lack political connections, and in general, reduce the high costs of doing business in Indonesia. These plans are all in the face of rapidly rising minimum wage policy and what looks like at least halting moves on the part of

the GOI toward a more market-oriented exchange rate policy—which, if foreign capital inflows continue at current levels (or accelerate even further), would lead to an appreciating real exchange rate.

Notes

1. The sharp drop in the inflation rate was not achieved by the so-called “heterodox” policy, which often has been suggested for a chronic high inflation environment.
2. The group was to meet yearly to discuss various development and policy issues of Indonesia in order to decide the amount of concessionary loans needed by the country to ease possible dislocations caused by policy changes.
3. The development agency, *Bappenas*, was led by economic technocrats, suggesting that there was an apparent competition between the two groups.
4. Some possible explanations as to why such a devaluation was considered necessary will be discussed in the next section.
5. Yet statistics show that the average growth rate for 1979 to 1982 remained positive (4.7 percent) while world economic growth had declined persistently during the period.
6. During the reform period, the average growth rate was more than 6 percent, and the inflation rate remained in single digits.
7. This was made possible by the fact that the so-called “checkprice”—that is, the price used by the government to estimate the export value—was set lower than the actual price.
8. Under the system, BI sets the central value of rupiah against a basket of foreign currencies and intervenes in the market around that central rate.
9. The role of a specially designed program for rice production, known as *Bimas*, should not be overlooked. It is believed that a great deal of welfare improvement for millions of farmers was made possible by the *Bimas* and *Inpres* programs.
10. By using a simple model, Usui (1996) also came to the same conclusion.
11. On the contrary, there were some indications showing that the government was expecting oil prices to rebound after weakening in 1982–83. But as it turned out, oil prices continued to drop, hitting rock bottom in August 1986 (less than US\$10 per barrel).
12. The increased amount of nonperforming loans, estimated between 12 percent and 15 percent of total loans as of June 1995, exacerbate the problems further. In terms of quantity, the following statistics speak for themselves: The number of banks, not counting foreign banks, increased from 61 in 1988 to 119 in 1991 and to 241 in 1995; and corresponding assets jumped from Rp68 trillion in 1988 to Rp386 trillion in 1995. On the savings front, the mobilized fund grew from Rp37 trillion to Rp221 trillion, and bank credit increased from Rp48 trillion to Rp257 trillion.
13. To some extent this is similar to the situation in Korea, where a few large industrial groups, *Chaebols*, dominate the industrial sector as well as the financial sector. A major difference is that the Korean banks generally have a higher degree of allocative efficiency (greater likelihood of resources flowing to the most productive, mostly export-oriented, investments) than the Indonesian banks.
14. For the moment, disregard the BP curves under the two cases of swap subsidy.
15. Negative change in the index of REER in Table 6.5 denotes a depreciation, and vice versa.
16. Actually, the phenomenon of capital outflow was already detected in late 1989, but it became widespread in 1990.

17. Using CPI as the price index, the trade weights are the following: 37 percent for Japan, 25 percent for European countries, 13 percent for the United States, 12 percent for the Association of South East Asian Nations (ASEAN), 7 percent for North Asia, and 2 percent each for China, Canada and Australia. With such a high weight for Japan, movements in the U.S. dollar–yen rate would translate automatically into real effective depreciation of rupiah.
18. Policy changes have been basically in the following areas: tariff reduction, divestment and ownership requirements, and reduction of sectoral restriction; less so in the legal and tax systems. While the importance of foreign investment in national development has been fully recognized since 1967, in the last few years increased competition primarily from China, Vietnam and neighboring ASEAN countries became an important factor prompting those policy changes. International pressures, such as, the formation of the ASEAN Free Trade Area (AFTA), also played a significant role.
19. Policy changes in some Asian newly industrializing economies were not negligible. For example, in 1986, the Korean government set up two important agencies: the Promotion Agency for Small-Scale Companies, and the foreign investment consulting centers for firms planning to invest in Southeast Asian countries. The establishment of the Export-Import Bank in 1987 was another important development. Strong push factors were also detected in Taiwan. The abolition of foreign exchange control in August 1986 had promoted outflows of Taiwanese investments to various countries including Indonesia. Prior to that, the foreign exchange control imposed by the government prevented Taiwanese investors from investing openly in other countries (Thee, 1988). In addition to these developments, the number of trade and investment missions sent by Taiwan and Korea to Southeast Asian countries increased considerably during this period.
20. The 5 percent requirement was already noted in the May 1986 package.
21. After 10 and 15 years the phase-down requirements should be met, that is, 20 percent and 51 percent respectively.
22. There were other important signs of relaxed restrictions in the package. For example, foreign investors were allowed to diversify up to 30 percent of their existing capacity with no requirement to have a new license; this will give them the opportunity to operate under a broad banding situation. A more precise guideline was provided through the use of the International Standard of Industrial Classification (ISIC) in the product definition. To help domestic investors secure additional funds and acquire foreign investment status, foreign investors can reinvest their profits in new or existing domestic companies. Soon after the 1987 package was announced, the approved foreign investment figure increased dramatically.
23. In fact, during the 1990s the budget has always been contractionary. Even in 1992–93, when the overall fiscal policy raised the size of base money, the budget was contractionary; it was the nonbudget expenditure that led to the increase (see Table 6.5).
24. The government decided not to spend budget surpluses (due to the Gulf War); rather, it maintained them as blocked deposits at BI as reserves—*Cadangan Anggaran Pembangunan* (CAP), a wise policy decision similar to that taken during the second oil boom. This is another sign of an anti-inflation strain.
25. It is very difficult to obtain accurate data in order to split the components of swap transactions into those which reflect foreign exchange sales and repurchases for protection against devaluation risk and those which are due to foreign (private) borrowing.
26. SBPUs (*Surat Berharga Pasar Uang*) are BI's promissory notes. It is important to note that this was the second shock measure. The first, known as "Sumarlin shock," was promulgated in 1987. In that measure, a strong liquidity squeeze was imposed by repurchasing SBPUs before maturity and forcing a number of SOEs to purchase SBIs.

27. The spot operation was the result of foreign exchange purchases from BI by commercial banks.
28. Despite a declining trend of the interest rate for SBI, during that year many commercial banks preferred to hold SBI, primarily because of the enforcement of loan equity ratios and other prudential regulations.
29. This must have been a difficult period to achieve a good coordination between the Ministry of Finance and BI, especially if the monetary sector was expected to adjust to any expansionary component in the fiscal sector.
30. The SBI rate was 13 percent, to be paid by BI as a borrower, whereas the received rate from the export credit was only roughly 3 percent (BI as a lender).
31. As expected, a stream of capital outflows was detected, in part because of a lower interest rate, but largely also due to the scandal involving one of the largest state-owned banks, BAPINDO.
32. The "cost" of such a move, however, was unexpectedly very high: a significant reduction in the number of economic technocrats in the new (1993–94–1997–98) cabinet.
33. Actually, September 1992 marked the beginning of the band-widening policy.
34. Later, BI also announced the use of two exchange rates that it can use: conversion rate (CR) and intervention rate (IR). The latter refers to the rate at which banks can purchase and sell rupiah for U.S. dollars; but only when interbank exchange rates reach the upper band of IR they can buy, and the lower band of IR they can sell.
35. The World Bank's figure is even higher, close to US\$11 billion, or more than 5 percent of GDP.
36. BI Governor Sudradjad Djiwandono admitted that the recent surge of the money supply was mostly triggered by increases in capital inflows.
37. A senior official at BI has recently cited a trend of the interest rate declining by 0.5–1 percent.
38. The trend of a rising U.S. rate and Japanese rate will also be a determining factor.
39. Faced with near-zero returns at home, Japanese investors have poured money into overseas markets, particularly the so-called emerging markets, including Indonesia.
40. In the 1990–1994 period, the percentages of portfolio capital in total inflows were recorded as 16 percent, 23 percent and 27 percent in Indonesia, Malaysia and Thailand. Compare these figures with 47 percent for Mexico.
41. An interesting NBER study by Chinn and Dooley (1995) indicates that, of ten Asia Pacific countries under study, only Indonesia and Malaysia show an inverse relation between capital flows and bank lending. The authors then contend, "Indonesia and Malaysia engaged in large scale sterilization of capital inflows. That is, in response to capital inflows some of the reduction of bank credit was manifested in a reduction in bank lending to private sector."
42. In early August 1996, finance minister Mar'ie Muhammad stated: "We will maintain our exchange rate policy so that it is as realistic as possible. But personally I prefer the rupiah to be undervalued rather than overvalued in order to support Indonesian exports."
43. In effect, the Salter-Swan approach does not distinguish between exports and imports. Further arguments against using such an approach is given in Devarajan, Lewis and Robinson (1993).
44. A complete list of equations is available upon request.
45. Government consumption is treated as exogenous; it is either assumed fixed or considered as a policy variable.
46. A refinement on the investment-savings model can be done by integrating a rational expectations hypothesis into the model. If agents can predict that the inflation rate will keep going up, for example, as a result of increased money supply, they should be

expected to behave such that the present values of their own assets can be maximized, that is, by reducing investment and savings and augmenting consumption (rational expectation). From the modeling point of view, the parameter describing marginal propensity to save (*mps* in the private consumption equation) may be adjusted downward, and the price variable will have to appear in the investment equation. It would be interesting to evaluate whether the cutback in investment is greater (smaller) than the increase in consumption, since that will determine whether final demands decrease (increase), and in turn the endogenous price levels will fall (rise). Having fairly detailed information and specification of household income, at the end the model simulation enables us to evaluate the repercussions of such a rational expectations hypothesis on income distributions.

47. Capital flows are defined to include foreign investment, *FORINV*, and other borrowing, *BORROW*.
48. The specification of *FCAP* follows closely that of Khan and Zahler (undated, IMF).
49. More recent work on investment models put emphasis on two important features, namely uncertainty and irreversibility. For modeling investment in developing countries within the context of economic reform, these factors are highly relevant. For one thing, most countries undergoing reform have paid more attention to capital goods investment, the expenditures on which feature precisely those two characteristics. Furthermore, an important direction of policy reform is to place greater reliance on private investment. Again, these two characteristics are mostly, if not exclusively, relevant for private investment. As described in recent literature, among others Pindyck (1993), the computation for such a model requires stochastic processes, since the relevant state variables and some parameters are not easy to measure. Nonetheless, attempts in this direction can be of great use for modeling investment in Indonesia.
50. For further arguments on this point, see Lewis (1991) and Lewis (1993).
51. It should be noted, however, that the static nature of the model precludes the possibility of migration, including rural-urban migration, that may eventually "correct" the urban-rural income gap.
52. While the open capital account system has been implemented since the early 1970s, there were still numerous obstacles restraining FDI and portfolio investment. Raising the size of parameter *degree* means effectively reducing those obstacles.
53. Note that *RER* in this model is defined simply as the nominal rate deflated by domestic price *PD*, not by the ratio of domestic and foreign prices.
54. As far as this sequence is concerned, there has never been a real problem in Indonesia.
55. More often than not, the assets market clears more instantly than the goods market and, therefore, corrections should be made first in the latter case.
56. Real exchange rates will appreciate under a fixed exchange rate regime, whereas both real and nominal exchange rates will appreciate under a flexible exchange rate regime.
57. The specification of financial block follows closely Thorbecke et al. (1992), which is based on a modified Tobin's model to conform with specific features of Indonesian financial markets.
58. Similar to the earlier case, liberalization of the capital account is accomplished by raising the value of parameter *degree*.
59. To isolate the effects of different sequencing, however, a devaluation is assumed taken in this phase as well.
60. Most favorable outcomes of income distribution under the no liberalization case support what most groups of society in a country would use to argue *against* economic liberalization.
61. While this may be counter-intuitive, it can be best explained by the argument that the structure of the economy in the base year (1980) is such that the manufacturing sector

- is, in general, more responsive to the improved price signals (due to trade liberalization). Furthermore, as is true in most cases of agricultural products, it would take a longer time for the production of the export-oriented agricultural sector to respond.
62. At the time of writing this manuscript, the latest band was 5 percent. However, in September 1996, together with the announcement of an increase in reserve requirements, BI decided to widen further the rupiah-U.S. dollar intervention band from 5 percent to 8 percent. Unlike the case of reserve requirements, the decision on widening the band caught many traders by surprise, especially since one month before the announcement the finance minister made a remark that no widening of the band was planned after it had been raised to 5 percent in June that year.
 63. COLT is a monitoring program that was set up to ensure total Indonesian foreign indebtedness did not climb above US\$100 billion.

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CHAPTER 7

Macroeconomic Policies and Real Exchange Rate Behavior in Kenya: 1970–1995

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Exchange rate management has become increasingly important in the economic management and stabilization of developing countries. In most of these countries, the formulation of exchange rate policy has involved the choice of an exchange rate system and the determination of a particular rate at which foreign exchange transactions will take place. In choosing an exchange rate system, however, a developing country would normally be guided by its own institutional characteristics as well as the economic conditions of its major trading partners. For a policy maker, these considerations are important because of the possible limitations they can impose on the effectiveness of the exchange rate policy and the accompanying macroeconomic policies.

The determination of an appropriate exchange rate for a developing country is a much more complex task for a policy maker. There are three options that could be utilized by a policy maker. First, in situations where there is a parallel market and a large premium on the parallel rate, the appropriate exchange rate level is achieved simply by unification of the foreign exchange markets and then floating the rate. The second option is to peg the value of domestic currency to that of a major trading partner. A third option is to peg the value of domestic currency to a composite basket of currencies representing the bulk of a country's external trade. The choice of a composite approach would reflect the

need to reduce to a minimum undesired appreciations or depreciations of the exchange rate.

Several factors do influence successful exchange rate policy. There are two important ones: First, the exchange rate policy and strategy must be properly formulated and implemented. Second, other policies in the country must be consistent with and supportive of a stable exchange rate. This emphasizes the desirability of a credible macroeconomic framework in which the monetary, financial and fiscal policies facilitate maintaining a stable exchange rate.

In Kenya, the exchange rate policy has for quite some time been a star economic policy instrument and has been the most successful of the structural adjustment policies in the 1990s. It has been used as a means to improving the international competitiveness of Kenya's tradable goods sector and also to bring about a reduced level of expenditures in real terms. The history of exchange rate policy in Kenya follows somewhat the international developments. Following the adoption of a floating exchange rate system by large industrial countries in 1973, Kenya continued to determine the value of the shilling exchange rate through a peg to the U.S. dollar.

However, as time progressed, the peg to the U.S. dollar was considered unsuitable because the benefit of maintaining the shilling exchange rate stability by pegging its value to the dollar was being offset by the cost of greater fluctuation of the dollar in relation to other major currencies.

As a result, a decision was made in 1975 to manage systematically the movements of the shilling exchange rate against a basket of currencies, the SDR (IMF's special drawing rights). This meant that the shilling would neither be allowed to float independently nor be pegged to any single major currency.

This system of pegging the shilling exchange rate to a fixed value of the SDR was modified in 1982 because the SDR peg was considered inadequate to maintain the competitiveness of the shilling measured in terms of Kenya's own trading situation. As a result, a system where the shilling exchange rate was to be determined via a peg to a composite basket of currencies representing the bulk of Kenya's external trade was adopted in 1982. The choice of the currency composite approach was determined by the need to reduce to a minimum the undesired exchange rate fluctuations in terms of the individual currencies in the SDR and to make it easier to manage the shilling exchange rate by disguising to some extent small exchange rate changes. In addition, these technical aspects of the exchange rate management were left to the Central Bank

and thus issues of exchange rate management were removed from political influence and control.

This system lasted up to 1990, when there was the introduction of a version of a dual exchange rate—the official exchange rate and the foreign exchange bearer certificates (FOREX-C) market. This was the first step taken to liberalize the foreign exchange market. The FOREX-Cs were issued against capital inflows and entitled the bearer to repurchase the certificates at face value at the going exchange rate. A vibrant secondary market in these certificates developed with premiums rising to 50 percent above the official exchange rate. By 1993, the dual exchange rate system was operating as an interbank rate and an official exchange rate. These two rates were merged in October 1993 to achieve a complete float of the exchange rate. This was preceded by the abolishing of all controls on imports and foreign exchange transactions. Thus, in the 1990s, the exchange rate policy can be regarded as the most successful component of structural adjustment in Kenya.

The floating exchange rate system was expected to have several advantages for Kenya. First, it would allow a more continuous adjustment of the exchange rate to shifts in the demand for and supply of foreign exchange. Second, it would equilibrate the demand for and supply of foreign exchange by changing the exchange rate, rather than the level of reserves. Third, it would allow Kenya the freedom to pursue its own monetary policy without having to be concerned about balance of payments effects. Fourth, under the floating system, external imbalances would be reflected in exchange rate movements rather than in reserve movements.

Several observations can be made from the Kenyan experience with a unified floating exchange rate system in the 1990s. First, consequent of the adoption of a floating exchange rate, it was expected that the interplay of market forces of supply of and demand for foreign exchange would raise the shilling price of exportables and hence stimulate their production and boost firms' incomes. At the same time, the depreciation was expected to decrease, in terms of foreign currency, the prices of exportable goods from Kenya relative to the prices of nontraded goods abroad. The ultimate objective was to stimulate foreign demand and increase foreign exchange proceeds from exports. Consistent with these expectations, Kenya indeed experienced a recovery of exports, leading to increased accumulation of foreign exchange reserves. But evidence of an export diversification, that is, the scope for extending the exports of nontraditional products appears to have been limited in the short run due to the instability of the exchange rate in 1993 to 1995.

Second, while import substitution may become evident in the long term (except for food and energy products), there has been little evidence of this, in part reflecting the share of uncontrollable imports or the effectiveness of exchange rate action on import demand. Perhaps reflecting the thinness of the foreign exchange market, or the inability of the monetary authorities to cushion the impact of increased inflows of foreign exchange, the exchange rate has tended to appreciate significantly, thus nullifying the initial advantage of improved international competitiveness and dashing hopes of a stable exchange rate and successful export promotion drive. The appreciation most evidently has been outside the influence of the economic fundamentals.

Finally, more recently, there has been a rapid increase of capital inflows that are not mediated by government or reflective of the recovery of exports. Preliminary data indicate that while increased capital inflows are accompanied by a resurgence in economic growth and by a marked accumulation of international reserves, they are not always an unmitigated blessing. This is a recent experience in Kenya. For some countries—for example, the Latin American countries—capital inflows have often been associated with inflationary pressures, a real exchange rate appreciation and a deterioration in the current account of the balance of payments. In addition, massive capital inflows have been shown to lead to excessive expansion in domestic credit, placing in jeopardy the stability of the domestic financial system. If the inflows are of a short-term nature, these problems intensify, as the probability of an abrupt and sudden reversal increases.

This chapter attempts to analyze Kenya's experience with exchange rate management and accompanying macroeconomic policies. The chapter is organized as follows: The next section provides the macroeconomic background of the Kenyan economy. The following section deals with exchange rate management issues and economic performance. The last section looks at the real exchange rate misalignment and issues of capital flows. The chapter ends with a conclusion that summarizes the lessons that can be learned from the Kenyan experience.

Macroeconomic Background

In the first decade of Kenya's independence, in the 1960s, the rate of inflation averaged 3 percent and the exchange rate was fixed to the pound sterling or the U.S. dollar. The inflation experience was thus not

a policy problem, nor was the exchange rate policy an active one. But in the 1970s, with balance of payments problems starting to show up and the first oil price shocks, the rate of inflation began rising. This was accompanied by devaluations and changes in the exchange rate peg from the pound sterling to the U.S. dollar and then to the SDR. But these changes, along with ensuing balance of payments crises and expansionary fiscal and monetary policies, produced an economic crisis in the 1970s. The response was a series of policy mistakes and administrative controls that compounded rather than solved the problems. In reaction to the first balance of payments crisis, the policy makers in Kenya chose to introduce instruments of control.

These included:

1. Selective controls on bank lending
2. Licensing of foreign exchange transactions
3. Quota restrictions on most imports
4. Direct price controls on goods

The restrictions on domestic credit were later lifted; but controls on foreign exchange transactions, imports and domestic prices were modified and made more restrictive every year. These controls thus provided an easier response to controlling balance of payments and inflationary pressures as far as the policy makers were concerned. But these administrative controls produced major distortions, and the discretionary powers gave room to pervasive rent-seeking activities in the public sector, which has been difficult to reverse and has formed the basis of the painful adjustment process in the 1990s. This easy reaction to the crises prevented the policy makers from formulating and adopting stabilization and adjustment measures and policies that could reorient the economy in the face of severe internal and external shocks.

One of the consequences of the oil-price shocks of 1973–74 was to increase production costs and spur the domestic rate of inflation. This was because Kenya was still in the easy phase of import substitution and the export sector heavily relied on a few agricultural exports. From Table 7.1, the rate of inflation doubled between 1973 and 1974. In fact, 1974 marked the year when inflation rose to double digits in Kenya. This continued up to 1979 when the rate of inflation dropped to 8 percent, but with another oil-price shock in 1979 went back to double digits. By 1982, the rate of inflation was an all-time high, about 21 percent. The exchange rate, on the other hand, was fixed but administratively adjusted after changes in the peg in 1975. There was

Table 7.1 Kenya's Basic Indicators: The Fixed Exchange Rate Regime, 1970–1982

Year	INFL	DEF	TOT	DEBT	NER\$	DC	M0	M2
1970	3.7	4.9	105	31.1	7.143	27.8	20.2	24.4
1971	3.8	4.5	108	28.0	7.143	29.0	6.0	7.3
1972	5.7	3.8	105	27.6	7.143	18.9	18.9	13.1
1973	9.3	6.8	116	33.7	6.900	24.5	9.4	22.1
1974	18.0	6.5	120	38.8	7.143	25.0	10.0	8.3
1975	19.2	7.9	116	39.6	8.250	21.8	12.8	15.8
1976	13.5	7.4	126	43.0	8.310	17.7	27.5	21.6
1977	14.9	5.7	159	36.9	7.947	21.1	29.5	38.4
1978	17.0	8.3	136	41.0	7.404	30.1	5.5	12.9
1979	8.0	8.5	129	43.7	7.468	12.0	14.8	14.9
1980	13.8	9.3	136	46.7	7.424	12.0	12.6	-1.2
1981	11.8	10.9	126	37.4	9.130	21.7	16.3	12.5
1982	21.0	15.0	125	52.4	11.020	25.7	4.3	15.4

NOTES: INFL is the domestic rate of inflation.

TOT are the terms of trade.

DEF is the government fiscal deficit to GDP ratio.

DEBT is the total external debt to GDP ratio.

NER\$ is the nominal exchange rate to the U.S. dollar.

DC is the growth of domestic credit.

M0 and M2 are the growth rates of, respectively, currency outside the banking sector and broad money.

SOURCE: Kenya Economic Survey, various issues; Kenya Statistical Abstract, various issues.

a slight appreciation in 1973, but that was followed by a devaluation of 14 percent and a change in the peg in 1975. This was followed by an appreciation until 1981, when a series of discrete devaluations occurred in fiscal year 1981–82.

In 1976–77, there was a commodity boom in the major export crops—coffee and tea. This boom eased some of the economic difficulties experienced in the early 1970s, but the management of this boom is partly responsible for the economic difficulties experienced after it subsided. The boom led to an appreciation of the exchange rate, a tremendous expansion of the domestic credit and tremendous growth in the money supply aggregates as shown in Table 7.1. Even with the boom, the country's level of indebtedness was rising and so was the level of the fiscal deficit.

The increased revenue from the commodity boom was passed on to the farmers (the bulk of coffee and tea production is dominated by small-holder farmers in the rural sector) without any effort to sterilize. This increased revenue had the effect of increasing the demand for real

domestic assets, which led to an increase in their prices. Thus the boom had an effect on the relative price structure. The increased revenue accrued to the private sector and increased government revenues and expenditures with a lag. Given a fixed exchange rate regime, these forces led to an overvaluation of the domestic currency.

Bevan et al. (1988) concluded that the boom had the familiar "Dutch Disease" characteristics in that its spending effects fell on nontradable goods, bidding their prices up relative to tradable goods. This was reinforced in two ways. First, the foreign exchange controls that existed made the acquisition of foreign assets illegal while financial repression made domestic financial assets unattractive. This distortion forced the private agents to transform their windfall incomes into domestic real assets, implying an increase in the demand for nontradable goods and reinforcing the spending effect. Second, even when import controls were relaxed (due to an abundance of foreign exchange reserves) during the boom period, the relaxation was partial so that most tradable goods behaved as nontradables, the market being cleared through price adjustment rather than through imports and exports. Bevan et al. (1988) argue that the increase in the relative prices in other sectors was consequently offset by the static spending effects.

This commodity boom has been viewed as a lost opportunity, where the policy makers could have undertaken stabilization and structural adjustment measures and policies with fewer economic, and perhaps political, difficulties. The commodity boom led to a fiscal explosion, a partial liberalization of imports and increased liquidity in the banking sector. In addition to the internal economic problems, there were two other shocks hitting the economy in this period. First was the decline in coffee prices, and second was the oil-price shock of 1979. The combined effect was to reduce the terms of trade drastically and increase the budget deficit, which went up to about 15 percent of GDP in 1982. The government decided to borrow heavily in order to maintain a minimum level of reserves and at the same time avoid excessive import compression. This heavy reliance on foreign borrowing after the commodity boom raised the level of indebtedness (debt overhang) to over 50 percent in 1982; see Table 7.1. But even with this heavy reliance on foreign loans, there was a heavy import compression due to a shortage of foreign exchange.

By 1982, it was clear that the macro policies pursued were not sustainable and needed drastic change. The first policy change was moving the exchange rate regime from a fixed peg to a crawling peg, a real exchange rate rule in effect; but the capital account was still closed

and there were also selective price controls. Between 1980 and 1982, the Kenya shilling was devalued by about 20 percent in real terms against the SDR. Table 7.2 shows indicators in this period when the crawling peg exchange rate was in operation.

By 1983, various policy measures were put in place; these included the interest rate adjustment and a reduction in the fiscal deficit as Table 7.2 shows. These measures helped to stabilize the balance of payments, reduce the excess liquidity generated by the coffee boom and explosive fiscal deficit, and tamed the rate of inflation. The evidence in Table 7.2 shows that even though the domestic rate of inflation declined, the nominal exchange rate continued to depreciate, and then inflation followed after 1988. The level of indebtedness however continued to rise, and this is attributable to aid flows to facilitate the stabilization and adjustment programs.¹

But most of the indicator variables in Table 7.2, especially inflation, money supply and fiscal deficit, show a temporary improvement in the first few years of stabilization. Some of the goals of the stabilization program were:

1. Reduction of the budget deficit to a more sustainable level that could be financed by foreign and non-inflationary domestic sources which would crowd out the private sector

Table 7.2 Kenya's Basic Indicators: The Crawling Peg Exchange Rate Regime, 1983–1989

Year	INFL	TOT	DEF	DEBT	NER\$	DC	M0	M2
1983	14.7	120	4.6	60.8	13.4	-1.7	9.2	4.3
1984	9.1	126	4.4	56.9	14.5	12.1	6.8	12.1
1985	8.9	124	5.8	68.5	16.4	12.2	14.2	6.5
1986	8.4	125	4.2	65.2	16.2	25.2	23.5	28.2
1987	8.7	100	7.7	74.0	16.5	19.5	18.8	10.6
1988	12.3	98	4.1	69.3	18.6	7.1	10.5	10.6
1989	13.4	92	4.6	70.8	21.6	8.8	12.3	18.9

Notes: INFL is the domestic rate of inflation.

TOT are the terms of trade.

DEF is the government fiscal deficit to GDP ratio.

DEBT is the total external debt to GDP ratio.

NER\$ is the nominal exchange rate to the U.S. dollar.

DC is the growth of domestic credit.

M0 and M2 are the growth rates of, respectively, currency outside the banking sector and broad money.

Source: Kenya Economic Survey, various issues; Kenya Statistical Abstract, various issues.

2. Control of monetary expansion and reduction of the domestic inflation rate to rates more in line with Kenya's major trading partners
3. Maintain an appropriate exchange rate policy that would support the import liberalization program and that would correct for differentials in domestic and international inflation
4. Reduction of the current account deficit to facilitate a buildup of foreign exchange reserves

These and other broader measures had a successful impact in the early years of the stabilization program; but in later years, the latter half of the 1980s, there was gradual decline and a worsening of the economic environment. From Table 7.2, there was a sudden depreciation of the currency, money supply growth was rapid, and the inflation rate seemed to respond. This was the start of the economic crisis that prevailed in the early 1990s.

In summary, up to 1990, the financial and goods markets in Kenya were subject to a wide variety of controls and thus goods prices; the interest rate, the exchange rate and the inflation rate failed to provide efficient signals to either domestic or international economic agents.

For the 1990s, Table 7.3 shows the same indicators with a somewhat different picture. The rate of inflation rose rapidly, indebtedness increased, and monetary expansion was rapid; so were the nominal exchange rate depreciations. In this period, the exchange rate regime had changed to a dual system, in that there was an official exchange

Table 7.3 Kenya's Basic Indicators: The Flexible Exchange Rate Regime, 1990-1995

Year	INFL	TOT	DEF	DEBT	NER\$	DC	M0	M2
1990	18.6	90	6.4	114.5	24.1	23.0	11.5	14.4
1991	19.7	89	7.5	102.0	28.1	18.0	16.4	19.0
1992	27.1	81	3.6	97.3	36.2	14.2	29.9	29.0
1993	46.0	80	5.6	114.9	68.2	0.4	21.6	22.9
1994	28.8	80	2.5	87.5	44.8	37.8	15.0	26.5
1995	1.6	76	1.0	72.5	55.6	32.1	15.2	17.1

NOTES: INFL is the domestic rate of inflation.

TOT are the terms of trade.

DEF is the government fiscal deficit to GDP ratio.

DEBT is the total external debt to GDP ratio.

NER\$ is the nominal exchange rate to the U.S. dollar.

DC is the growth of domestic credit.

M0 and M2 are the growth rates of, respectively, currency outside the banking sector and broad money.

SOURCE: Kenya Economic Survey, various issues; Kenya Statistical Abstract, various issues.

rate and a “market” rate which was operated on the basis of foreign exchange bearer certificates (FOREX-Cs)²; and there were also foreign exchange retention accounts in commercial banks by 1992. This means that there was a gradual relaxation of controls in foreign exchange transactions. The outcome in the short run was to raise the rate of inflation and inflationary expectations because these policies were implemented at a time when there was excess money in circulation, a severe shortage of foreign exchange, price decontrol in the presence of an inadequate supply of essential commodities, and a strong rise in consumer demand due to excess liquidity in the economy and accompanied by increased spending in the runup to the 1992 elections.

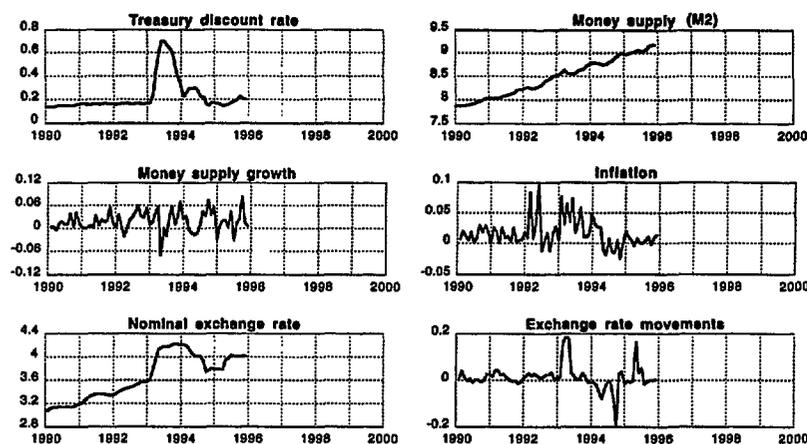
Besides all these factors, the money supply was also being expanded by the indirect effects of the aid embargo at the time, due to the escalating fiscal deficit, which inevitably had to be financed by printing money. In an attempt to mop up the excess liquidity, the Treasury discount rate shot up,³ pushing the rate of inflation with it and the exchange rate depreciated markedly. This was followed by massive private capital inflows, which led to a buildup of foreign exchange reserves and thus appreciated the exchange rate. The Treasury bills’ discount rate gradually came down and the rate of inflation started to follow.

This appreciation of the shilling thus partly reflected substantial inflows which were a result of liberalization of foreign exchange transactions and a high yield on domestic Treasury bills. Data suggest that the interest rate differential, the exchange rate expectations, the forecast on inflation and the general stability that was being achieved were such that holders of foreign exchange took advantage of the liberalized regime to profit by bringing funds back, converting them to shillings, and benefiting from the high Treasury bills’ rate.

The events in this period indicate that the market exchange rate overshot as predicted by Dornbusch (1988, Chapter 4), since inflation responded to the drying up of liquidity. Then as real returns on the Treasury bills’ rate grew to be excessive, the interest rate started to track inflation down (see Figure 7.1).

The 1990s, which we label the “crisis and liberalization period,” are characterized by a shift in attention away from the real economy to the one in which trade in financial assets dominates, with rates on secure government paper earning excess premium. Lending for investment or importing inputs was seen as unattractive. Exporters were benefiting from currency depreciations while a depressed demand for imports (which are fundamental for a resource poor country like Kenya) was

Figure 7.1 Kenya's Monetary Variables, 1990–1996



SOURCE: Kenya Economic Survey, various issues; Kenya Statistical Abstract, various issues.

dampening growth in other sectors of the economy. But by the end of 1993, the official exchange rate had been abolished and further liberalization in the foreign exchange market allowed individuals to hold foreign exchange. These liberalization efforts together with a shadow program negotiated by the World Bank and IMF further created credibility and assured traders of commitment to a more market-driven policy.⁴ These factors are thus responsible for the general stability of macro prices in the 1994 to 1996 period.

According to the *Economic Survey, 1996*, the overall rate of inflation declined from 46 percent in 1993 to 28.8 percent in 1994 to around 1.6 percent in December 1995. The drop was attributed to a combination of factors, including the tightening of fiscal and monetary factors, a stabilized exchange rate, favorable weather conditions, an increased supply of maize due to an abundant harvest in 1994, the lowering of the value-added tax rate from 18 percent to 15 percent in 1994, and the low price of imports of consumer goods.

Exchange Rate Management and Economic Performance

In this section exchange rate management issues are traced in relation to the accompanying monetary policies, economic performance indicators,

the parallel market for foreign exchange, and the inflation experience with different exchange rate regime changes.

Loss of the Nominal Anchor

The issue of a nominal anchor that can tie prices down is analyzed with regard to inflation experience in Kenya and contrasted with regimes that have been in operation. In particular, we ask the following questions: What was the effect on inflation when the exchange rate regime moved from fixed to crawling peg and subsequently to a flexible rate?

In attempting to answer this question, we estimate a simple model that takes into account the exchange rate regime and the inflation experience, following Edwards (1995). The question asked in this simple framework, unlike in Edwards (1995), is whether inflation increases with the exchange rate regime shifting from a fixed to a crawling peg or is there an increase in inflationary inertia. The reduced form of the model includes domestic inflation—which is a weighted average of the rate of inflation in tradable goods, as a function of world inflation—and exchange rate depreciation and the rate of inflation in the nontradable goods sector—in turn a function of domestic aggregate demand and wages (see Edwards, 1995, p. 30). The estimable equation is of the form:

$$\begin{aligned} \pi_t = & \alpha_0 + \alpha_1 \pi_{t-1} + \alpha_2 D_1 \pi_t + \alpha_3 D_2 \pi_t + \alpha_4 \pi^f \\ & + \alpha_5 RDAG_t + \varepsilon_t \end{aligned} \quad (7.1)$$

where π_t is the rate of domestic inflation, π^f is the international rate of inflation, $D_1 \pi_t$ and $D_2 \pi_t$ is the product of a dummy variable and lagged value of the domestic rate of inflation. The dummy D_1 variable takes the value of zero between 1970 and 1982 and a value of one between 1983 and 1989 to capture the change in exchange rate regime from fixed to crawling peg, and D_2 is a dummy for the dual/floating exchange rate regime period from 1990. The coefficient for lagged inflation captures the degree of inflation inertia and it is thus expected to be positive. We expect α_3 and α_4 to be positive since the change in regime from fixed to more flexible regimes is likely to increase inflation and inflation inertia—that is, with the crawling peg, the nominal anchor is lost and this should be reflected in inflation dynamics (see Edwards, 1995,

p. 32). *RDAG* is growth of real domestic aggregate demand, whose coefficient should be positive since this reflects the impact of demand forces on the aggregate price level. The world rate of inflation is supposed to be positive; that is, the world rate of inflation should drive the domestic rate of inflation. Generally, we would estimate this model as a general autoregressive form and then solve the model.

The results confirm the questions posed. First, in 1983:1 and 1990:1, we have huge outliers consistent with a change of the inflation profile following a regime change. These effects are modeled separately by including impulse dummies for those two periods. The results of estimating equation 7.1 are shown in Table 7.4.

We use a battery of tests in order to ascertain whether the estimated results tentatively reflect the data generating process and to judge the appropriateness of the model. In particular, the Wald test shows that all the variables in the model are jointly significant. The diagnostic tests, on the other hand, test the behavior of the regression residuals and the model specification. There is thus absence of serial correlation (AR test),

Table 7.4 Inflation Profile: Model Estimates,
1970–1995

Variable	Coefficient	t-Ratio
intercept	.0203	1.05
π_{t-1}	.654	10.35
π_t^f	-.092	1.08
<i>RDAG</i> _t	.373	3.01
$D_1\pi_{t-1}$.0889	1.62
$D_2\pi_{t-1}$.232	3.09
D83:1	.0636	10.97
D90:1	-.0206	3.75
seasonals	-.0067	3.05

NOTES:

Wald test $\chi^2(8) = 204.23$ [.000]**

$R^2 = .97$

s.e. = .0053

DW = 2.18

Diagnostic tests:

AR 1 – 5 $F(5,68) = 1.33$ [.268]

ARCH 4 $F(4,65) = 3.11$ [.0212]*

$\chi^2 F(41,31) = .5395$ [.9677]

Normality $\chi^2 = 11.31$ [.0035]**

RESET $F(1,72) = 1.076$ [.3033]

SOURCE: Authors' estimations.

and the regression specification is adequate (RESET) in relation to the assumption of linear specification. The test for heteroscedastic errors (ARCH) is significant at 5 percent but not at the 1 percent level. The residuals are not normally distributed (Normality), and this can be attributed to the fact that other factors that influence the inflation rate are not taken into account in this simple model. However, we assume that the most important tests are adequate and that the residuals are approximately a white noise process.

From these results we see that moving from a fixed exchange rate regime increased inflation and the rate of inflation accelerated when the regime changed in the 1990s. The effect has also been to increase inflation inertia, such that 65 percent of the previous period's inflation feeds into the current rate of domestic inflation. Thus, moving from a fixed exchange rate to a crawling peg increased the rate of inflation and inflationary inertia. The results also show that growth in real aggregate demand drives the rate of inflation and that inflation also has a seasonal component, while foreign inflation is not related to the domestic rate of inflation.

The coefficients for the step dummies are both positive, showing that regime changes from a fixed to a crawling and then a floating rate increased the rate of inflation and inflationary inertia. These results are tentatively consistent with Edwards' (1995) observation that a country learns to live with relatively high inflation when it changes to a crawling peg regime because it cannot maintain a competitive exchange rate with a fixed nominal exchange rate in light of its fiscal stance. We thus come to the conclusion that regime changes have also changed the inflation profile. The inflation experience of the 1980s and the 1990s had thus an extra dimension of dynamics from the loss of a nominal anchor and the increase in inflation inertia.

The Exchange Rate and the Accompanying Monetary Policy

This section attempts to assess whether the exchange rate is affected by monetary policy and whether these effects are permanent or transitory. This is in recognition of the fact that the choice of the exchange rate regime is determined by various objectives, but that, once this choice is made, the authorities are presumed to adjust their macroeconomic policies (especially fiscal and monetary policies) to fit the chosen exchange rate policy. Furthermore, once the exchange rate

regime has been chosen, it determines the flexibility or independence of monetary policy.

Exchange rate and monetary policy is one of the most important tools in economic management and in the stabilization and adjustment policies of developing countries. In most developing countries, low inflation and international competitiveness have become major targets. The real exchange rate is a measure of international competitiveness; and inflation, on the other hand, mostly emanates from monetary expansion, currency devaluations and other structural factors. The importance of monetary and exchange rate policies is reflected by the current wave of liberalization of the financial markets and the capital accounts in the balance of payments. The response has been private capital inflows responding to interest rate differentials. The important questions asked in literature dealing with capital inflows are, What should be the optimal response of the exchange rate and monetary policy to these capital flows, and What is the effect on the real interest rate, the real exchange rate and the exchange rate regime?

In the period between the end of 1982 and 1995, we can safely say that there has been an active exchange rate policy in Kenya, in the sense that there was some degree of flexibility as opposed to a fixed exchange rate. During the period 1982–1990, there was a deliberate attempt to depreciate the currency during the crawling peg regime. The real exchange rate was the target, and the nominal exchange rate was no longer an anchor to domestic prices. But the period 1982–1994 was also characterized by controls and policy reforms. The controls were pervasive in the 1980s, while policy reforms and dismantling of controls are a phenomena of the 1990s.

The 1990s began with a dual exchange rate system, accelerated money supply growth⁵ and high inflation; but at the same time there was a move to speed up economic reforms and accelerate the pace of liberalization in line with donor conditionalities. The economic environment, with the severe imbalances in the major macroeconomic variables, was not conducive for reforms, especially financial liberalization. This was because macro prices had become severely unstable, especially the exchange rate and the domestic prices, which were then followed by the Treasury bill discount rate. In fact, in March 1993 instability in these variables, especially the exchange rate and domestic prices, was in such a state that all financial liberalization measures could not continue without first establishing some basic stability. These instabilities stemmed from excess liquidity in the economy, especially after the

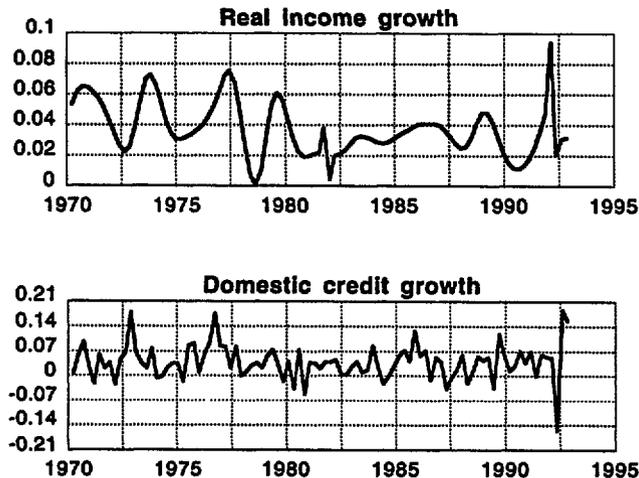
December 1992 elections. But when excess liquidity started drying up, inflation responded albeit hesitatingly, the exchange rate appreciated throughout 1994, and the interest rate started to track the domestic rate of inflation down. This meant that macro stability was slowly being achieved.

The events in this period suggest that monetary policy in Kenya is key to the determination of the path of the exchange rate, inflation and the interest rate. In addition, fiscal policies and the budget deficit are closely interwoven with monetary policy. Monetary policy in Kenya is mostly driven by fiscal demands. Part of the exchange rate depreciation and accelerating inflation, however, could be traced to expectations which were at the time being driven by either fear of policy reversal or perhaps a backlog of demand for both goods and foreign exchange reserves.

Figures 7.1–7.3 show the behavior of macro indicators between 1971 and 1994. For all the indicators, the 1990s present a crisis period. Domestic credit expanded rapidly, which also reflects the movements in money supply, interest rate changes, the inflation rate and exchange rate movements. The rate of inflation responded to both money supply growth and exchange rate movements.

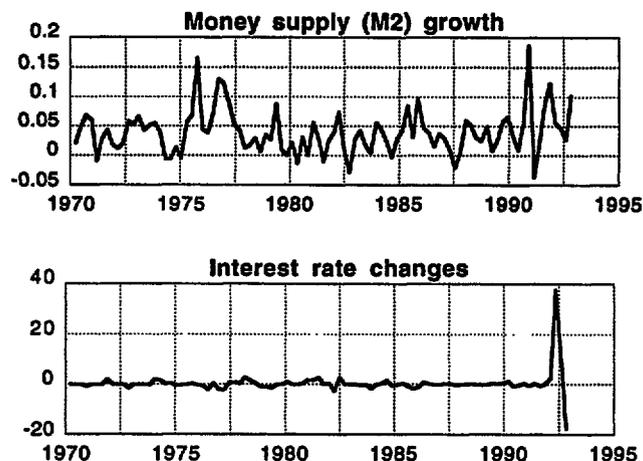
The recurring policy objectives in Kenya have been to maintain an exchange rate that would ensure international competitiveness and at

Figure 7.2 Kenya's Real Income and Domestic Credit Growth, 1971–1995



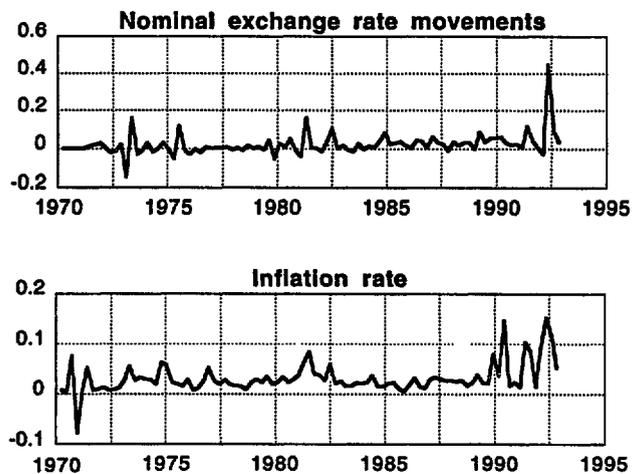
SOURCE: Kenya Economic Survey, various issues; Kenya Statistical Abstract, various issues.

Figure 7.3 Kenya's Money Supply (M2) Growth and Interest Rate Changes, 1971–1995



SOURCE: Kenya Economic Survey, various issues; Kenya Statistical Abstract, various issues.

Figure 7.4 Kenya's Inflation and Nominal Exchange Rate Movements, 1971–1995



SOURCE: Kenya Economic Survey, various issues; Kenya Statistical Abstract, various issues.

the same time keep the domestic inflation rate at low levels; conduct a strict monetary stance; and maintain positive real interest rates. This has been difficult in practice and it has been made even more difficult by a floating exchange rate, which at times moves out of line with its fundamentals in the short run. For example, in July 1995, the nominal exchange rate suddenly depreciated by about 32 percent, moving to Kshs.58 to the U.S. dollar from Kshs.44 to the dollar.

This movement was associated with the expectations of an aid freeze in the Consultative Group Meeting in Paris between Kenya and its major donors. As it turned out aid was not frozen, but the exchange rate held on to a new level (at Kshs.56 to the U.S. dollar). In the month of August, interest rates, starting with the Treasury bills' discount rate, suddenly shot upward. From 1982, when the crawling peg exchange rate regime was adopted, we can safely say that a target for a low domestic rate of inflation would have been difficult to achieve. Control of some basic producer and consumer prices could not have helped to keep inflation down either. This is because by adopting a crawling peg exchange rate policy the authorities accepted living with relatively high inflation (see Edwards, 1993).

When the exchange rate was changed to a float in an environment of excess liquidity, massive depreciation and high and accelerating inflation ensued. The mopping up of excess liquidity pushed the Treasury bill discount rate up; and because it was a bench mark for other interest rates, all the other interest rates shot up to high historical levels. Money supply, on the other hand, has been quite erratic despite the promise of a tough stance by the Central Bank. The Central Bank of Kenya in its July 1995 *Monthly Report* indicated that the major challenge for monetary policy in Kenya is to control and finally eliminate credit extended to the Treasury by the Central Bank. This is the main component driving money supply growth.

The movements in major macroeconomic indicators for the period 1983–1994 are shown in Table 7.5. Money supply growth in Kenya is mostly driven by domestic credit extended to the Treasury by the Central Bank. The government share of domestic credit has steadily risen in the 1980s and 1990s. This proportion rose to 46 percent in 1993 and was generally above 40 percent during most of the 1990s, compared to the 1970s when this proportion was below 30 percent. Money supply, on the other hand, measured in narrow money, M1, increased sixfold; M2, by more than sevenfold. The period of money supply upsurge

Table 7.5 Kenya's Major Macroeconomic Indicators, 1983–1994

Year	M1	M2	DC	GDP	INFL	TDR	EXR	DCG
1983	100	100	100	100	14.5	14.04	13.39	31.2
1984	114	111	114	112	9.1	13.27	14.54	31.4
1985	126	124	121	127	10.7	13.27	16.39	30.5
1986	152	152	163	147	5.7	13.77	16.21	36.9
1987	174	182	191	163	10.5	13.21	16.48	39.8
1988	178	192	198	186	12.8	12.84	17.81	34.1
1989	251	272	216	215	14.6	13.46	20.67	30.9
1990	269	288	264	281	17.7	13.86	23.04	40.6
1991	313	348	307	318	19.6	14.78	28.07	42.6
1992	450	466	376	369	27.3	16.59	36.22	35.8
1993	552	585	485	461	46.0	39.30	68.16	46.2
1994	613	765	493	561	28.8	17.90	44.84	41.6

NOTES:

M1 and M2 is money supply.

DC is total domestic credit.

GDP is total domestic output (these are indexes).

TDR is the Treasury bill discount rate.

INFL is the domestic rate of inflation.

EXR is the nominal exchange rate to the U.S. dollar.

DCG is the government share of domestic credit.

SOURCE: *Economic Survey*, various issues.

coincided with some lag in inflation rate acceleration, and exchange rate depreciation and a high interest rate.

Table 7.5 thus does not portray a lot of stability in the major macroeconomic indicators. The problem in Kenya's stabilization program has been pursuing many targets with too few instruments. In the 1980s, the stabilization program was aimed at the following (see World Bank, 1990):

1. Reduction of the budget deficit to a more sustainable level that could be financed by foreign and non-inflationary domestic sources, and that does not crowd out the private sector⁶
2. Control of monetary expansion and reduction in the inflation rate to levels more in line with Kenya's major trading partners
3. Maintain an appropriate exchange rate policy that supports the import liberalization program and corrects for differentials in domestic and foreign inflation rate

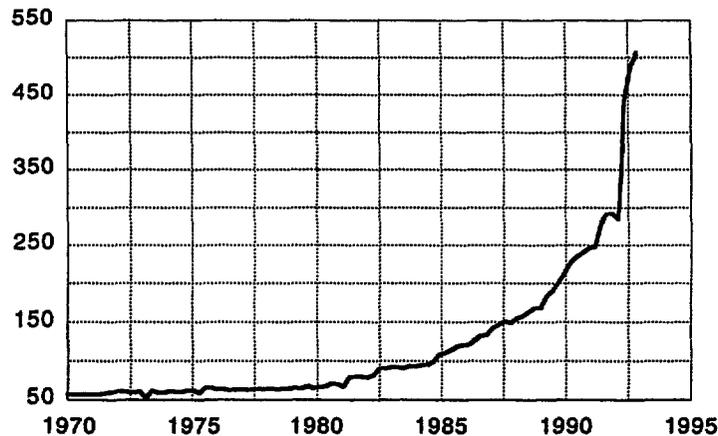
4. Reduction in the current account deficit to facilitate an accumulation of foreign exchange reserves

As the pace of liberalization was stepped up in the 1990s, the problem of pursuing too many targets with too few instruments intensified. The authorities want to target low inflation and the real exchange rate, but with one instrument, the interest rate. Furthermore, when the authorities keep switching between targets and look at a longer horizon, they may appear as if they never had any target at all. In the subsections that follow, we look at the exchange rate and monetary policies pursued and ask whether they are consistent with the targets.

Figure 7.5 shows the nominal exchange rate movements between 1970 and 1994. It is a relatively stable rate in the early years and then displays a series of regime shifts, with the fixed exchange rate period showing a crawling peg period, when the exchange rate depreciates gradually over time. The crises and flexible period between 1990 and 1994 show rampant depreciation.

On a monthly basis the figures would show an appreciation throughout most of 1994, and then discrete jumps thereafter, with a series of depreciations and periods of relative stability.

Figure 7.5 Kenya's Nominal Exchange Rate Movements, 1970–1993



SOURCE: *Kenya Economic Survey*, various issues; *Kenya Statistical Abstract*, various issues.

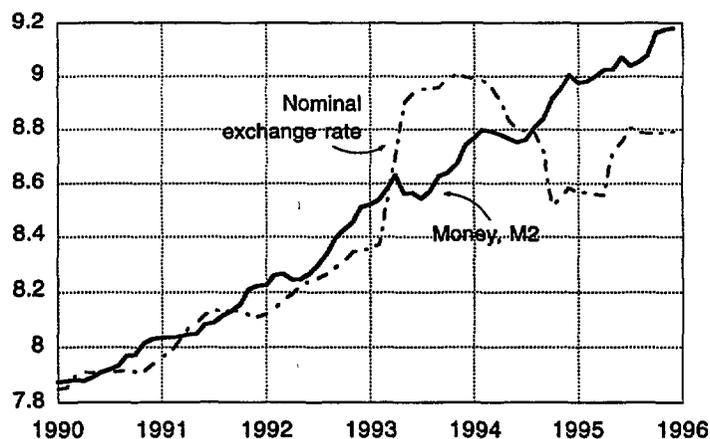
Finally, we show the corresponding movements between the nominal exchange rate, money supply and the interest rate in Kenya. Figures 7.6 and 7.7 show these trends for the 1990–June 1995 period, using monthly series.

In Figure 7.6, the nominal exchange rate to the U.S. dollar and money, M2, are seen to track each other until 1993, when M2 starts rising fast, the exchange rate follows with a lag, and the depreciation is very rapid. When the exchange rate starts appreciating, money supply growth slows.

Figure 7.7 shows the corresponding movements between the nominal exchange rate, M2 and the interest rate. The interest rate and the nominal exchange rate track each other until an accelerated appreciation starts, when the interest rate hesitates but follows the downward movement.

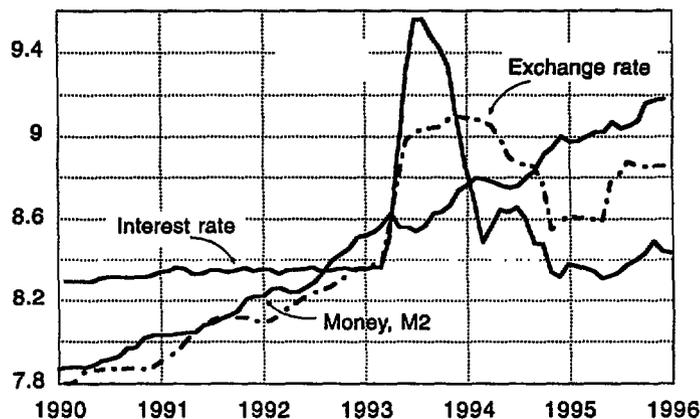
In this period, in an attempt to mop up excess liquidity in the economy, the amount offered at the Treasury bills' auction was increased from Kshs.1 billion to Kshs.5 billion. The Treasury bill rate responded and shot up to a historic level. The exchange rate and the inflation rate followed a similar movement. In the latter part of the period, the interest rate differential, high Treasury bills' discount rate and a weak domestic currency triggered inflows of private capital.

Figure 7.6 Kenya's Money and Nominal Exchange Rate, 1991–1995



SOURCE: Kenya Economic Survey, various issues; Kenya Statistical Abstract, various issues.

Figure 7.7 Money, Nominal Exchange Rate and the Interest Rate in Kenya, 1991–1995



SOURCE: Kenya Economic Survey, various issues; Kenya Statistical Abstract, various issues.

Monetary Shocks and the Real Exchange Rate (RER)

Now we will attempt to link monetary shocks to real exchange rate movements. We decompose the RER into its temporary (or cyclical) and permanent components.⁷ Hence:

$$RER_t = RERP_t + RERC_t \quad (7.2)$$

where $RERP_t$ is the permanent component and $RERC_t$ is the cyclical or temporary component. We view $RERP_t$ as the equilibrium real exchange rate, while $RERC_t$ measures the temporary deviations from this equilibrium.

The next stage is to consider what constitutes monetary shocks in the economy. This could be induced from the fiscal side through domestic credit extended to the Treasury by the Central Bank to finance fiscal deficits. Several measures have been used in the empirical literature. Eichenbaum and Evans (1993) use three measures for the United States: the orthogonalized components of the innovation to the rate of nonborrowed to total reserves, the orthogonalized components of the

innovation to the federal funds rate, and the Romer and Romer index of monetary contraction. These measures may be inappropriate in a country with a shallow financial market and dominated by multinational banks. Furthermore, the appropriate measure of credit squeeze or ease in a country like Kenya with shifts in the exchange rate regimes is best reflected by the growth of the domestic credit. Since the monetary authorities always aim at a strict monetary stance, the monetary stance should be reflected by the growth of domestic credit. We thus follow Edwards' (1994) definition of excess supply of domestic credit:

$$EXDC_t = [\Delta DC_t - \Delta GDP_{t-1}] \quad (7.3)$$

where $EXDC_t$ is excess domestic credit, DC_t is the log of domestic credit, and GDP_t is the log of national output and the delta indicates the first difference. In addition, growth of domestic credit can also be used. On the other hand, Elbadawi (1994) uses excess money supply, $EXMS$, which is defined as

$$EXMS_t = \left(\frac{\Delta DC}{M2} \right)_{t-1} - \Delta \text{Log } P_t^* - \Delta \log EX_t - \Delta \log RGDP_t \quad (7.4)$$

where $RGDP$ is real GDP. Excess money supply is defined as the ratio of growth in domestic credit to money supply in excess of the foreign inflation rate, exchange rate movements and the real growth of output. We thus have three measures that will be used in our empirical investigation to approximate monetary shocks in the economy. Given the decomposition of the RER and a measure of monetary shocks, the investigation will show whether the cyclical component of RER is driven by monetary shocks. If the authorities aim at RER, then they should pursue a monetary policy consistent with this target and, as such, temporary deviations from the RER should not be correlated with monetary shocks.

Empirical Results

The RER is decomposed into cyclical, $RERC$, and permanent, $RERP$, components. This, as was argued before, will enable us to test whether

the cyclical component is driven by shocks from money supply as defined in equations (7.3) and (7.4). The results are as follows:

Excess domestic credit.

$$RERC \Rightarrow \Rightarrow EXDC F(5,80) = 9.108[.000]$$

$$EXDC \Rightarrow \Rightarrow RERC F(5,80) = 2.679[.0274]$$

These should be read as excess domestic credit predicts *RERC* and vice versa for the reverse causation. Five lags of each variable were used, and we also tested the reverse causation. The results of the F-test are shown, and the figures in the brackets are the probability values. The above results show that shocks from domestic credit, that is, excess domestic credit, predict the cyclical movements of the real exchange rate. The reverse effects are also strong; that is, the cyclical movements in the RER also drive excess domestic credit.

Excess money supply. Here we test whether excess money supply drives or is driven by the cyclical component of the real exchange rate.

$$RERC \Rightarrow \Rightarrow EXMS F(5,79) = 175.17[.000]$$

$$EXMS \Rightarrow \Rightarrow RERC F(5,79) = 2.861[.020]$$

Excess money supply as defined by equation (7.4) is seen here to predict cyclical movements of the RER with strong feedback effects.

Domestic credit growth. In the last case we test whether growth in domestic credit drives or is driven by the cyclical component of the real exchange rate.

$$RERC \Rightarrow \Rightarrow DDC F(5,79) = 11.292[.000]$$

$$DDC \Rightarrow \Rightarrow RERC F(5,79) = 1.574[.1773]$$

Domestic credit growth is seen to drive the cyclical component of the RER but with no feedback effects.

The conclusion we draw from these results is that monetary shocks drive cyclical real exchange rate movements, but also that the cyclical

real exchange rate movements have an impact on monetary shocks, that is, they drive each other. This implies that when money supply or domestic credit grows excessively out of line of the growth in economic activity they feed into the real exchange rate movements with feedback effects. These results thus show that monetary policy has effects on cyclical real exchange rate movements. This may perhaps point to an inconsistency between the monetary policy and a competitive exchange rate target and the inflation rate. The fact that shocks in the money market and the cyclical component of the real exchange rate drive each other may imply that shocks may have permanent rather than transitory effects.

The Parallel Market and the Official Exchange Rate

From the 1970s, when controls on foreign exchange transactions were instituted, a parallel market for foreign exchange emerged as a result of rationing reserves available. This was a risky market due to government regulations and laws governing foreign exchange transactions. The premium in this market was thought to be reflective of the risks involved in the transactions. However, some researchers have argued that this parallel market was responsible for triggering devaluations in the official exchange rate and have concluded that the official exchange rate was indexed to the parallel market exchange rate. Here we attempt to test this proposition.

We provide causality test results between the official exchange rate and the parallel market rates. Since their relationship is likely to be disturbed or enhanced by the regime changes, we conduct the tests for the whole sample, for the fixed exchange rate period and for the flexible or active exchange rate. The results are as follows.

The official rate is predicted by the parallel market rate:

$$EX \Rightarrow \Rightarrow PEX \quad F(6,69) = 0.816[.5612] \quad 1971:3 - 1993:4$$

$$EX \Rightarrow \Rightarrow PEX \quad F(6,27) = 0.439[.846] \quad 1971:3 - 1982:4$$

$$EX \Rightarrow \Rightarrow PEX \quad F(6,26) = 2.2677[.068] \quad 1983:1 - 1993:4$$

The parallel rate is predicted by the official rate:

$$PEX \Rightarrow \Rightarrow EX F(6,69) = 0.998[.434] \text{ 1971:3 - 1993:4}$$

$$PEX \Rightarrow \Rightarrow EX F(6,27) = 0.078[.998] \text{ 1971:3 - 1982:4}$$

$$PEX \Rightarrow \Rightarrow EX F(6,26) = 1.232[.323] \text{ 1983:1 - 1993:4}$$

The parallel market rate and the official rate do not predict each other when the whole period is considered. The parallel market exchange rate predicts the official rate in the flexible exchange rate period, 1983–1993. This covers the period of the crawl and floating rate. It may thus appear that the level of the crawl was reflective of the parallel market exchange rate. Put differently, when the Central Bank decided on the movements of the crawl, it was likely to have taken into account the developments in the parallel market exchange rate.

Still these results do not confirm whether the official exchange rate was indexed to the parallel exchange rate. However, we would expect these two rates to drive each other if the official rate was indexed to the parallel rate. The results thus reject this proposition. The tentative conclusion that we can draw from these results is that even though the parallel market was illegal, the Central Bank in determining the crawl took into account the value of the currency in the parallel market, but did not hook the crawl entirely on the parallel market developments. This we can consider as backward indexing of the official exchange rate to the parallel market exchange rate. Perhaps these results may explain why most researchers have come to the conclusion that the exchange rate in Kenya was never seriously misaligned. The issue of misalignment is analyzed later in the chapter.

However, in reality, the situation has been rather more complex than the causality tests done in the preceding two sections show. The authorities, theoretically, are supposed to choose the exchange rate regime and leave money supply endogenous or vice versa. Kenya has had both systems. In situations of foreign exchange rationing, the official exchange rate and the foreign exchange reserves held at the Central Bank are thus not endogenous, but the parallel market exchange rate is. Similarly, in periods of credit controls, the interest rate and money supply become exogenous. This change in regimes and the endogeneity of some of the policy variables have had an effect on the official exchange rate or the parallel rate in different periods. These experiences have been quite prevalent in Kenya and may thus produce a more complicated causal structure than our analysis can uncover or

worse still give a confused causal structure. The results should thus be treated with caution.

Real Exchange Rate Determination and Degree of Misalignment in Kenya

Kenya has intermittently faced serious problems of rapid inflation, balance of payments (BOP) disequilibrium and sluggish economic growth. Stabilization and structural adjustment programs have therefore been implemented since the mid-1970s, mainly with the support of international financial institutions. Two objectives of these programs is to control inflation and to improve the international competitiveness of the country's tradable sector.

There is a wide consensus in the economics literature on a close association between depreciation of the exchange rate and inflation. This is through the impact of devaluation on import prices and losers attempting to defend their incomes from the income redistribution brought about by devaluation (Edwards, 1993). Studies that have analyzed the impact of changes in the nominal exchange rate on inflation in Kenya tend to confirm this view (Ndung'u, 1993). Depreciation of the exchange rate can be expected to worsen the inflation rate.

One concern with the adoption of a market-based exchange rate regime is that it would result in a depreciation of the exchange rate regardless of the macroeconomic stance adopted. This would feed into the domestic inflation rate and the two cumulate over time (Quirk et al., 1987). As the Kenyan experience with the floating exchange rate regime in the 1990s shows, this is not generally the case and the exchange rate can move in either direction, depending on the developments in the balance of payments and the macroeconomic policy stance.

Use of the nominal exchange rate as an anchor for inflation, however, conflicts with its use as an instrument to enhance the international competitiveness of the economy's exports. Policy makers therefore face a policy dilemma of whether to use the exchange rate as a nominal anchor or to limit real exchange rate misalignment. An appreciation of the exchange rate helps promote price stability but reduces the country's international competitiveness and vice versa. There is no easy way to resolve this trade-off. Policy makers however need to establish clear priorities and operational targets within a formal analytical framework (Roe and Sowa, 1994). An inept monetary policy can, for example,

compound rather than reduce instabilities arising from the impact of terms of trade shocks, capital flows and policy inconsistencies which directly impact the real exchange rate.

The real exchange rate is one of the most important relative prices in the economy as it influences the price of domestic vis-à-vis foreign goods and services. Adoption of an “appropriate” real exchange rate is a most critical factor in the management of the economy. Real currency depreciation reduces the relative price of domestic goods and services, encourages the production of tradables in agriculture, manufacturing and services such as tourism, and discourages the production of nontradables (for example, in construction). Conversely, a real appreciation increases the relative price of domestic goods and services, and discourages the production of tradables while it encourages the production of nontradables.

One basic objective of economic reforms in Kenya was therefore to reduce real exchange rate misalignment—defined as the sustained deviations of the actual real exchange rate from the “equilibrium” real exchange (Edwards, 1989). Real exchange rate (RER) misalignment is commonly believed to be a major cause of poor economic performance. It is postulated to discourage exports and the production of importables, and to encourage destabilizing capital movements. It is also associated with an external debt problem through a weakening of the balance of payments, encouragement of capital flight and discouragement of foreign investment, hence contributing to an unstable macroeconomic environment detrimental to enterprise, investment and price responsiveness (Collier and Joshi, 1989; Killick, 1991; Ghura and Grennes, 1993).

The equilibrium RER is defined as the rate at which the economy would be at internal and external balance for given sustainable levels of the other variables such as taxes, international prices and technology (Edwards, 1989). Internal equilibrium is attained when the nontradables sector clears in the present and is expected to clear in the future, while the external balance is attained when the current account balance is compatible with long-run sustainable net capital inflows. The equilibrium RER therefore varies continuously in response to changes in actual and expected economic fundamentals.

This section attempts to measure and to analyze the determinants of RER in Kenya, distinguishing between the relative importance of the short-term disequilibrium impacts of fiscal, monetary and nominal exchange rate policies, and the long-term equilibrium impacts of

changes in economic fundamentals on RER. According to Edwards (1989), while the monetary and nominal exchange rate policies are destabilizing and hence require policy interventions, changes in the fundamental factors induce equilibrium adjustments and hence do not require policy interventions.

Determinants of the Real Exchange Rate

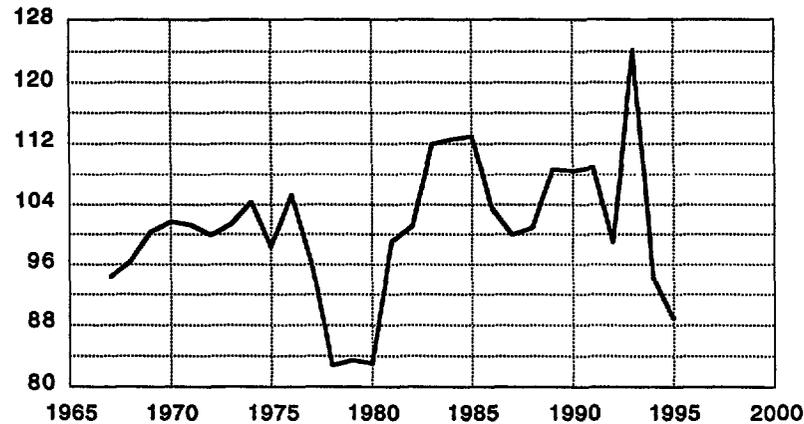
RER is defined as the price of tradables in terms of nontradables (Pt/Pnt). Based on the small country assumption, Pt is influenced by world prices, the nominal exchange rate and trade taxes, while Pnt is a function of domestic supply and demand and hence macroeconomic and trade policies. Since it is difficult to find an exact empirical counterpart to this definition, various proxies for RER have been estimated in the literature. De Groot (1991) for example estimated seven of these for Kenya and found them to show similar movements.⁸

As is common in the literature, RER here is therefore approximated by the product of an index of the nominal exchange rate (NER) and an index of wholesale foreign prices (WPI) divided by an index of domestic consumer prices (CPI). Since NER is derived from domestic currency per unit of the numeraire foreign currency, depreciation therefore corresponds to a rise in the RER (and improved external competitiveness) and an appreciation to a decline in the rate (and reduced external competitiveness). As in Elbadawi and Soto (1995), a bilateral exchange rate index against the U.S. dollar is utilized, as it was found to be relatively more cointegrated with economic fundamentals than the multilateral rates.⁹

Figure 7.8 shows the evolution of the bilateral RER, which is fairly successful in reproducing the salient episodes in the macroeconomic history of Kenya.

The RER was fairly stable in 1967–1975, when the country had a fixed but adjustable exchange rate regime. The official exchange rate remained fixed at Kshs.7.143 to the U.S. dollar for much of this period, except for 1973 when it was slightly appreciated. The other currencies reflected cross rates against the U.S. dollar in the international currencies market.

Between October 1975 and December 1982, the Kenya shilling was pegged to the SDR which, calculated from a basket of currencies, was considered to be relatively more stable than a single currency peg,

Figure 7.8 Evolution of the RER in Kenya, 1967–1995

SOURCE: Authors' computations.

especially following the floating of the U.S. dollar in 1973. During the SDR peg, the shilling was subjected to a number of discretionary devaluations, resulting in relatively more instability in the RER in the 1977–1982 period.

The country adopted a crawling peg exchange rate regime in 1983–1991 in which the exchange rate was adjusted on a daily basis against a composite basket of currencies of the country's main trading partners to reflect inflation differentials between Kenya and these countries. The SDR peg was considered inadequate to maintain competitiveness of the Kenya shilling because the weights used did not reflect Kenya's trade pattern, which is more diversified with the currencies included in the SDR accounting for only 40 percent of the country's combined exports and imports (Mullei, 1992). According to the Central Bank of Kenya (CBK) (1987), the policy was aimed at "maintaining the shilling's competitiveness, raising the relative profitability of traded goods and reducing resources from import and consumption to activities that are export oriented." In this period, the RER was relatively stable.

Since the late 1991, the authorities have adopted the more market-based exchange rate regime described earlier. It became government

policy to make the shilling convertible by fully liberalizing the current and the capital accounts, with a stable and “realistic” rate maintained through prudent fiscal and monetary policies. The government for example on June 30, 1994, officially agreed to abide by the obligations of Article III of the IMF’s Articles of Agreement to promote full convertibility of the Kenya shilling at least for current account transactions (CBK, 1994). Convertibility refers to the right to convert without limit a country’s currency at the going exchange rate. In practice, this requires the maintenance of a market-clearing foreign exchange rate unless the Central Bank (from its reserves) or an external power (as in the CFA franc zone) guarantees convertibility of the domestic currency.

Movement toward the convertibility of the Kenya shilling has reflected both donor pressure and conviction by policy makers of its likely benefits. First, it helps in the dismantling of foreign exchange controls, which are cumbersome and expensive to manage and which provide wide scope for corruption and rent-seeking behavior especially if the foreign exchange allocations are narrowly defined and closely monitored. Second, a market-based exchange rate may be more efficient both in providing the appropriate incentive structure to foreign exchange earners and in allocating foreign exchange to users, reducing the scope of a parallel market.¹⁰

One concern that has been expressed in the literature (Quirk et al., 1987) is that since exchange markets are relatively thin and financial markets in general are undeveloped, market-determined rates would be more volatile, imposing a cost on the economy of hedging against it. Hence, market exchange rates would prove to be volatile, fluctuating widely in both directions in response to both internal and external shocks and hence might severely destabilize the economy. This would particularly be the case with exchange rate unification done without revamping export-promotion policies and reducing macroeconomic imbalances which impose undue pressure on the balance of payments.

This seems to have been the case in Kenya. The introduction of the interbank market in August 1992 was accompanied by a massive depreciation of the RER in 1993. The RER has subsequently appreciated in 1994–1995.

Based on the analytical framework suggested by Edwards (1989), changes in the actual observed RER are dynamically influenced by three broad factors. First is the degree of deviation of the equilibrium real exchange rate (ERER) from the actual RER observed in the previous

period; second is variation of macroeconomic policies (Z) from their sustainable levels (Z^*), representing departure of fiscal and monetary policies from their optimal levels; and third is changes in the nominal exchange rate (NER). Formally:

$$\text{DRER} = f(\text{ERER} - \text{RER}_1, Z - Z^*, \text{NER}) \quad (7.5)$$

where the variables are as defined above.

While nominal devaluation may cause a depreciation of the RER, excessive credit and monetary growth cause the actual RER to appreciate at least in the short run.

Among important determinants of the ERER, on the other hand, include: terms of trade; net capital inflows; commercial policy particularly trade taxes and quantitative restrictions; government expenditure on nontradables; and productivity growth (Edwards, 1989).

The impact of terms of trade (TOT) shocks on the ERER cannot be signaled a priori because they have counteracting income and substitution effects on the economy with the net impact a function of the source of the TOT changes. RER appreciation is however more likely following an improvement in terms of trade (and vice versa), as has been confirmed by various empirical studies on developing countries (for example, Elbadawi, 1989; Krumm, 1993; Khan and Ostry, 1991) suggesting that the income effect is dominant. It is however possible for the opposite to be the case when the substitution effect dominates the income effect or for the TOT impact to be nonsignificant. Following a TOT deterioration for example due to an increase in import prices, the ERER may appreciate if imports are competitive and have many domestic substitutes (hence the initial increase in P_t is more than counteracted by movements in P_{nt}) or if importables constitute a small proportion of tradables.

Similarly, the ERER appreciates with an increase in net capital inflows, which increase the aggregate demand for both tradables and nontradables, hence raising the prices of nontradables more than those of tradables which are determined in external markets. Capital inflows, however, may have a limited impact if they are directly tied to imports (for example, where production and investment are highly import intensive) such that these resources do not spill over into increased demand for nontradables. Net capital inflows may also induce an increase in savings to service them in the future, according to the Ricardo Equivalence hypothesis.

Trade liberalization such as a reduction in tariff rates and relaxation of quantitative restrictions on imports (hence making the economy more open) causes the ERER to depreciate because increased competition puts downward pressure on the price of nontradables relative to tradables.¹¹

The impact of an increase in government expenditures on the ERER will depend on its composition. If it favors the tradables sector, the rate will depreciate; but if it favors the nontradables sector, the rate will appreciate (Edwards, 1989). The ERER may also appreciate or depreciate with productivity growth. Technological progress which favors the tradables sector will induce an appreciation by causing a relative decline in the sector's product prices. On other hand, it will induce a depreciation if it favors the nontradables sector.

By substituting the determinants of the ERER, the following basic estimation equation is derived:

$$RER = g(TOT, KFLOW, OPEN, GEXPE, TECHPRO, Z-Z^*, \Delta NER) \quad (7.6)$$

where *RER* is the observed real exchange rate, *TOT* is external terms of trade, *KFLOW* is net capital inflows, *OPEN* is an index of the severity of trade restrictions and capital controls, *GEXPE* is government expenditure; *TECHPRO* is a measure of technical progress, *Z-Z** is an index of macroeconomic imbalances and *NER* is the nominal exchange rate.

KFLOW (as a proportion of GDP) was derived from the capital account of the balance of payments.¹² *OPEN* was proxied by the trade ratio $(X + M)/Y$ where *X* is exports, *M* is imports, and *Y* is GDP. This measures the degree of openness of the economy and hence the severity of foreign exchange controls and trade policy restrictions, particularly QRs.

GEXPE represents total government expenditure as a proportion of GDP, and *TECHPRO* shows real income growth. Many studies show economic growth to be highly correlated to productivity growth, the so-called Verdoorn's law (Tybout, 1992). There are several reasons why this is the case. Faster growth permits the exploitation of scale economies, better use of factor inputs and absorption of new technologies through investment acceleration.

Following Ghura and Grennes (1993), *Z-Z** is proxied by $(\Delta DC/M2 - \Delta y/y - 1 - \Delta NER/NER - 1 - \Delta Pf/Pf - 1)$ where *DC* is domestic credit and *Pf* foreign prices as measured by the export-weighted wholesale price index.¹³

To investigate whether the categorization of these determinants of RER into real factors with long-term effects through their impact on the ERER and nominal factors with mainly short-term direct effects is validated in the Kenyan case, each variable was first tested for its degree of integration, indicating the number of times it would need to be differenced to be included in an econometric model. Econometric theory requires that the independent variables be stationary (integrated of degree zero) if inferences are to be nonspurious.¹⁴ Second, the nonstationary explanatory variables were tested for cointegration with the RER. If economic time series are cointegrated, their relationship is most efficiently estimated by an error correction model (Engle and Granger, 1987). If cointegration is therefore found, an error correction model would be utilized to analyze short-run impacts on the RER as well as feedback effects to indicate the speed of adjustment to long-run equilibrium.

Table 7.6 shows the results from the SBDW, DF and ADF stationarity tests. The ADF test was run on one or two lags. While some of the

Table 7.6 Tests of Data Stationarity

	SBDW	DF	ADF
log RER	0.9995	-2.8506	-2.6587
Dlog RER	2.4760	-6.1975	-2.7917
log TOT	0.3406	-1.7772	-1.6040
Dlog TOT	2.7336	-7.1008	-3.6480
log KFLOW	0.3263	-1.1237	-2.0836
DlogKFLOW	1.3723	-3.303	-4.7174
log OPEN	0.9044	-2.6743	-2.2542
Dlog OPEN	2.4960	-6.197	-6.1112
log GEXPE	0.2108	-2.3675	-2.1106
Dlog GEXPE	2.3234	-5.9155	-3.4336
GROWTH	0.8389	-2.7536	-3.1450
DGROWTH	1.9488	-4.7007	-4.4904
Z-Z*	2.0654	-5.0905	-4.0949
Log NER	0.1213	1.1285	0.9908
Dlog NER	1.4943	-3.7698	-2.7429

KEY: Approximate critical values at 5 percent: SBDW 1.56, DF and ADF -3.00.

NOTES:

SBDW = Sargan-Bagwara Durbin Watson test.

DF = Dickey-Fuller test.

ADF = Augmented Dickey-Fuller test.

SOURCE: Authors' computations.

results are ambiguous, the three tests generally show evidence that the RER and the fundamentals (TOT, KFLOW, OPEN, GEXPE and GROWTH) to be I(1) series as supported by at least two of the tests. On the other hand, $Z-Z^*$ is shown to be I(0) by the three tests. While $\Delta \log \text{NER}$ is I(0) in the DF test, it is close enough to the critical values in the others such that it is taken to be stationary.

Testing for cointegration was done on residuals from a cointegrating equation. Long-run equations were estimated from an autoregressive distributed lag model with each variable lagged once to preserve degrees of freedom, with the nonstationary independent variables as regressors. The equation residuals were then tested for stationarity using the SBDW, DF and ADF tests. Table 7.7 shows the cointegration equations and Table 7.8 the test results.

These results show the following. First, terms of trade, government expenditure and real economic growth have significant negative impacts (at least on a 10 percent level), as expected from the discussion above with the government expenditure mainly on nontradables and technological progress (shown by real economic growth) mainly favoring the tradables. Both the degree of openness and net capital inflows are

Table 7.7 Cointegration RER Equations

	CONSTANT	TOT	OPEN	GEXPE	GROWTH	KFLOW	R2
RER	9.192 (4.04)	-0.317 (1.430)	-0.360 (0.64)	-0.450 (2.16)	-0.038 (1.34)	0.077 (0.82)	0.65
RER	7.987 (6.19)	-0.376 (2.41)		-0.407 (2.28)	-0.039 (1.77)	0.023 (0.61)	0.61
RER	7.497 (7.94)	-0.326 (2.75)		-0.34 (2.60)	-0.026 (1.87)		0.57

SOURCE: Authors' computations.

Table 7.8 Tests of Cointegration between RER and the Shown Explanatory Variables

	SBDW	DF	ADF
TOT KFLOW OPEN GEXPE GROWTH	1.6884	-4.2557	-4.5535
TOT KFLOW GEXPE GROWTH	1.7869	-4.3843	-4.3665
TOT GEXPE GROWTH	1.9945	-4.9796	-4.8059

SOURCE: Authors' computations.

insignificant reflecting the fact that Kenya has not undertaken deep reforms. While the RER has generally depreciated in the study period (Figure 7.8), the trade ratio for example shows that the Kenyan economy became less open over time (Mwega, 1995). The reduction in openness reflects poor export performance, particularly in the 1980s, leading to import compression. Net capital inflows as a proportion of GDP also have substantially declined since the mid-1980s.¹⁵

The evidence on the first two equations is ambiguous as to whether the variables are cointegrated or not. The third equation however seems to show evidence of cointegration.¹⁶ It is therefore the one used in the analysis that follows.

Table 7.9 shows the short-run RER model results derived from the simplification of the over-parameterized model, where in each case the current variable and its lag was included in the model. The simplification was done by systematically setting nonsignificant coefficients to zero.

Table 7.9 Modeling $\Delta \log$ RER by Ordinary Least Squares (OLS)

Variable	Coefficient	t-Value
$\Delta \log$ RER 1	0.2360163	1.62169
$\Delta \log$ TOT	-0.0424434	-0.68283
$\Delta \log$ KFLOW	0.0317224	1.19485
$\Delta \log$ OPEN	0.0774269	1.26927
$\Delta \log$ GEXPE	-0.2145663	-1.88004
Δ GROWTH 1	0.0062333	1.33506
Z-Z* 1	0.0006634	0.78134
$\Delta \log$ NER	0.4609876	5.13547
$\Delta \log$ NER 1	-0.3309701	-1.81323
ECM 1	-0.5240176	-3.17358
CONSTANT	0.0018890	0.13822

Notes:

$R^2 = .9206517$

$\sigma = .0352236$

$F(10, 15) = 17.40$ [.0000]

DW = 2.007

Testing for serial correlation from Lags 1 to 2

$\chi^2(2) = 2.722$ and F-Form (2, 13) = .76 [.4873]

ARCH Test $\chi^2(1) = .034$ with $F(1, 13) = .02$ [.8961]

CHI-Squared Test for Normality: $\chi^2(2) = .480$

Reset F-test for adding \hat{Y} hat²

$F(1, 14) = .263$ [.6164]

SOURCE: Authors' computations.

In the estimation of this equation, the independent variables are also taken to be exogenous. To formally verify this hypothesis, both bivariate and multivariate Granger-Sims methodologies were utilized to test whether previous growth in the RER significantly “caused” the current growth of the fundamentals, macroeconomic imbalances ($Z-Z^*$), and growth in the nominal exchange rate when their previous growth is also incorporated. In every equation, two lags of each variable were employed. Only in the case of net capital inflows in the bivariate case is there evidence of significant feedback effects at the 5 percent level. This feedback effect becomes nonsignificant when the other variables are incorporated in the multivariate case.¹⁷

The reported diagnostics include (a) the equation standard error (σ); (b) the LM autocorrelation test statistic; and (c) the LM Autoregressive-Conditional Heteroscedasticity (ARCH) test statistic.¹⁸ The results in Table 7.9 show that the equation explains a large proportion of variations in the real exchange rate ($R^2 = 0.92$) and has a standard error (σ) of 3.5 percent. It is marginally subject to some serial correlation but not to ARCH.

The results show the RER is to a large extent driven by the contemporaneous nominal exchange rate, which has the most significant coefficient. A large part of this impact is however dissipated in the following year. The offset is less than perfect so that nominal devaluations played a role in Kenya’s real exchange rate evolution.

The government expenditure coefficient is significant at the 5 percent level. An increase in real government expenditures caused the RER to appreciate, as they were mainly expended on the nontradables.

Though nonsignificant at the 10 percent level, net capital inflows cause a depreciation of the exchange rate in the short run. Kenya has since the early 1970s widely applied quantitative restrictions to close the gap between the demand for imports and the supply of foreign exchange, and to protect domestic industries. In the presence of a foreign exchange constraint, the volume of imports has traditionally depended on the amount of foreign exchange importers can get and the priority attached to the various imports in FOREX allocation. Mwega (1993), for example, found significant responsiveness of aggregate imports to FOREX receipts and lagged FOREX reserves in Kenya which dominated the income and relative price elasticities. Until the 1990s, net capital inflows have led to a liberalization and opening of the economy. The trade liberalization effects in a foreign exchange–

constrained economy have dominated the spending effects, causing a depreciation of the RER.

Several of the other variables also have the expected signs even though nonsignificant. An improvement in terms of trade causes an appreciation of the real exchange rate, as has been found by many empirical studies on developing countries (for example, Elbadawi, 1989; Krumm, 1993; Khan and Ostry, 1991). An increase in openness [$(X + M)/Y$] causes the RER to depreciate. Both economic growth and excessive credit growth, however, cause a depreciation of the RER.

Lastly, the error-correction term is significant at the 1 percent level and shows an average speed of adjustment of 52 percent from the actual to the long-run RER in each period.

Real Exchange Rate Misalignment

RER misalignment is formally defined by Edwards (1989) as deviations of the real exchange rate from its long-run equilibrium level, or

$$RERM = (ERER - RER)/RER * 100$$

where *RERM* is the degree of real exchange rate misalignment and the other variables are as defined above. Since *ERER* is not observable, *RERM* is approximated in various ways. One method suggested by Ghura and Grennes (1993) is to estimate the time path of *ERER* from a cointegration equation and normalize it so that it starts from a common base with the actual RER during a period when the economy was to a large extent in internal and external balance.

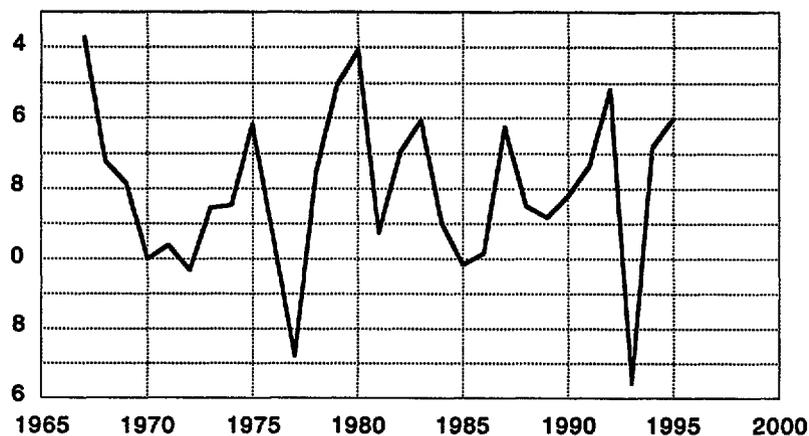
Economic observers are generally agreed that the Kenya shilling was not much overvalued in the late 1960s. This was a period when domestic prices were stable (the inflation rate was only about 3–4 percent), the external payment balances were healthy, the economy was growing rapidly, and import licensing covered only a few (seventy) commodities. Restrictive trade policies were actively applied from the early 1970s, when the economy started to experience large macroeconomic imbalances. The number of import products under license for example increased from 228 in 1972 to 2,737 by the mid-1980s (Dlamini, 1987). As done by Elbadawi and Soto (1995), we take 1970 as a year when there was both internal and external balance in the economy.

Figure 7.9 shows the estimated evolution of real exchange rate misalignment in Kenya.¹⁹ The results are fairly successful in reproducing the salient episodes and characteristics of the macroeconomic history of Kenya and is quite consistent with the series estimated by Elbadawi and Soto (1995). The shilling was substantially misaligned at the beginning of the period following the devaluation in November 1967 of the British pound and the failure by the local authorities to devalue the shilling even though it was pegged to the pound. This misalignment was reduced during the rest of the 1960s as contractionary monetary policies were implemented.

Misalignment increased in 1973–1975, following the first oil crisis. The country reacted to the ensuing recession by tightening the trade control regime and by seeking external finances, whose general policy conditionalities were spelled out in Sessional Paper no. 4 of 1975.

Misalignment reduced in 1976–77, when the country experienced an improvement in the balance of payments resulting from a large increase (80–91 percent) in the world prices of coffee and tea. The proceeds of this boom were not sterilized (for example, by putting some of them in a stabilization fund) and were fully passed on to the farmers. The resulting expansion in aggregate demand (which was compounded by

Figure 7.9 Estimated RER Misalignment in Kenya, 1967–1995



SOURCE: Author's computations.

an expansion in government expenditure and the second oil crisis of 1979) spilled into imports and produced a serious BOP crisis beginning in 1978 during which import bans, quotas, quantitative restrictions and an advance import deposit scheme were used to try to contain the situation. This is reflected in an increase in misalignment in 1978–1980.

The country adopted several World Bank/IMF programs in the early 1980s, but these failed or collapsed because the IMF-stipulated credit ceilings were exceeded while the Structural Adjustment Lending (SAL) program was poorly implemented. This is reflected in an increase in misalignment in 1982–83. A decision was hence made in 1984 not to continue with new balance of payments support programs, but instead to focus on sectoral programs. These sectoral programs were more successful, leading to a decline in misalignment in 1984–85.

The country experienced a mini coffee boom in 1986 which was not sterilized, leading to a serious BOP problem by the end of the following year. This is reflected in an increase in misalignment in 1986–87. The adverse BOP situation led to recourse to an eighteen-month IMF standby in late 1987 which was supplemented in 1988 by a loan under its Structural Adjustment Facility and in 1989 under its Enhanced Structural Adjustment Facility. Trade liberalization policies were, however, mainly implemented under the World Bank's Industrial Sector Credit covering the period 1988–89. This is reflected in a decrease in misalignment in the latter period. Although the Industrial Sector Credit was extended to 1990–91, there were reversals in this period culminating in the aid embargo of November 1991 (UNDP/World Bank, 1993), reflected in an increase in misalignment in 1990–1992.

This aid embargo was not lifted until December 1993 following the implementation of many reforms in that year, sharply reducing the degree of misalignment. Misalignment increased in 1994–95 following the sharp appreciation of the nominal exchange rate in this period.

Capital Flows and the Real Exchange Rate

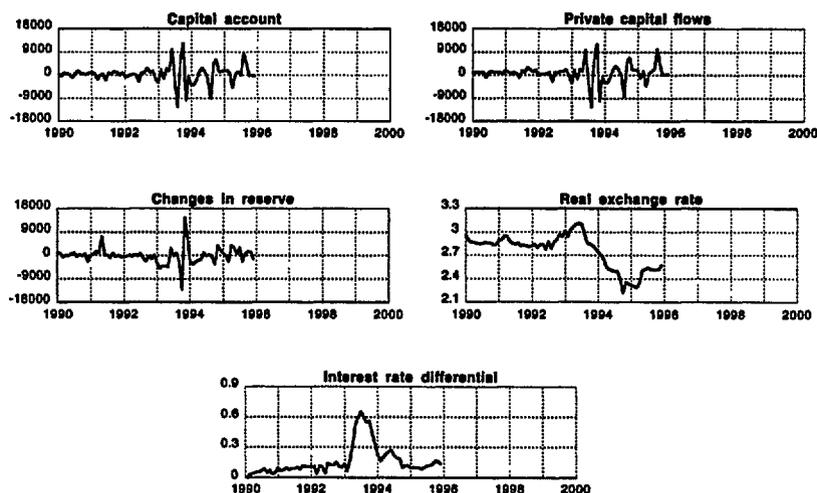
The period 1990 to 1995 has been characterized by a speed of liberalization that was never witnessed in the 1980s. However, at the beginning of the liberalization process, it was clear that macro stability had not been achieved. The result was instability in the nominal exchange rate, domestic prices and the interest rate. The widening gap in the interest rate differential induced capital to flow in to take advantage of the weak

shilling and the high returns on the short-term Treasury bills. In the process, the stock of foreign exchange reserves shot up and was also aided by the sluggish demand for foreign exchange. These capital inflows in turn led to an appreciation of the shilling, and the interest rate differential came down drastically.

The figures that follow show the movements of private capital flows, the real exchange rate, the Treasury discount rate, changes in reserves, the interest rate differential and the capital account of the balance of payments. These are graphed from monthly data from 1990:1 to 1995:12.

Data suggest that the interest rate differential, the exchange rate expectations, the forecast on inflation and the general stability that was slowly being achieved toward the end of 1993 were such that holders of foreign exchange took advantage of the liberalized regime to profit by bringing funds back, converting them to shillings and benefiting from the Treasury bills' rate. The widening gap in the interest rate differential induced capital to flow in to take advantage of the weak shilling and the high returns on the short-term Treasury bills. In the process, the changes in reserves built up tremendously and were also aided by the sluggish demand for foreign exchange. The capital inflows and

Figure 7.10 Kenya's Macroeconomic Development, 1990–1995



SOURCE: Kenya Economic Survey, various issues; Kenya Statistical Abstract, various issues.

hence the accumulation of foreign reserves led to an appreciation of the real exchange rate, and the interest rate differential came down drastically.

Figure 7.10 explains these phenomena by showing movements of the capital account of the balance of payments, private capital flows, changes in reserves (a decline means an accumulation), the real exchange rate (a decline means an appreciation) and the interest rate differential (a movement toward zero indicates that the interest rates are being equalized). These are graphed from monthly observations from 1990:1 to 1995:12. These capital inflows are not always a blessing. Their effects in the economy can be destabilizing, and their effect is also dependent on the policy responses. There has not, however, been an excessive outflow of private capital, implying that it was not composed of “hot money” that is easily triggered by an interest rate differential. But there is also no evidence that these private capital inflows have been invested in irreversible investments.

Summary and Conclusions

This chapter has traced the developments in Kenya’s exchange rate policy from the 1970s to the 1990s. It has shown that the exchange rate policy in Kenya has followed the international developments and has also been a component of structural adjustment and stabilization policies in the 1980s and the 1990s. The exchange rate policy has thus moved from a passive policy (fixed) to an active one (flexible). Its management has also impacted other macro variables, while at the same time economic management has not been entirely consistent with the chosen exchange rate regime.

The results in this chapter show that first the monetary policy has not been consistent with the targets for a competitive exchange rate and low inflation. This is because the cyclical movements of the real exchange rate are driven by shocks from the money market, and furthermore inflation is driven by exchange rate movements and money supply growth.

Second, the chapter has shown that the official exchange rate is driven by the parallel rate during the flexible exchange rate period. This was argued to be a case of backward indexing and is most prevalent in the crawling peg period.

Finally, the issue of the loss of a nominal anchor was analyzed by studying the inflation experience with exchange rate regime changes. The results showed that regime changes shock the rate of inflation and thus change the inflation profile. These changes increased the inflation inertia in the active exchange rate management period. These results are consistent with those of other researchers in other countries that moved to a crawling peg exchange rate regime.

Kenya has implemented IMF/World Bank stabilization and structural adjustment programs since the mid-1970s to control inflation and to improve the international competitiveness of the country's external sector by reducing real exchange rate misalignment, defined as the sustained deviation of the actual real exchange rate from the equilibrium real exchange. The third section of this chapter attempted to measure and to analyze the determinants of the RER as well as to trace its misalignment based on the bilateral exchange rate index against the U.S. dollar, which was found to be more cointegrated with economic fundamentals than the trade-weighted indexes.

From the cointegration (long-run) equations, the following results were found. First, terms of trade, government expenditure and real economic growth have significant negative impacts (at least on the 10 percent level) on the RER. The income effects of TOT changes have therefore dominated the substitution effect. Government expenditures have mainly been on nontradables, while technological progress (represented by real economic growth) mainly favored the tradables sector. Second, both the degree of openness and net capital inflows have insignificant effects on the RER, reflecting the fact that Kenya has been a reluctant reformer. While the RER has generally depreciated in the study period, the trade ratio shows that Kenya's economy became less open over time (Mwega, 1995). Net capital inflows as a proportion of GDP have also substantially declined since the mid-1980s.

The short-run error correction RER model, on the other hand, shows that changes in the RER were to a large extent driven by the contemporaneous changes in the nominal exchange rate. A large part of this impact is however dissipated in the following year due to the inflationary impact of nominal devaluation. The offset is less than complete so that nominal devaluations have played an important role in Kenya's real exchange rate evolution.

The government expenditure coefficient was also negative and significant, hence real government expenditures have caused the RER to appreciate. Net capital inflows, on the other hand, did not have a

significant impact on the RER consistent with the long-run results mentioned earlier. Recursive estimation showed these results to be stable even in the 1990s. Granger causality tests showed the RER to have some feedback effects on net capital inflows in the bivariate case, but the effects become nonsignificant when the other variables are incorporated.

Lastly, estimates of the degree of misalignment over time (relative to 1970 when the economy had minimal internal and external imbalances) are fairly successful in reproducing the salient episodes and turning points in the macroeconomic history of Kenya, and are quite consistent with the series estimated by Elbadawi and Soto (1995).

Appendix 7.1

Macroeconomic Policies and Exchange Rate Management: The Kenya Case

Richard Greene, USAID

First of all, I would like to thank Professor Ndung'u and Professor Mwege for the enormous effort of data collection, analysis and background research that they have put forth in the preparation of a study of this breadth and depth. I am truly glad I was merely asked to review this paper, and not to write it.

Let me begin by saying that I agree, for the most part, with the remark contained in the introduction to the effect that exchange rate policy has been the "star" among economic policy instruments in Kenya in recent years.

But progress on the exchange rate took place in an overall atmosphere of pervasive economic controls. This reflected in part an attitude of "control for control's sake" that was consistent with the legacy of British colonialism and with the prevailing intellectual climate of African socialism. It reflected in part as well a certain degree of tension between the government and the Asian business community during an extended period of "Kenyanization" of the economy.

Nevertheless, as a USAID economist in Kenya in the first half of the 1980s, I was encouraged by the appearance of evidence that the government had taken the decision to make a series of periodic adjustments to the exchange rate to reduce the serious misalignment that had emerged after the fading of the coffee and tea booms of 1976-77.

A minor industry evolved among economists in the country to try to discern, from the evidence, the central exchange rate implicit in Central Bank actions, the width of putative bands, and the currencies and trade weights being employed to implement what we all came to realize was a bona fide crawling peg.

What was more important, we were all quite pleased to make out, with a certain lag, that the operation of the crawling peg was being managed largely by the Central Bank itself, effectively depoliticizing the exchange rate issue. This was an enormous step forward. The result was a period of six or seven years during which exchange rate misalignment was pretty well controlled, although miscalculations, such as that following the mini coffee boom of 1986, were still possible.

Although the crawling peg represented an advance in its time, I believe the move in 1990 to introduce foreign exchange bearer certificates (FOREX-C), and to allow a secondary market to develop in these instruments, was a useful step toward liberalization of the foreign exchange regime. I would be very interested in knowing how and when the decision was taken to allow this secondary market to exist and develop. The elimination of all controls on import and foreign exchange transactions in 1993 was another enormous step forward, and would be followed in October 1993 by the merging of the unofficial interbank rate and the official exchange rate. The result was a bona fide floating foreign exchange system.

If the operation was successful, why is the patient dead? After all, the growth rate in the 1990s so far has averaged only 2.5 percent, after declining monotonously, decade after decade, since independence in 1963. As pointed out in one of the chapter's fascinating footnotes, average openness ($X + M/Y$) has declined nearly as monotonously, from 62 percent of national income in 1970–1975, to 54 percent of income in 1981–1985, and to 47 percent in 1991–1995. And net capital inflows as a proportion of GDP also declined from 13.4 percent of GDP in 1976–1980, to 11.5 percent in 1981–1985, to 6.4 percent in 1986–1990, and still more to 4.2 percent in 1991–1995.

What has been going on here? Without keeping you in suspense, and taking up any more of your valuable time, I'll refer you to an important remark from one of the other conference sessions: "Fiscal Policy is King." And one might add in the case of Kenya, the trade control regime is the Queen. The study by Professor Ndung'u and Professor Mwea demonstrates the extent to which fiscal and monetary policy have not been consistent with the targets for a competitive exchange rate and

low inflation. And although the mechanisms of devaluation, crawling peg and floating rates have been around for quite some time, obviating the requirement for the trade control regime to provide protection, Kenya has a well-deserved reputation for being a reluctant adjuster in this area. In this unfortunate context, the loss of the nominal exchange anchor did change the inflation profile, and did increase inflation inertia, without having yet delivered on competitiveness, openness, export expansion, export diversification and growth.

At the risk of expanding the chapter to the size of a very interesting book, I would urge that these latter considerations be rescued from the footnotes and receive expanded treatment in the text. When the time comes for the book to be written, however, further considerations of employment effects, improved income distribution and poverty reduction under the various alternative exchange systems might be undertaken.

Thank you for your indulgence with these musings.

Notes

1. Kenya had become increasingly dependent on foreign aid. For example, there was the balance of payments support, which was more than US\$400 million per year—over half the current account deficit, net of foreign loan payments.
2. The FOREX-Cs provided a significant relief to the foreign exchange since possessing them entitled one to some amount of foreign exchange without having to go through the long delays of the foreign exchange licensing process. These FOREX-Cs were purchased at the official rate from the Central Bank in foreign exchange without having to declare the source of foreign exchange. These certificates attracted an interest rate and could thus be marketed as any other paper asset.
3. By March 1993, price instability was in such a state that all financial liberalization measures had to stop to allow for a more orderly process to be worked out. The new process included stepping up weekly auctions of the Treasury bills from Kshs.1 billion to Kshs.5 billion. This led to a rapid rise in the Treasury bills' discount rate, which is viewed as a benchmark for all interest rates. A consequence of this was that the interest rate differential with the foreign interest rate was widened and hence created a conducive environment for speculative capital to flow in.
4. A "shadow program" is an unfunded IMF program which has monitorable benchmarks like the balance of payments, money supply and fiscal targets and is monitored quarterly just like an ordinary IMF program. A country gets into this kind of program for two reasons:
 - a. Good-housekeeping. The country does not need IMF funding but wants IMF approval. This provides a macro framework for Structural Adjustment Lending (SAL) from the World Bank's Structural Adjustment Programs.
 - b. The situation in the country is so bad that a country falls out of grace with the IMF. The country needs to reestablish credibility, showing that it can live with a reform program. It provides a macro framework that is necessary for SAL, and the World Bank can release loans like quick disbursements for balance of payments support, and so on. This is the situation Kenya has been in.

5. There are several events that contributed to money supply expansion in this period, but the most spectacular is the aid freeze in 1991 and the multiparty elections in 1992. Given that the central government was very reliant on foreign funds, deficit financing had to resort to domestic sources, mostly the Central Bank.
6. Fiscal adjustment has been the most difficult and fragile of the components of the structural adjustment program. One of the major problems in Kenya has been high indebtedness and mismanagement of external debt obligations. Fiscal policy thus impacts heavily on monetary policy.
7. The method usually followed is the univariate Beveridge and Nelson (1981) and the modifications of computation that have followed. However, Enders (1995) has argued that this method is not unique in that it forces the correlation coefficients between innovations in the trend and the irregular components to be unity. Enders (1995) shows that an alternative restriction can be imposed in which the correlation between the trend and irregular component is zero. This is the method we adopt in this study.
8. The proxies were derived by (1) disaggregation of the GDP deflator into trade and nontraded components; (2) estimation of P_t by price of exports (P_x); and (3) imports (P_m) with nontraded GDP deflator in the denominator; (4) PPP bilateral real exchange rate (Exchange Rate*US CPI/domestic CPI); (5) multilateral RER based on CPIs; (6) multilateral RER based on the foreign wholesale price index and domestic CPI; and (7) multilateral RER based on the foreign wholesale price index and domestic GDP deflator.
9. This seems quite common. Ogun (1995), in the case of Nigeria, and Amin and Awung (1996), in the case of Cameroon, Gabon and Congo, could not find cointegration between their multilateral RER and the fundamentals.
10. For a succinct but somewhat partisan discussion of the case for currency convertibility, see *IMF Survey*, April 1994.
11. As pointed out by Krumm (1993) however, the opposite may be the case where effective protection is negative. Nontradables or importables are more capital intensive than exportables so that the substitution effect of trade liberalization dominates the income effect.
12. KFLOW is expected to be the most volatile of the fundamentals, reducing the probability of cointegration with the RER. A three-year moving average was therefore utilized to remove the stochastic components of the short-run net capital inflows.
13. This expression was derived from the quantity theory of money assuming a constant income velocity and the operation of the law of one price in the long run, that is, $P = \text{NER} * P_f$. Hence $\Delta \text{Log } M = \Delta \text{Log } \text{NER} + \Delta \text{log } P_f + \Delta \text{Log } y$. From the money supply identity $\Delta M/M = \Delta D/M + \Delta R/M$, excess domestic credit in the economy is derived as $\Delta D/M - (\Delta \text{Log } \text{NER} + \Delta \text{log } P_f + \Delta \text{Log } y)$ on the basis that $\Delta R/M$ is zero in the steady state.
14. The RER will also be tested for stationarity to determine whether it is influenced by economic factors of a relatively permanent nature or self-correcting forces that indicate temporary elements in its dynamics. This is equivalent to testing whether the nominal exchange rate and relative prices (in logarithms) are nonstationary but cointegrated. The RER is $I(1)$, therefore supporting the first case.
15. The following are the average data on openness ($X + M/Y$) and the proportion of net capital inflows in GDP.

	OPEN	KFLOW
	%	%
1970-1975	62.0	7.4

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1976–1980	63.6	13.4
1981–1985	53.8	11.5
1986–1990	51.6	6.4
1991–1995	47.0	4.2

16. These inferences are based on critical values for three to five explanatory variables and fifty and one-hundred observations cited in Adam (1992). Critical values for less than fifty variables are not available.
17. The F-Statistic was calculated by:

$$F(J,DF) = \{(RSSc - RSSnc)/J\}/(RSSnc/DF)$$

where $RSSc$ and $RSSnc$ are the residual sum of squares of the constrained and non-constrained equations respectively, J is 2 and 12 respectively, and DF is the degree of freedom in the nonconstrained equation. The estimation results were:

Bivariate			
	C	NC	F-Stat.
log TOT	0.5410	0.4925	1.0340
log KFLOW	4.4518	2.8408	5.9545
log OPEN	0.4381	0.4174	0.5207
log GEXPE	0.2463	0.210	1.8150
GROWTH	91.4374	89.5679	0.2192
Z-Z*	8,026.9840	7,723.1740	0.4130
log NER	0.4419	0.3729	1.9429
Multivariate			
	C	NC	F-Stat.
log TOT	0.3604	0.2831	0.2048
log KFLOW	1.1615	1.1055	0.0380
log OPEN	0.2847	0.2272	0.1898
log GEXPE	0.0656	0.0380	0.5447
GROWTH	31.6516	27.4856	0.1137
Z-Z*	1,481.6880	1,169.4140	0.2003
log NER	0.0919	0.0634	0.3371

The critical values are $F(2,21) = 3.47$ and $F(12,9) = 3.07$ respectively at the 5 percent level.

18. For an interpretation of these tests, see Adam (1992).
19. The ERER index was actually measured by $\exp(a_1*(\text{Log TOT}) + a_2*\text{Log GEXPE} + a_3*\text{GROWTH})$ where "a"s are coefficients from the real exchange rate cointegration equation. Static expectations are assumed so that actual and expected values do not deviate substantially. We also do not distinguish between sustainable and nonsustainable changes, particularly in the case of TOT.

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CHAPTER 8

Final Discussion and Conclusions

Robert Mundell

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Robert Mundell: Thoughts in the Revolution of Macroeconomic Policy

What a revolution has occurred in thinking about macroeconomic policy over the past century! Think what Alfred Marshall would say if he were attending this seminar on exchange rates. His was a stable century where “God’s in his Heaven and all’s right with the world!” Marshall lived most of his life in a world that had a stable international monetary system. In 1912 he made the astonishing statement: “The most important thing that can be said about currency is that it is unimportant!” But here we have an entire workshop devoted to specific currency questions!

The Advent of Monetary Management

In Marshall’s time, the monetary standard—whether bimetallism before 1873 or the gold standard after it—meant fixed exchange rates, a monetary policy automatically governed by the balance of payments, a balanced budget, and the imperative: “Don’t tamper with gold!” The gold standard gave the world an astonishing degree of monetary unity while the “Golden Brake” (Schumpeter’s words) kept world inflation under control. There were, to be sure, Kondratief-like long swings of

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the price level, but gentle inflation was followed by gentle deflation so that, over the long run, gold was stable.

World War I shattered that system. With inflationary finance, gold became unstable. Its real value fell by half. Prices soared even in countries which, like the United States, continued on the gold standard.

After the war, exchange rates fluctuated. Ideas began to change. John Maynard Keynes, in his 1922 book, *Tract on Monetary Reform*, made the distinction between “internal stability”—a stable price level—and “external stability”—stable exchange rates.¹ He definitely favored the former over the latter, at least for Britain. He had seen the erratic policy of the Federal Reserve in the postwar period, when, during the 1920–21 recession, it brought prices back to the 1914 level.

Governor Benjamin Strong of the Federal Reserve Bank of New York was a quick study. He organized the Open Market Committee, centralized the short-term operations of the system, and elaborated a revolution in monetary policy, as succinctly indicated in the following exchange before the U.S. Congress Committee on Stabilization:

Mr. Williamson: “Do you think that the Federal Reserve Board could, as a matter of fact, stabilize price levels to a greater extent than they have in the past, by giving greater expansion to market operations and restriction or extension of credit facilities?”

Governor Strong: “I, personally, think that the administration of the Federal Reserve System, since the reaction in 1921, has been just as nearly directed as reasonable human wisdom could direct it, toward that very object.”

With the announcement of a shift to internal stability, the practice of monetary management was on its way.

The Return to Gold

The European countries, however, were nostalgic for the stability and prestige of gold. But there were severe problems that suggested in advance that an early return to gold would be unwise. World gold production had fallen in half; the U.S. price level, despite the postwar recession, was still a third higher than in 1914 (lowering the real value of the 1914 level of gold balances); over half the monetary stock of

gold was in the United States, and unstable exchange rates had increased the need for reserves. In addition to these factors, a return to the gold standard would necessarily bring with it a sharp increase in demand for gold. All these factors combined to affirm that a return to gold would be extreme folly.

Nevertheless, the political dynamics brought about a return to gold. Recovering from its hyper-inflation, Germany, in 1924, was the first to stabilize. Britain, hopeful of regaining its financial hegemony, stabilized the next year and at the old parity. France came aboard later with stabilization at a rate that undervalued the franc and a monetary law that made France a suction cup for gold. Much of the rest of the world followed.

By the end of the 1920s, three-quarters of the world's monetary gold stock was in the hands of either the United States or France. Throughout the 1920s, there had been much discussion of the need for "economy on gold." Now there was a scramble for it. Not only governments (especially France) were hoarding, but the public followed the example of their governments.

The postwar return to gold was a colossal blunder. The problem was not simply—as many writers have alleged—that Britain restored gold at its old parity, overvaluing the pound and increasing unemployment. The mistake was more fundamental. The return to the gold standard increased the gold requirements of the central banks adhering to it and created a scramble for gold. Tight money policies led to deflation, bank collapses and the Great Depression.

Officials and economists had still not learned the lesson that massive shifts onto or off of the gold standard would make gold unstable. The gold standard, not the mismanagement of it, was blamed for the Depression. It was doubly unfortunate that the Federal Reserve System did not follow through—after Strong's death—on its 1923 intentions. Instead of maintaining price stability, it gave overriding importance to its commitment to gold and allowed itself to be dragged into the greatest depression the world had ever seen.

The British were luckier—or smarter. Finally realizing the mistake of 1925, they opted out of the deflationary gold standard in September 1931. An important part of the world went with sterling. At the Ottawa conference of 1932, the monetary report effectively established an invitation for the countries of the British Empire to stabilize exchange rates with sterling, with the recommendation that Britain herself reflate and then stabilize the price level. The sterling area was more formally

established the following year when, after the adjournment of the World Economic Conference, the British Empire Currency Declaration endorsing the Ottawa conclusions was issued on July 27, 1933.

Monetary management and eclecticism now replaced automaticity. Even rigid gold standard advocates like Professor Kemmerer of Princeton University acknowledged, "The public should not be unduly scared by the term, 'managed currency'; all currencies have in recent years been more or less managed, even the gold standard currencies themselves." The exchange rate was elevated to an instrument rather than a target. Remember Joan Robinson's article on "beggar-thy-neighbor" policies. In a deflationary world, with deflationary expectations, devaluation began to be looked upon as a vehicle for capturing markets, improving trade balances, and increasing employment.

The United States hung on for dear life to gold while it dragged itself and the world into the slough of depression. Nevertheless, the dollar made a comeback. President Franklin Delano Roosevelt had taken the dollar off gold in one of the first acts of his administration. The downturn reached bottom in 1934. Roosevelt now wanted to reflate—to restore, as he said, the price level of 1926. To this end, he established a higher price of gold at \$35. The theory was that just as the old gold price of \$20.67 had brought the U.S. price level down to its 1914 level, so an increase in its price, by establishing the reserve base for additional monetary expansion, would ratify and restore the price level of the 1920s. It is unfortunate that this advice had not been taken in 1930, before the deflation had done its dirty work.

The Convertible Dollar Standard

The \$35 gold price was to last from 1934 until 1971. Because the United States had become by far the dominant economy, the dollar became the basis for the international system that was endorsed (but not created) at Bretton Woods in 1944. This system could not be considered a "gold standard." Gold had become a mere passenger in the dollar system. But the external convertibility of gold at a fixed price gave the dollar a prestige and uniqueness that enabled other governments to fix their currencies to the dollar.

There now began a monetary process that, for the world economy, was unique. Confidence in the dollar, its use as the major intervention currency and the fact that it could be held in interest-bearing form made

it the currency of choice in foreign exchange reserves. The accumulation of dollars was a capital inflow for the United States that financed the U.S. balance of payments deficit. As long as countries wanted to accumulate dollars, they would earn them through balance of payments surpluses; the U.S. deficit then became the residual of the rest-of-the-world's surpluses. The problem was that these dollars were potential claims on the U.S. gold stock; their accumulation was to put the system on a collision course with the U.S. convertibility pledge. Finally, in August 1971, the dollar became inconvertible, and two years later the system broke up into flexible exchange rates.²

Meanwhile, countries had to formulate guidelines for macroeconomic policy under fixed exchange rates. In the realm of theory, there was confusion. Under fixed exchange rates, equilibrium required that monetary policy be passive. Most of the European countries that had pegged their currencies to the U.S. dollar—untainted by Keynesianism—stumbled onto the truth that equilibrium required two policies: first, a monetary policy that was determined by the balance of payments; and second, a balanced budget.

Across the waters in the United States, however, things were different. At the end of World War II, Keynesians—using the consumption function model without taking into account liquid assets—had predicted a postwar depression. The Full Employment Act was enacted in 1946 to make full employment a prime goal of economic policy. Fighting the threat of deflation, there was little concern for the dangers of inflation or disequilibrium in the balance of payments.

Inflation was indeed substantial in the early postwar period. Huge stores of liquid assets had been accumulated under conditions of rationing and scarcity; and when price controls were lifted (without any attempt on the part of the Federal Reserve to reduce liquidity), prices soared. Yet with two-thirds of the world's monetary gold reserves, and Europe, with depreciated currencies, even more inflationary, the United States did not have to concern itself—for the moment—with its balance of payments. The postwar inflation had the side effect of slashing the U.S. debt-GDP ratio (which had grown during the war to 125 percent in 1945).

Caught in the grips of Keynesianism, most economists in the United States were relieved that inflation rather than unemployment had proved to be the major problem. But inflation without balance of payments problems served to reinforce the belief that monetary and fiscal policy could be devoted to employment and growth targets as if the United

States were a closed economy. It was the closed-economy version of macroeconomics that dominated the textbooks of the 1940s and 1950s.

History now repeated itself. Just as the Federal Reserve could, in the 1920s, follow internal policy targets, so, in the 1940s and 1950s, policy was discussed as if the United States were a closed economy. In the 1950s the conventional wisdom—led by Paul Samuelson and James Tobin—came to be the “neoclassical synthesis.” Low interest rates were urged to spur economic growth coupled with a fiscal surplus to drain away the inflationary implications of easy money. That policy was adopted in the early years of the Kennedy administration when Tobin was a member of the Council of Economic Advisors, and it was endorsed by the IMF.

In September 1961, I joined the staff of the IMF and had the task of studying the policy mix. There were three recommendations. As already noted, the neoclassical policy mix pointed to easy money and a tight budget. Keynesians, as represented by Leon Keyserling, the first chairman of the Council of Economic Advisors, were recommending easy money and an expansionary budget. The Chamber of Commerce, concerned about inflation and fiscal prudence, recommended tight money and a tight budget.

My analysis, however, pointed to the fourth policy mix: tight money to protect the balance of payments coupled with tax cuts to spur growth and employment. In the context of what was essentially a Keynesian model (No other model would receive any attention in those days!), I proved³ that the alternative recommendations would lead away from equilibrium. In January 1963, President Kennedy announced the shift to my policy mix. The tax cuts, passed in the summer of 1964, inaugurated one of the longest expansions in U.S. history.

The Advent of Flexible Exchange Rates

The postwar anchored-U.S. dollar standard had severe defects, and it did finally break down. U.S. monetary policy set the pace for world monetary policy, and the U.S. inflation rate became the floor inflation rate for the European countries that had moved to a surplus position. Europe wanted the United States to reduce its inflation rate and correct its balance of payments. The United States at first promised to correct its deficit⁴ and then, in the grip of the Vietnam War, tried to get the surplus countries to appreciate their currencies. The European counter to this

argument was that the inflationary country should be adjusting in the interests both of its own economy and the rest of the world.

Despite these defects, however, the performance of the international economy under the fixed rate system was much better than that after fixed rates had been abandoned. Countries adhering to the monetary standard experienced, on the average, inflation rates lower than 3 percent in the two decades between the end of the Korean War and the move to floating exchange rates in 1973. Although the U.S. dollar standard did not possess the same degree of inflation control as the gold standard, it was much better than the flexible-rate system that followed it.

Table 8.1 demonstrates that for the major countries, on grounds both of inflation and growth performance, the earlier period was much better than the later period. It is apparent that the rates of inflation are higher and the rates of growth lower *in every single case*. The experience of the G-7 countries—the pacesetter for the world—reflected the consequences of the breakup of the international monetary system into a regime of flexible exchange rates.⁵

A flexible system of exchange rates was, of course, by no means a new phenomenon in 1973. In the past, however, flexible exchange rates had emerged, for the most part, out of the exigencies of war and revolution. There were some exceptions. One was the argument of Thomas Attwood, a Manchester economist writing early in the nineteenth century; he argued for flexible rates as an alternative to Britain's deflationary return to the gold standard after the Napoleonic Wars. Irving Fisher in 1912 and Keynes in 1922 advocated a standard based on price stability as an alternative to the gold standard. Frank Graham

Table 8.1 Inflation and Growth, Averages, 1963–1972 and 1973–1982

Country	Inflation 1963–1972	Inflation 1973–1982	Growth 1963–1972	Growth 1973–1982
U.S.	3.5	9.0	3.8	1.6
Japan	5.4	8.3	9.7	3.5
Germany	3.1	5.2	3.6	1.9
France	4.4	11.4	5.3	2.5
United Kingdom	5.3	14.7	2.9	0.8
Italy	3.8	17.4	4.6	3.0
Canada	3.6	9.3	5.3	3.0

SOURCE: WEFA, *Historical Statistics*, July 1993.

had advocated flexible exchange rates in the 1940s as part of his scheme for a commodity reserve currency. Canada had adopted flexible exchange rates in violation of IMF rules in 1950 before returning to fixed rates in 1962.

It was, however, the influence of an unlikely pair of economists which did most to foist flexible exchange rates on the world in recent decades. They were James Meade, an English liberal socialist, and Milton Friedman, an American conservative libertarian. Meade saw flexible exchange rates as a way of allowing macroeconomic planning on a national scale while preserving, as he thought, the benefits of a market economy. Friedman saw them as a preferable alternative to the panoply of discriminatory trade and exchange controls that had sprouted up all over the world. That was back in 1950. It is interesting and very relevant that these two greatly respected economists were from the two countries that have been at the center of the international monetary system over the past two centuries.

The early arguments made a case for flexible exchange rates. “Fixed prices” smack of wartime controls. Initially, Friedman’s argument was that flexible rates would replace postwar controls. In the Tinbergenian policy matrix, two extra degrees of freedom appear to be obtained, as the exchange rate is shifted from the target to the instrument category.

Alternative Monetary Rules

Less naively, the choice was not simply fixed or flexible exchange rates, but alternative monetary rules. No inflationist, Friedman recommended that a rule was to target the money supply (or its rate of change) and let the exchange rate and the price level adapt. It is this model that must be contrasted with the alternative to target the exchange rate and let the money supply and the price level adapt. The third possibility is to target the price level and let the exchange rate and the money supply adapt. The three possibilities are noted in Table 8.2.

In an abstract static general equilibrium model, these systems are formally equivalent. With three equations representing the excess demands for goods, money and foreign exchange and three variables—the money supply, the exchange rate and the price level—and the assumption of homogeneity, there is one degree of freedom. The static equilibrium will be invariant with respect to the choice of numeraire.

Table 8.2 Alternative Fixed Points of Economic Policy

System	Fixed point	Variable	Variable
A	Money Supply	Exchange Rate	Price Level
B	Exchange Rate	Price Level	Money Supply
C	Price Level	Money Supply	Exchange Rate

Policy assignments in the real world, of course, are more complex. Monetary management requires an assignment of instruments to targets that will optimize price level stability. Let me give you my views on the three assignments.

The monetary rule is the weakest of the three systems. It is almost never optimal to fix the money supply or its rate of growth if the objective is to achieve price stability. There are too many different definitions of money; its measure is not easily obtainable on a day-to-day or even weekly basis; the demand for money is quasi-random in the short run, being influenced by exchange rate and interest rate expectations; the meaning of money is constantly changing with innovation and, even if a single definition of a monetary target could be agreed on, it would be rendered obsolete by innovations; and so on. Monetary targeting has failed in every country in which it has been tried.

This is not to say—to repeat the obvious—that policy makers should not carefully monitor the money supply; obviously all the variables in an economy have to be watched; policy makers will always want to pay attention to the information implicit in the monetary aggregates. Especially in situations of high inflation, stability will not be achieved without control over the money supply. But the link between the money supply and the price level is too elastic to be suitable as a target.

The Exchange Rate Anchor

Not so the exchange rate. The value of the exchange rate is well known on a daily and even hourly basis. It forms a suitable index on which to base expectations. A commitment to maintain a fixed exchange rate provides a guideline about future monetary policy. For small, open countries, the exchange rate is the most important price in the economy and the best indication of the value of money. When a small country fixes

its currency to the currency of a larger partner, it will eventually get the inflation rate of its partner.

Obviously, the choice of a partner is important. The partner economy should be both large and stable. Size is important because, like a big oceangoing liner, it is immune to the tides of speculation. Stability is important; there is little advantage to fixing if the partner's inflation rate is higher than the inflation preferences of the fixing country. A fixed exchange rate also helps a country to gain access to the money and capital markets of its partner.

Fixing the exchange rate establishes monetary discipline; the balance of payments governs the change in reserves which, if not offset by changes in domestic assets of the central bank, will affect the money supply in such a way as to establish equilibrium. What is often not realized, however, is that a fixed exchange rate also imposes fiscal discipline. A budget deficit would set in motion speculative forces that would undermine the fixed exchange rate. If fixed exchange rates have become rare, it is because profligate governments have not come to grips with the problem of establishing fiscal balance.

Fixed exchange rates, however, is not an alternative for all countries. It would not work for countries that cannot achieve fiscal balance and do not have access to borrowing; inevitably, monetization of the deficit would conflict with the monetary policy needed to maintain the exchange rate. Exchange rate adjustment is inevitable in countries that are inflating relative to their neighbors.

Nor would fixed exchange rates be an alternative for a country which, for economic or political reasons, cannot find an appropriate partner currency. The U.S. dollar is the obvious default currency because it is the only global currency, but political considerations might rule out a dollar fix in some countries. Such countries might choose to peg to a basket of currencies, such as the SDR or the European Currency Unit (ECU) or a tailor-made basket.

It should be realized, however, that, other things equal, the use of a basket is inferior to a single-currency peg. One of the great advantages of a fixed exchange rate is the clue it provides to the price level, interest rates and future monetary policy. The more currencies in the basket, the more the unit-of-account advantage of fixed exchange rates is lost. The connection to capital markets is also less effective.

European and Asian countries can choose between the U.S. dollar, deutsche Marks (DM) or yen. Many European countries would choose the DM. However, it should be realized that the DM transactions area

is hardly a quarter of the dollar transactions area. Nevertheless, because of the attractions of the European Union, and the probability that it will advance toward European Monetary Union (EMU), the political advantages of a DM peg may outweigh its economic disadvantages.

Price Level and Mixed Anchors

It goes without saying that a fixed exchange rate is not an option for the U.S. dollar. Mexico or Canada or Hong Kong can fix their currencies to the dollar, but the United States cannot fix the dollar to the peso or the Canadian or Hong Kong dollars. With the "n-th" currency with the largest transactions domain, the United States cannot peg another currency without dominating that country's monetary policy. The United States therefore must have a mixed policy, paying attention to the inflation rate, major exchange rates and the price of gold.

The most important ultimate policy target is the inflation rate. An inflation rate target between 1 percent and 2 percent would be appropriate, allowing for the acknowledged upward bias of the consumer price indexes due to undercounting of new products and innovations in the service industries. But ignoring the exchange rates and the price of gold would be a serious mistake. Inflationary impulses typically affect first the exchange rate and the price of gold before they have worked through to the price level. Inflation in the consumer price index typically has to wait for inflationary pressure to affect wage rates, which sets in motion contractionary policies too late.

In the special position of the United States, a movement upward of the price of major foreign currencies combined with an increase in the U.S. dollar price of gold is almost certainly an indication that monetary policy is too loose, whereas the opposite is a warning that monetary policy is too tight. Exchange rates and the gold price are leading indicators of changes in the inflation rate. This phenomenon is well illustrated by the mistakes made by the Federal Reserve between 1979 and 1983. In the years 1979 and 1980, the dollar was falling, the price of gold was soaring, and the inflation rate had jumped, respectively, to 11.3 percent and 13.5 percent.

The Federal Reserve was guilty of the opposite mistake in 1981 and 1982. Money was tightened, the dollar soared on exchange markets, and the inflation rate came down to 10.4 percent in 1981 and 6.2 percent in 1982. The brakes had been slammed on too heavily and unemploy-

ment soared to 11 percent. While the second mistake was more understandable than the first—the Volcker Federal Reserve had to deal with an inflation situation that had gotten out of hand—a slower disinflation would not have sacrificed so much output and employment.

I want to conclude by saying something about fiscal policy. As we have seen, under the gold standard, a balanced budget was looked upon as the hallmark of sound finance. The Keynesian Revolution at first undermined that idea, and an era of fiscal experimentation was inaugurated. But under the postwar monetary system, based on exchange rates fixed to a gold-convertible U.S. dollar, there was little scope for the exercise of fiscal expansionism; budget deficits were quickly punished by speculators against the currency.

With the breakdown of the fixed exchange rate system, however, the floodgates were opened to government spending. In Table 8.3 below,

Table 8.3 The Tax Wedge: Government Expenditure/GDP (percent)

Country	1963	1993	Change
Japan	13.6	26.3	12.7
Switzerland	18.5	33.1	14.6
United States	27.5	34.4	6.9
Australia	21.9	37.5	15.6
New Zealand	23.7	37.5	13.8
United Kingdom	30.1	40.6	10.5
Ireland	25.0	41.0	16.0
Spain	18.2	42.6	24.4
Portugal	17.4	42.7	25.3
Greece	18.7	45.8	27.1
W. Germany	30.4	46.6	16.2
Austria	31.3	48.1	16.8
Canada	24.7	48.7	24.0
France	33.5	51.2	17.7
Italy	26.8	51.6	24.8
Finland	23.8	53.1	29.3
Norway	29.3	54.1	24.8
Belgium	28.3	55.8	27.5
Netherlands	29.8	56.2	26.4
Denmark	27.0	60.4	33.4

Source: Adapted from R. A. Mundell. 1995. "Unemployment, Competitiveness and the Welfare State." *Rivista di Politica Economica*.

government spending is presented as a percentage of GDP for the years 1963 and 1993. The countries are ranked in increasing order of government spending. It may be seen that in 1963 the shares of government spending in the countries ranged from a low of 13.6 percent for Japan to 33.5 percent for France. In 1993, the lowest share was again Japan, but it had doubled to 26.3 percent. The highest share was no less than Denmark's 60.4 percent, more than double the share of 27 percent in 1963. This is nothing short of a spectacular revolution in the role played by government in the economy.

The phenomenal increase in government spending has altered fundamentally concepts of fiscal policy. High government spending means either high taxes or high budget deficits. In the event, both have taken place. Tax revenues as a share of GDP have of course also soared. Most of the increase in government spending has been financed out of taxes. Nevertheless, over these decades, fiscal policy took a sharp turn for the worse. A few examples suffice: Italy's deficit ranged from 0.9 percent to 4.4 percent between 1963 and 1970, from 5.9 percent to 12.8 percent between 1971 and 1982, and from 9.5 percent and 12.6 percent between 1983 and 1992. Italy's situation is more spectacular than many of the other countries, but they all experienced bigger deficits in the decades of flexible exchange rates than in the decades of fixed rates.

A Proposal for Fiscal Reform

Monetary discipline is weakened under flexible exchange rates. Under fixed exchange rates, a balance of payments deficit leads to a loss of reserves, which brings about an immediate reduction in the money supply (unless it is sterilized by expansion of domestic credit). Under flexible exchange rates, a balance of payments deficit leads to depreciation of the currency without any change in the money supply.

Advocates of flexible exchange rates once argued that currency depreciation would be as potent a threat to the monetary authorities under flexible exchange rates as is a loss of reserves under fixed exchange rates. Hardly anyone believes this dictum anymore. Currency depreciation has become a habit to which, with few exceptions, all the developing and several industrial countries have become accustomed.

Fixed exchange rates also provided a measure of fiscal discipline that is lacking in a system of flexible exchange rates. Under fixed rate, fiscal discipline is enforced quickly, because a budget deficit creates the

possibility that it will be monetized, putting a devaluation premium in interest rates and aggravating the budgetary problem. Under flexible rates, fiscal discipline is imposed mainly by the threat of default.⁶ Under fixed rates, currency risk precedes default risk, braking the buildup of debt, whereas under flexible rates, deficits are deterred mainly by default risk.⁷

Although this observation holds for most of the developing countries, it has some application also to the developed countries. Consider, for example, the case of Italy, hoping to enter European Monetary Union with other countries in 1999; Italy has a debt-GDP ratio of slightly less than 125 percent, a deficit-GDP ratio of about 6 percent (in the middle of 1996) and interest rates of about 9 percent. If Italy were admitted to EMU, currency risk would be ruled out and the only penalty from higher deficits would be a premium based on the risk of default. Default risk is a much more distant possibility than currency risk.⁸ Under fixed exchange rates, currency risk acts as a buffer, an early error signal, inhibiting excessive deficits before default risk has become important.

There is an externality associated with government debt. The externality is associated with the frequency of changes in government. Borrowing eases the national budget constraint in the present at the expense of the budget constraint in the future. Overborrowing arises because the borrowing government enjoys the benefits of current liquidity and leaves the cost of borrowing to future governments. This is patently obvious in the case of tyrannies. But it has also been the case for democratic governments. The governments that incurred the huge debts that led up to the 1982 debt crisis escaped scot-free while future governments had to pick up the pieces.

There is nothing wrong per se with international borrowing (and lending). Capital movements have legitimate functions in smoothing consumption and in increasing investment; in general, capital inflows enable a country to achieve objectives earlier than would otherwise be possible. If the capital inflow is matched by productive investment, the debt can be serviced and amortized with a net gain to society. However, much of the public borrowing (and some private borrowing) is not of this form; it is instead used to increase government spending on consumption programs. Because the government is—initially—credit-worthy, capital inflows to increase sovereign debt can take place without any associated increase in real capital. The debt limit can be stretched further by pledges of national assets as collateral. When this occurs, it becomes increasingly clear that the debt has passed its optimal level.

There are too often too few voices raised against excessive national borrowing. During the borrowing process, with current account deficits financed by foreign savings, the public experiences the euphoria of higher consumption, myopic to the inevitable pain of the subsequent austerity.

An enabling factor in building up a high debt position has been the practice of borrowing in foreign currency; this is analogous to providing foreign currency cover on domestic loans.⁹ The debt-carrying capacity of a government can be stretched much further if it can be denominated in foreign currency. In a national emergency, the opportunity provided by this possibility is an advantage. More often, however, it is used to conceal a deterioration in the financial condition. It is a device for delaying rather than financing adjustment. Mexico's recourse to *tesobonos* in 1994 is only the most recent example of a practice that has become much more frequent since the advent of flexible exchange rates. The externality associated with government borrowing in general is greatly magnified by borrowing in foreign currency.

The consequences of the now pervasive practice of issuing debt in foreign currency have not been fully realized.¹⁰ Prior to the introduction of this practice, government access to international capital had been contingent on maintaining monetary stability, in order to have access to credit in local currency at reasonable interest rates. When this problem is "finessed" by government issues of foreign currency-denominated bonds, the debt-issuing capacity of the government depends only on default risk. Indebtedness rises, interest penalties soar, and lending dries up only when the limit set by default risk is reached.

There are two constitutional reforms that would go most of the way to correct situations and would be beneficial both to the borrowing countries and to the stability of the international financial system. One reform would require a vote of the legislature for each placement of securities denominated in local currency. A second reform would require a referendum for each placement of securities denominated in a foreign currency.

The advantage of these reforms is obvious. These reforms would put federal spending on the same footing as that of junior governments. Because the second requirement is stiffer than the first, governments would have a strong incentive to keep interest rates down, which would require a stable monetary program. It would encourage, for example, a restoration of a fixed exchange rate system with semiautomatic adjustment along lines of which a currency board represents the limiting case.

Elaine Grigsby: Macroeconomic Policies and Exchange Rate Management

Exchange rate management is a difficult subject on which to speak because the literature is vast and it seems as if there is hardly anything new to add.

Exchange rate management remains an important issue for developing countries today and an important component of macroeconomic stability. Some would say that exchange rate management has become more complex with increased openness in the international economic system and integration of financial markets.

After the collapse of the Bretton Woods agreement in 1973, there was enthusiasm for introduction of flexible exchange rates. As the decade passed, people realized flexible exchange rates were not a panacea. Flexible exchange rates could be volatile since exchange rates not only equilibrated goods markets but asset markets. The benefits of a nominal anchor for high-inflation countries soon became apparent.

Since the disenchantment with flexible exchange rates, there has been much discussion centered on which exchange rate regime is most appropriate for developing countries—flexible rates or a fixed rate. Some argue that the regime does not matter. What matters is whether the appropriate macro policy package is adopted and implemented. Others argue that developing countries do not have a choice and need to adopt the fixed exchange rate, that is to use the exchange rate as the nominal anchor to reduce inflation. However, doing so creates a problem in moving away from the fixed rate if the rate becomes overvalued because the fixed rate did not reflect the long-term fundamentals if the long-term fundamentals changed. How does one achieve external balance as terms of trade are changing? What are implications of capital flows for exchange rate management? These are real problems for developing countries. The past twenty years have provided some evidence from developing countries on how best to manage exchange rates. Yet events constantly motivate rethinking of the conventional wisdom.

One of the initial reasons for having the workshop was to hear and discuss current thinking on alternatives of exchange rate-based stabilization (ERBS) and money-based stabilization (MBS). Based on evidence from Peru presented in Chapter 5 and the few other money-based stabilization examples available, it indeed seems that the major difference between the two alternatives is in timing but not in impact.

The conclusion was that the MBS resulted in fiscal adjustment and inflation reduction, both positive results of ERBS. The difference was that the MBS resulted in a lag in increase in output relative to the ERBS.

But real exchange rates appreciated with both the exchange rate- and money-based programs, one of the primary reasons for dissatisfaction with the exchange rate anchor. Interest rates also increased with money-based stabilization, not necessarily a problem with the exchange rate anchor. One important conclusion is that the money-based stabilization program does not provide relief for the two major concerns with economic stabilization—external adjustment and overvalued exchange rates, and high interest rates.

One problem with the exchange rate anchor has been that once it's selected it's difficult to adjust if the rate was selected at the "wrong" level, or if fundamentals change, without undercutting the stabilization program. I will rely on the Nicaragua experience for an example. As Ulrich Lacher, World Bank economist, noted, the Nicaragua story is not finished, but exchange rate management has not been the key problem. That was not as clearly the case in 1992, one year after stabilization. When the exchange rate-based stabilization program was announced in March 1991, and the new currency was issued at a devalued rate, this was the third attempt to stabilize runaway inflation. A major effort was successfully undertaken before the program was announced to negotiate wage increases to levels that would permit a real devaluation. The program was successfully introduced and inflation dropped. Money demand also increased.

However, one year into the program, pressure began to build for depreciation of the currency. Exporters began to complain that the currency was overvalued and hurting exports. The situation was complicated by the slowdown of foreign assistance midway through the year which developed out of political polarization between groups in Managua, some of whom had allies on the U.S. Capitol Hill. The halt in foreign assistance in the summer of 1992 meant that the already low level of foreign reserves was jeopardized, also jeopardizing the ability to support the exchange rate and the stabilization program. Six months before the end of 1992, it was not clear that the government would not run out of foreign reserves. Yet they were afraid to change the exchange rate for fear of losing confidence in the low inflation rate. To be forced off of the rate would ignite speculation and flight to U.S. dollars. To the credit of the economic cabinet, the government took on the issue head first and explored options for alternative exchange regimes, even

though it was very controversial and any outcome was likely to be uncertain. The options ranged from adjustment of the rate but keeping the anchor, to moving to completely flexible rates. The decision was finally taken to maintain a real exchange rate, adjusted monthly after preannouncing the rate. The new system was enacted in January 1993.

Someone has said that expectations were not important—possibly not from the perspective of model building or from analyzing developments from Washington, D.C. But on the ground, expectations play an important role in how governments manage crisis, as well as influence the end result.

In Nicaragua, commerce stopped two days before the announcement of the stabilization program in March 1991. It may be that it was announced on that date because expectations had reached such a point that it could not be delayed further. When pressure for devaluation mounted in 1992, expectations of the devaluation held back policy makers for fear of currency flight.

Money creation is a key problem in high-inflation countries. As noted earlier, regardless of the stabilization regime, there is a response to the shock, whether it's through the exchange rate or through money and real prices.

From the perspective of the practicing economist, one of the constant tensions in managing exchange rate policy is between price stability and external adjustment and competitiveness. The money-based stabilization does not alleviate that problem because, as was noted earlier, the real currency can appreciate as a result of MBS also.

Trade competitiveness is particularly difficult to assess because many developing and transition countries are undergoing structural changes that influence export possibilities. This is also a serious issue in postconflict countries where restructuring is an ongoing issue. In postconflict countries, there seems to be a movement toward currency boards.

A flexible rate may not ensure that the exchange rate will not appreciate, but it is likely to be easier to adjust. More countries are attempting MBS, and in the future there is likely to be more evidence on which to base policy decisions.

Larry Sjaastad: Argentina's Experience

My comments concern the Argentine monetary and exchange rate reforms that began in April 1991. These reforms, which were radical by any standard, quite literally transformed the Argentine economy.

The Argentine economic disaster of the 1980s began with the Viola administration in early 1981, and was deepened by President Galtieri's adventure in the South Atlantic in 1982 and his singular humiliation by the *Lady from Number 10* Downing Street. The only positive consequences one might attribute to that debacle were Margaret Thatcher's highly successful snap election in 1983, and Argentina's return to civilian rule with the installation of Alfonsín's Radical government in December of that year.

The economic policies of that administration, however, turned out to be no less unfortunate than was the foreign policy of Galtieri. As was one explained by Alvaro Alsogaray, the candidate for presidency from the UCD, the liberal party of Argentina, when invited to speak at a seminar at the University of Chicago: "Economics cannot penetrate the mind of a Radical." The enormous fiscal deficits that were financed at the Banco Central fueled an inflation that reached as high as 5,000 percent per annum. Reform was promised in June 1985 with the austral plan. The government's solemn pledge to print no more money was extraordinarily cynical even by Argentine standards. Prior to announcing the plan, the authorities had secretly warehoused a 100 percent increase in the monetary base.

Nonetheless, the depth of the economic crisis was such that the austral plan was greeted with a high degree of hope; and initially its credibility was sufficiently high to cause the demand for real cash balances to grow and inflation declined quite sharply for several months. The cruel hoax soon became clear to all, however, and the inflation rate began to increase again in late 1986. Despite valiant efforts in the form of a seemingly endless series of new stabilization plans, the credibility of the Alfonsín government could not be revived. Indeed Alfonsín threw in the towel five months before his legal term in office ended, turning the government—and an economy in total chaos—over to the newly elected President Carlos Menem.

Initially, the Menem government conducted business as usual: large fiscal deficits and high inflation. But in April 1991, the recently appointed finance minister, Domingo Cavallo, unveiled an ambitious reform program of unprecedented dimensions. The new peso would be convertible at a one-to-one rate against the U.S. dollar; the Banco Central would be prohibited (at the margin) from acquiring domestic debt instruments; U.S. dollar deposits were made legal; fiscal reforms were made to eliminate the deficit; and a sweeping privatization program was put in motion. The response to the Convertibility Plan was tremendous. After a decade of economic stagnation and decline, the

Argentine economy rebounded with growth rates approaching 10 percent. Indeed, by 1993, Argentine per-capita income had been restored to its 1982 level.

Not all went according to plan, however. While the inflation rate declined dramatically, prices continued to rise, particularly in the nontraded goods sector. From the first quarter of 1991 to the corresponding quarter of 1993, consumer prices rose by 66 percent, but wholesale prices by a mere 18 percent. While some may argue that this resulted from inertia, a more probable explanation lies in the large capital inflow that began in the second semester of 1991 and continued at a rate of 5 percent of GDP throughout 1992. Despite full convertibility, peso interest rates were very high relative to U.S. dollar interest rates. The explanation for that phenomenon appears to be the high discount of Argentine debt instruments in the secondary market, which precluded the usual arbitrage operations by Argentine financial institutions. Rather, the inflow of capital has been widely attributed to repatriation of foreign investments (the famous "Miami" dollars) by Argentine residents, a flow that was accelerated by the decline in U.S. interest rates.

Despite these anomalies, the Convertibility Plan enjoyed enormous success for nearly four years until the "tequila effect" following the Mexican crisis of December 1994 struck the Argentine economy with unusual ferocity. Fearing a devaluation, Argentines fled from the peso, causing international reserves to disappear, interest rates to surge, and the economy to plunge into a recession so severe that the real GDP declined by 5 percent from 1994 to 1995. Unemployment, which historically had fluctuated in the 5–7 percent range in Argentina, had risen to 18 percent by the end of 1995. The newly reelected government, however, weathered the storm, and the currency crisis had abated by mid-April of 1995.

But what had been a currency crisis was transformed, in part by the devastating effects of a prolonged period of very high interest rates and in part by the reversal of the capital inflow, into a full-scale economic crisis. Owing to exceptionally high levels of import protection, the macroeconomic stability of the Argentine economy is very easily disturbed by capital flows. Protection, and particularly the typical structure of protection, erodes the margins of substitution between traded and nontraded goods, and hence a response of the real exchange rate is needed to bring about the expenditure and production shifting that is required when capital flows into or out of a country.

In a recent study, I have estimated that the elasticity of the price of traded goods relative to the overall price level (measured by consumer prices) with respect to capital inflows (measured by the ratio of expenditure to output) is about -6.0 in the highly protected Argentine economy. In the far less protected but otherwise quite similar Australian economy, it is only -2.0 , and not significantly different from zero in free-trading Canada.¹¹ This estimate squares quite well with the 40 percent rise in consumer prices relative to producer prices associated with the Argentine capital inflow of 1991–92.

So when the tequila effect eliminated the Argentine capital inflow, the relative level of wages and prices of nontraded goods had to decline; but, in the face of a fixed exchange rate, that relative decline also implies a decline in nominal levels. Although wages and prices in Argentina do exhibit some downward flexibility (consumer prices actually declined by about 1 percent during 1995), that flexibility has not been sufficient to eliminate a very high level of unemployment. In other words, if the requisite adjustment cannot take place through prices, it will manifest itself in quantities (that is, unemployment). It is my view that, unless there is a resumption of the capital inflow, the recovery of the Argentine economy will be a slow and painful process. Whether the new economic team could set the economy right soon enough for President Menem to once again amend the Argentine Constitution and win a third term of office remained to be seen.

The current Argentine economic crisis does not, however, detract from the underlying and very considerable merits of the Convertibility Plan. Nonetheless, with the aid of hindsight, it is possible to identify some areas where the implementation of the plan might have been improved. In the first place, as it is not at all clear that Argentina constitutes a genuine component of the U.S. dollar currency area, it is very risky to tie the peso to a basket consisting only of U.S. dollars. A simple basket such as one composed of equal values of U.S. dollars and DM could provide a lot of protection for the Argentine economy from swings in the major currency exchange rates.

Secondly, it is very risky to fix the exchange rate and totally open the capital account of the balance of payments in a highly protected economy such as that of Argentina. It is only a matter of time until an open capital account will result in a capital inflow; but, as capital inflows are not permanent, it also is a matter of time until changing circumstances will convert that inflow into an outflow. This is not an argument in favor of capital controls, nor is it one against fixed

exchange rates. Rather, it is an argument for adoption of a liberal commercial policy *prior* to fixing the exchange rate and allowing free movement of capital.

Finally, there is the issue of the well-known rigidity of the Argentine labor market that is largely caused by well-intended but unfortunate legislation. Although the need for greater labor market flexibility had become quite evident by 1994, when despite a booming economy and a very high growth rate the unemployment rate was rising well above its historical levels, it was only in late 1996 that the economic team proposed measures that would improve the flexibility of wages and other aspects of Argentine labor contracts. That the combination of convertibility, fixed exchange rates and a rigid labor market is a recipe for disaster is all too evident from the European experience of the mid-1980s to mid-1990s. The addition of the final ingredient—a very high level of import protection—can only make matters worse.

Notes

1. Had the United States instead kept postwar prices stable (at a level double the price level of 1914), Britain would have been able to restore the pound to the old U.S. dollar parity with a much less deflationary policy in the early 1920s.
2. The pre-1914 gold standard could be considered a gigantic sterling area because of the role played by the sovereign and the sterling bill as a world currency. Unlike the U.S. dollar area, however, differences between British assets and liabilities tended to be settled in gold rather than in additional holdings of sterling.
3. R. A. Mundell. 1962. *The Monetary and Fiscal Policy Mix for Internal and External Stability*. IMF Staff Papers (March).
4. In July 1965, Secretary of the Treasury Henry Fowler proclaimed a restoration program and schedule, stating: "The deficit will be reduced by half by the end of 1965 and fully eliminated by the end of 1966." The Brookings Administration, in a paper commissioned by the United States, predicted that the U.S. balance of payments would be in equilibrium in 1968. Obviously, these predictions were not based on a deep understanding of the way the international monetary system had come to operate.
5. The inflation of the early 1970s is sometimes blamed on the Middle East War in 1973 and the subsequent quadrupling of oil prices, just as the acceleration of the price level in the late 1970s is blamed on the doubling of oil prices. There is no doubt that the rise in oil prices played a role in the increase in inflation. It could not, however, have occurred without the increased elasticity of international money, manifested in the explosion of the Eurodollar market, arising from the movement to flexible exchange rates. From the end of 1972 to the end of 1974, the Eurodollar market increased by 79 percent, from \$284.7 billion to \$509.5 billion (See IMF *International Financial Statistics Yearbook*, 1986, p. 68); after the second oil shock, in the year 1979, the Eurodollar market expanded by 30 percent, from \$1,537.5 billion to \$1,856.7 billion. In both cases, the explosion of international money accommodated the oil price

- increases. In both cases also, the U.S. dollar price of gold and foreign exchange reserves soared.
6. The asymmetry is due partly to the greater prevalence of foreign currency loans under flexible rates than under fixed rates. Default rather than currency risk would also be the barrier under fixed exchange rates if the loans were denominated in foreign currency.
 7. More precisely, governments are deterred earlier by the threat to their bond ratings.
 8. Default risk is also made more expensive because, when it is present, borrowing usually entails—besides higher interest rates—a pledge of national assets such as gold or future export revenues.
 9. It is tragically amusing that while central banks and governments would be horrified at granting full-scale forward cover on domestic loans, which would subject them to immediate loss after the exchange rate changes, they are nevertheless willing to build up indebtedness in foreign currency, a practice which is just as expensive but not so visible to the public.
 10. Some creditworthy countries, for example, Japan, have used borrowing in foreign currencies to good effect. Obviously the arguments made against flexible exchange rates and borrowing in foreign currencies do not apply to creditor or potential creditor countries like Japan and Germany.
 11. L. A. Sjaastad and Meher Manzur. 1996. "Protection and Real Exchange Rate Volatility." The University of Chicago. Mimeo.