

THE DECLINE OF INFLATION IN EMERGING MARKETS: CAN IT BE MAINTAINED?

Recent years have witnessed a dramatic decline in inflation in emerging market economies.¹ By the end of 2000, average inflation in emerging markets had declined from triple-digit figures in the late 1980s to some 5 percent excluding a few outlier cases—Indonesia, Turkey, and Venezuela (Table 4.1). Such low levels of inflation have not been seen since before World War II, when, mostly under the discipline of the gold standard system of fixed exchange rates, prices were roughly stable and episodes of deflation were not uncommon. The recent decline of inflation in emerging markets looks all the more impressive against the background of the 1970s and 1980s. Inflation began to rise gradually in the 1950s, but it accelerated dramatically in the 1970s and early 1980s, culminating in several episodes of triple-digit annual inflation and four major hyperinflations in the late 1980s/early 1990s (Figure 4.1).² From that point on, disinflation was steep.

This rise and fall of inflation in emerging markets appears to reflect in part changes in the in-

ternational monetary system and inflation trends in advanced countries. One notable feature of the post-World War II period was an increase in inflation persistence compared with earlier historical eras, when inflation was either generalized and gradual (e.g., following the gold discoveries of the fifteenth through the nineteenth century), or rapid and specific, reflecting exceptional fiscal strains (as during or immediately after wars).³ This gradual increase in the persistence of inflation, combined with the breakup of the Bretton Woods international system of commodity-based money and the associated removal of external constraints on accommodative monetary policies, made it possible for the supply shocks of the 1970s to push world inflation to unprecedented peacetime levels, producing the “Great Inflation” of the 1970s and early 1980s.⁴ To the extent that emerging markets imported this inflation, loosened fiscal policies, and also adopted increasingly accommodative monetary policies during the period, these external trends were reflected in those countries’ prices and magnified further. Conversely, as governments in advanced countries responded to public dissatisfaction with inflation, and institutional and operational changes were put in place to foster monetary and fiscal policy discipline, this helped bring inflation in advanced countries back under control. This combination of falling external inflation and the adoption of sounder macroeconomic policies, also in response to public dissatisfaction with high inflation, explains much of the recent fall in inflation in emerging markets.

¹For the purposes of this chapter, the following 24 countries are defined as emerging markets: Argentina, Brazil, Bulgaria, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Russia, South Africa, Thailand, Turkey, and Venezuela. This group comprises countries that either have small economies with relatively high per capita income or large economies with lower per capita income. All of them have nominal GDP in excess of \$50 billion (in 1999 PPP-adjusted terms) with the exception of Bulgaria, which has a nominal GDP of \$12 billion but is usually classified as an emerging market.

²The underlying definition of hyperinflation follows that of Phillip Cagan’s seminal work, which defines hyperinflation as consumer price increases in excess of 50 percent *per month*. See Phillip Cagan, “The Monetary Dynamics of Hyperinflation,” in *Studies in the Quantity Theory of Money*, ed. by Milton Friedman (Chicago: University of Chicago Press, 1956). Those four episodes were: Argentina (May 1989–March 1990), Brazil (December 1989–March 1990), Peru (July–August 1990), and Russia (April 1991–January 1992).

³See Barry Eichengreen and Nathan Sussman, “The International System in the (Very) Long Run,” *World Economic Outlook Supporting Studies* (Washington: International Monetary Fund, 2000) for a historical overview and bibliographical references.

⁴For an account of the rise and fall of inflation in advanced countries since the 1970s, see the October 1996 issue of the *World Economic Outlook*.

Table 4.1. Inflation in Industrial Countries and Emerging Markets¹

(Annual percent)

	1900–13	1930–39	1950–60	1961–70	1971–80	1981–90	1991–95	1996–2000	2000
Advanced Economies	1.5	0.2	4.3	4.0	10.8	8.1	3.9	2.0	2.5
Selected Emerging Markets	1.2	1.6	15.2	18.3	29.8	139.7	94.4	23.4	7.8
Selected Emerging Markets, excluding Bulgaria, Indonesia, Venezuela, and Turkey	1.2	2.8	15.0	9.2	31.4	161.1	100.0	9.1	5.2

Sources: Brian Mitchell, *International Historical Statistics* (New York: Stockton Press, 1998); and IMF staff estimates.

¹Average of annual percent change of the consumer price index over the specified period.

Within this broad picture, inflation performance has varied widely across emerging market countries and regions (Table 4.2). Asia has had the lowest inflation during much of the post-World War II period—a development associated with fiscal prudence and sound macroeconomic policies. Latin America has had the highest inflation, featuring several cases of long-lasting triple-digit inflation and hyperinflations associated with deep-seated fiscal problems and monetary accommodation. In between the Asian and Latin American extremes lie the experiences of the emerging markets of Africa, the Middle East, and Eastern Europe. Inflation has been persistently high in some (as in Israel through the early 1990s and Turkey to date), while in others, such as the Czech Republic, Poland, and Hungary, the combination of dismantling of price controls, nominal rigidities, and fiscal problems produced brief episodes of high inflation followed by gradual disinflation from the mid-1990s.

Given the harm caused by high inflation (see in Box 4.1), the recent decline of inflation in emerging markets is clearly welcome. Whether this more stable price environment is likely to be permanent and what steps need to be taken to keep inflation under control are questions of considerable policy relevance that have yet to be settled. This chapter aims to shed light on these issues by reviewing the cross-country evidence and by highlighting the main threats to the current low inflation environment. Four broad questions are addressed:

- Why has inflation been historically high in emerging markets and why has it declined sharply in recent years?

- Has there been a systematic relationship between fiscal performance and inflation?
- Which monetary regime has been better in controlling money growth and inflation?
- What additional steps need to be taken to curb inflation in some countries and to keep inflation at current low levels in others?

Why Do Countries Inflate?

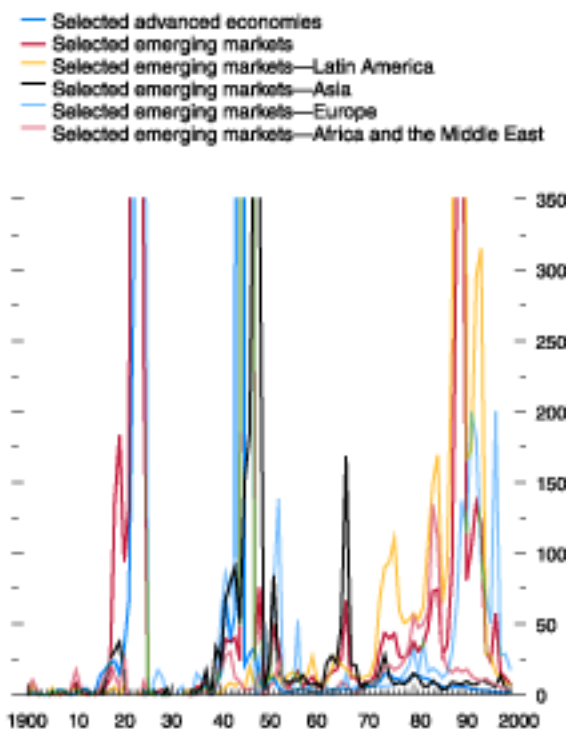
The literature provides two main motives as to why inflation strikes: the need of governments to finance persistent fiscal deficits through seigniorage and the time inconsistency of economic policies.⁵ Governments have financed persistent fiscal deficits by issuing money since time immemorial—witness coin clipping that occurred in Roman times. At the root of the seigniorage motive is the government’s unwillingness or incapacity to avoid persistent deficits or to resort to other sources of financing to make up for the shortfall.⁶ Governments generally resort to seigniorage because, compared to other revenue sources, it tends to be easier to

⁵For a survey and references see Stanley Fischer, “Modern Central Banking,” in *The Future of Central Banking*, ed. by Forrest Capie, Charles Goodhart, Stanley Fischer, and Norbert Schnadt (New York: Cambridge University Press, 1994), pp. 262–308.

⁶In any period of time, seigniorage—the revenues the government obtains from issuing money—comprises both the “inflation tax”—the purchasing power losses that inflation causes to the holders of real money balances—and the change in real money balances. As the inflation tax is usually the main component of seigniorage, both terms are often used equivalently in the literature. In steady state, inflation tax and seigniorage are equal, as real balances are constant.

Figure 4.1. Inflation Over Time*(Percent change)*

Emerging markets in Latin America, Europe, Africa, and the Middle East have recently accomplished a marked reduction in inflation, while Asia continues to sustain moderate to low inflation.



Sources: Brian Mitchell, *International Historical Statistics* (New York: Stockton Press, 1998); and IMF staff estimates.

collect and enforce and does not require the approval of the legislative body, which can be lengthy and politically difficult.

Seigniorage has varied widely across countries and over time. Reasons that might account for such wide variations in seigniorage include different spending needs (as a ratio to GDP) and the relative cost of funding those needs through a variety of taxes and borrowing instruments, with the cost of using a particular instrument rising in proportion to its use. Accordingly, incentives to use seigniorage will be lower in countries where collection of formal taxes is more efficient and borrowing is cheaper due to more developed capital markets. Seigniorage will also tend to be lower in countries where public tolerance for inflation is lower (itself a function of institutional and historical factors), and where governments' capacity to enhance the use of high-powered money (the tax base for seigniorage) is more limited—this being the case, for instance, in highly “dollarized” small open economies relative to large economies in which domestic transactions in foreign currency are rarer. In addition to these country specific factors, seigniorage has also varied over time with the advent of paper money and, even more important, with changes in the international monetary system. In particular, the breakup of the Bretton Woods fixed exchange rate system in the early 1970s, by ending the long period in which the international monetary system was commodity-based, reduced the external constraint on seigniorage. This made it easier for many countries to explore this source of revenue in the 1970s and 1980s, until public antipathy to inflation became an increasingly binding domestic constraint.

Relative to advanced countries, seigniorage has been a significant source of government revenue in many developing countries.⁷ Asian coun-

⁷See, for instance, Berthold Herrendorf, “Time Consistent Collection of Optimal Seigniorage: A Unifying Framework,” *Journal of Economic Surveys*, Vol. 11 (March, 1997), pp. 1–46; and Alex Cukierman, Sebastian Edwards, and Guido Tabellini, “Seigniorage and Political Instability,” *The American Economic Review*, Vol. 82 (June 1992), pp. 537–55.

Table 4.2. Inflation in Emerging Markets*(Annual percent change in the consumer price index)*

	1961–70	1971–80	1981–90	1991–95	1996–2000	2000
Africa/Middle East						
Egypt	3.2	9.5	17.0	13.9	4.4	2.7
Israel	5.6	45.0	118.3	12.9	6.4	1.1
South Africa	2.8	10.7	14.7	11.3	6.5	4.5
Asia						
China	...	4.1	7.2	13.1	1.8	0.3
India	6.4	8.2	8.9	10.5	7.5	3.4
Indonesia	210.6	17.5	8.6	8.9	19.1	2.5
Korea	14.8	16.5	6.4	6.2	4.0	2.3
Malaysia	0.9	6.0	3.2	4.3	3.1	1.3
Pakistan	3.5	12.4	7.0	11.2	7.3	4.4
Philippines	5.7	14.9	13.7	10.1	7.1	4.4
Thailand	2.3	10.0	4.4	4.8	4.3	1.5
Emerging Europe						
Bulgaria	7.6	132.1	242.3	10.4
Czech Republic ¹	1.0	1.1	3.4	19.2	6.8	3.9
Hungary	10.3	9.7	10.9	25.4	15.1	9.7
Poland	...	4.7	107.7	44.0	12.8	10.1
Russia ²	1.2	3.3	2.0	583.7	39.3	20.8
Turkey	4.0	33.6	46.3	79.3	74.1	54.9
Latin America						
Argentina	21.5	141.7	787.0	42.9	-0.1	-0.8
Brazil	33.6	41.7	613.8	1113.8	7.6	7.5
Chile	27.2	174.8	20.4	13.9	5.2	3.8
Colombia	11.5	21.3	23.7	25.0	16.0	9.5
Mexico	2.7	16.8	69.1	18.0	19.4	9.5
Peru	9.4	31.9	1223.6	113.3	6.9	3.8
Venezuela	1.1	8.5	24.9	44.9	45.1	16.2

¹Before 1993, the data refers to Czechoslovakia.²Before 1991, the data refers to the Soviet Union.

tries have generally collected the lowest levels and Latin America the highest (Figure 4.2). In extreme cases, such as in Argentina, Chile, Egypt, and Israel at various times during the 1970s and 1980s, seigniorage as a share of GDP reached the double-digits. Interestingly, despite the higher inflation rates, seigniorage in Latin America has not been substantially higher than that of other regions except Asia. This suggests that some Latin American countries operated beyond the point where revenues from seigniorage are maximized (i.e., the peak of the inflation-tax collection curves depicted in Figure 4.2), due to the shrinking of the tax base caused by falling real money balances as inflation kept rising. This implies that high inflation cannot be entirely explained as a result of efficient taxation.

While the seigniorage theory emphasizes the behavior of the fiscal authority, the time inconsistency theory focuses on the behavior of the

monetary authority. The theory highlights the inflationary bias to monetary policy from not being able to credibly commit to low inflation. The perception that output can be raised in the short-run by expansionary monetary policies may induce the central bank to run a looser monetary policy than is consistent with low inflation. This is particularly likely if the central bank is not independent from the rest of the government and when political considerations, such as electoral cycles, may influence policy. By the same token, the theory also helps explain why central banks may adopt an accommodative policy stance once inflation is triggered by other factors, such as adverse supply shocks.

Once triggered, higher inflation can also lead to the development of various indexation mechanisms that tie subsequent price and wage increases to past inflation, which can help to maintain existing inflationary momentum. In

Box 4.1. Why Emerging Market Countries Should Strive to Preserve Lower Inflation

Following the decline in inflation in emerging markets in recent years, a widespread consensus has emerged among policymakers and the public that one of the key policy challenges is now to preserve these gains. Why is there so much concern about inflation, especially for emerging markets, where fostering economic growth and reducing poverty and unemployment might be considered to be of greater intrinsic importance?

Most economists agree that inflation, especially high inflation, harms economic efficiency and growth, but the nature and magnitude of these costs are not yet entirely understood. Several costs of inflation have been identified, including:

- High inflation may distort relative prices of different goods and services, thereby lowering economic efficiency.
- People devote time and resources to economizing on money balances whose real value is eroding over time.
- Unexpected inflation leads to arbitrary redistribution: for example, from fixed interest rate lenders to borrowers.
- Higher inflation is typically associated with higher uncertainty about future inflation, forcing people to spend time and resources protecting themselves from future changes in inflation.
- High inflation may interfere with the financial system's ability to allocate resources effectively, for example because of distortions to accounting and tax rules.
- That said, moderate levels of inflation may also have benefits, such as facilitating needed relative price adjustment if the flexibility of nominal wages to downward adjustments is limited.

While few doubt that extremely high inflation is bad for economic growth and efficiency, there is a debate on whether moderate inflation is harmful and on exactly where the threshold lies between moderate, tolerable inflation and high, harmful inflation.¹ The empirical literature on

¹Indeed, one of the most common arguments that is put forward in favor of maintaining inflation at a low level (say 2–4 percent a year) rather than letting it increase to a moderate level (say 10–20 percent) is simply that it is important to avoid taking a slippery slope

this issue is not conclusive, with estimates ranging from 2 to 7 percent a year in many studies to, as high as 40 percent a year according to one study. Nevertheless, recent trends in emerging markets reveal a clear preference for single-digit inflation levels.² The costs of inflation will also differ across countries depending on specific characteristics, such as the degree of indexation and the ways in which the financial system has developed to cope with the uncertainties associated with inflation. Countries with a recent history of high inflation typically still have in place indexation mechanisms that may reduce the annual costs of inflation but may also make inflation—and its associated costs—more persistent.

Inflation and Financial Sector Development

The effects of inflation on the development of the financial system are complex and especially relevant for emerging markets. High inflation may be expected to increase the resources a country devotes to financial services. High expected inflation will lead households to make smaller cash withdrawals with greater frequency; banks will therefore need to build more branches and make more investments in automation and technology in order to satisfy increased customer activity. Higher and more volatile inflation will raise the demand for financial sector services aimed at protecting economic agents from the associated uncertainty. One study confirms that countries with higher inflation devote a greater share of their GDP to

where moderate inflation might degenerate into excessive, harmful inflation.

²See Michael Bruno and William Easterly, "Inflation Crises and Long-Run Growth," *Journal of Monetary Economics*, Vol. 41 (February 1998), pp. 3–26; Atish Ghosh and Steven Phillips, "Warning: Inflation May Be Harmful to Your Growth," *IMF Staff Papers*, International Monetary Fund, Vol. 45, (December 1998), pp. 672–713; Mohsin S. Khan and Abdelhak S. Senhadji, "Threshold Effects in the Relationship Between Inflation and Growth," IMF Working Paper 00/110 (Washington: International Monetary Fund, June 2000); and Peter Christoffersen and Peter Doyle, "From Inflation to Growth: Eight Years of Transition," *The Economics of Transition*, Vol. 8, No. 2 (2000), pp. 421–451.

financial services.³ However, it seems that these resources, while protecting agents from inflation uncertainty, do not result in genuine financial development. Indeed private credit, bank assets, financial sector liquid liabilities, and stock market capitalization (all as a share of GDP) tend to be lower in countries with high inflation, with a marked drop in financial sector development around a threshold of 15 percent inflation.⁴

Inflation and the Poor

A possible cost of inflation, which is particularly relevant in developing countries, relates to its effects on the poor. There are a number of reasons why inflation often hurts the poor more than it hurts the rich. The poor have less access to financial instruments used to hedge against inflation. Moreover, the poor are more likely to rely on sources of income—such as pensions, subsidies, and transfers—that may be only partially indexed to inflation. There are, of course, counterarguments. First, in those countries where rural poverty remains widespread, poor households are likely to be engaged in subsistence farming, which is less affected by developments in the monetized economy: while inflation is likely to hurt the urban poor, it may have a smaller impact on the poor living in rural areas. Second, those below the poverty line in developing countries may have small cash hold-

ings, no pensions, and no transfers or subsidies from the state. Finally, policies aimed at boosting aggregate demand may raise inflation but may also temporarily assist the poor by reducing unemployment.

Current evidence suggests that inflation tends to hurt the poor to a greater extent than it hurts the rich. Drawing on a polling data survey of more than 30,000 households in 38 countries, and controlling for other factors, a recent paper finds that [relatively] poor people are more likely to mention inflation as one of their top concerns.⁵ Moreover, the authors report that direct measures of improvement in the well-being of the poor are negatively correlated with inflation in cross-country samples for the past few decades. Another study confirms that, in an international panel, higher inflation is associated with lower income of the poor over the longer term.⁶ Using U.S. data over time, it also finds that any benefits to the poor of expansionary policies leading to higher inflation and lower unemployment are minor and short-lived. Such studies relying on data from developing countries are subject to a number of caveats, in particular whether surveys capture a sufficiently large share of the rural population, where many of the poor are to be found.

³William B. English, "Inflation and Financial Sector Size," *Journal of Monetary Economics*, Vol. 44, (December 1999), pp. 379–400.

⁴John H. Boyd, Ross Levine, and Bruce D. Smith, "The Impact of Inflation on Financial Sector Performance," *Journal of Monetary Economics* (forthcoming).

⁵William Easterly and Stanley Fischer, "Inflation and the Poor," Policy Research Working Paper No. 2335 (Washington: The World Bank, 2000), forthcoming in the *Journal of Money, Credit, and Banking*.

⁶Christina Romer and David Romer, "Monetary Policy and the Well-Being of the Poor," NBER Working Paper No. 6793 (Cambridge, Mass.: National Bureau for Economic Research, 1998).

addition, other factors may contribute.⁸ One is the so-called province effect, where local governments have an incentive to increase expenditure,

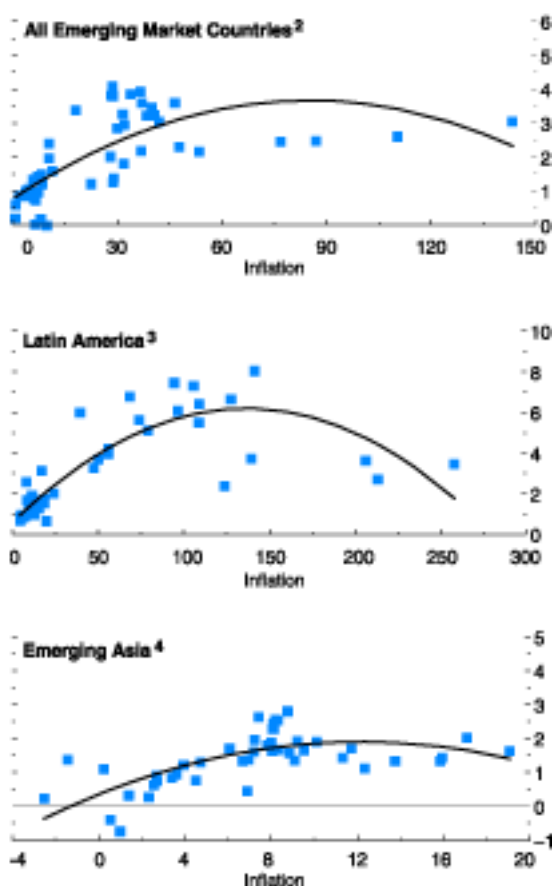
⁸For a more detailed discussion and references, see Guillermo Calvo and Carlos Végh, "Inflation Stabilization and BOP Crises in Developing Countries," in *Handbook of Macroeconomics*, ed. by John Taylor and Michael Woodford (New York: North-Holland, 1999), pp. 1531–1614.

overlooking the impact on the national government deficit because they only pay part of the cost. As the resulting fiscal deficit is higher, so tends to be the resort to seigniorage. In addition, a war of attrition between social groups can also make it difficult for the government to reach a consensus on appropriate macroeconomic policies, leading to increased use of

Figure 4.2. Seigniorage in Emerging Market Economies, 1950–2000¹

(Three-year moving averages; percent of GDP)

Seigniorage has displayed a Laffer-curve shape, the peak of which has varied widely across countries.



seigniorage.⁹ Finally, persistent inflation can arise out of the dynamics of interest payments on government debt. Once the nominal interest rate on the debt is given by private sector expectations of future inflation, the government will have an incentive to validate those expectations or inflate further, as disinflation increases the real value of the debt service.

These considerations reveal the complexity of inflationary processes. Inflation can be triggered by a host of factors—ranging from higher fiscal deficits to oil price shocks—and since the government, including the central bank, has a variety of incentives to accommodate such impulses, a complex inflationary dynamic can result with little connection to its original cause. Thus, any analysis of the determinants of inflation must look at several variables and recognize that, even then, a satisfactory explanation of specific developments in certain countries during certain periods might prove elusive.

The complexity of persistent high inflation can make it harder for governments to create consensus to stabilize the economy, underscoring the importance of reacting quickly to early signs of inflationary pressures. Failure to do so may mean that the macroeconomic situation will have to become clearly unsustainable—as under high and hyperinflation—before such a consensus is reached. Indeed, the difficulty in forging a consensus to lower inflation helps explain why many emerging market countries have tolerated moderate to high inflation rates until recently.

Empirical Evidence on the Determinants of Inflation

The extensive literature on the determinants of inflation across countries has explored the roles of fiscal deficits, monetary policy, and the combination of external shocks and inflation inertia in producing inflation. Studies that fo-

⁹See Alberto Alesina and Allan Drazen, “Why Are Stabilizations Delayed?” *American Economic Review*, Vol. 81 (December 1991), pp.1170–88; and Alejandro M. Werner, “Building Consensus for Stabilizations,” *Journal of Development Economics*, Vol. 59 (August 1999), pp.319–336.

cused on the relationship between deficits, seigniorage, and inflation have yielded mixed results, with little evidence of a strong connection across a wide range of countries and inflation rates.¹⁰ On time inconsistency, the empirical literature has focused on two implications of the theory—namely, that central bank independence and greater openness to trade are associated with lower inflation. Such studies have found a negative relationship between inflation and central bank independence, while the results on openness have been found to be sensitive to the sample, specification, and period of estimation.¹¹ Other studies have examined the role of monetary expansion, price inertia, and changes in nominal exchange rates and the world price of oil and other commodities. Inflation inertia and changes in money supply have been found to be key determinants of inflation, with oil and other world prices playing a less important role.¹²

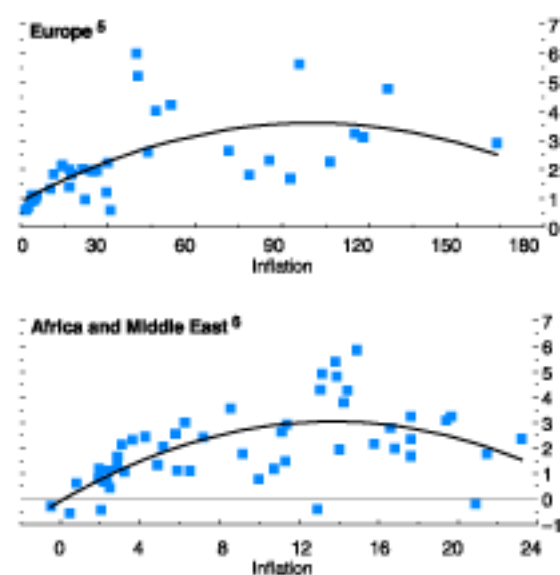
Given the widespread view that fiscal policy is closely connected with the inflationary experience of many emerging market countries, the IMF has reexamined the relationship between fiscal deficits and inflation, focusing only on emerging markets (Box 4.2). This study finds a significant and relatively consistent long-run relationship between the size of government

¹⁰See Robert King and Charles Plosser, “Money, Deficits, and Inflation,” *Carnegie-Rochester Conference Series on Public Policy*, Vol. 22 (1985), pp. 147–96; and Stanley Fischer, Ratna Sahay, and Carlos Végh, “Modern Hyper—and High Inflation,” *Journal of Economic Literature* (forthcoming).

¹¹See the large literature referenced in Sylvester C. Eijffinger, *Independent Central Banks and Economic Performance* (United Kingdom: Edward Elgar, 1997); and Marta Campillo and Jeffrey Miron, “Why Does Inflation Differ Across Countries,” in *Reducing Inflation: Motivation and Strategy*, ed. by Christina Romer and David Romer (Chicago: University of Chicago Press, 1997); and Christina Terra, “Openness and Inflation: A New Assessment,” *Quarterly Journal of Economics*, Vol. 113 (May 1998), pp. 641–80.

¹²See Prakash Loungani and Phillip Swagel, “Sources of Inflation in Developing Countries,” IMF Working Paper (Washington, International Monetary Fund, forthcoming); and “The Rise and Fall of Inflation,” Chapter VI in the October 1996 *World Economic Outlook*.

Figure 4.2 (concluded)



Source: IMF, *International Financial Statistics*.

¹Seigniorage is calculated as the annual change in reserve money divided by nominal GDP.

²Excluding three outlying observations with inflation rates greater than 200 percent as well as inflation and seigniorage in Israel for the period 1977 to 1985.

³Excluding four outlying observations with inflation rates greater than 300 percent.

⁴Excluding three outlying observations with inflation rates greater than 70 percent.

⁵Availability of data for emerging Europe is as follows: Czech Republic (1994–99), Hungary (1983–99), Poland (1980–99), Russia (1994–99), and Turkey (1962–99).

⁶Excluding inflation and seigniorage in Israel for the period 1877 to 1985.

Box 4.2. Is There a Relationship Between Fiscal Deficits and Inflation?

Economists generally agree that fiscal deficits are one of the main causes of inflation, particularly high and hyper inflation. By creating excessive aggregate demand pressures recurrent fiscal deficits can both spark and sustain inflationary processes.¹ Typically, governments facing persistent fiscal imbalances are incapable (or unwilling) to create the political consensus needed to increase taxes and/or reduce expenditures and find borrowing increasingly difficult. As a result, these governments pressure the central bank to finance those deficits by printing money. Indeed, there is a large literature documenting the crucial role played by fiscal deficits during the hyperinflation episodes of the 1920s, 1970s, and 1980s and high and moderate inflation episodes of the 1970s, 1980s, and 1990s.²

Despite these case studies, more formal empirical analysis has had only limited success in establishing the existence of a relationship between the size of fiscal deficits and inflation.³

¹Inflation, by affecting government revenues and expenditures, also changes the size of the fiscal deficits, albeit in an uncertain direction. There is some evidence, however, that fiscal deficits tend to increase with high inflation because of high nominal interest payments. To eliminate the effects of inflation on the deficit, alternative deficit definitions have been proposed, including that of the operational fiscal deficit; however, these definitions are not problem free. See Vito Tanzi, Mario Blejer, and Mario Teijeiro, "Effects of Inflation on Measurement of Fiscal Deficits: Conventional Versus Operational Measures" in *How to Measure the Fiscal Deficit*, ed. by Mario Blejer and Adrienne Cheasty (Washington: International Monetary Fund, 1993).

²See, for instance, Thomas Sargent, "The Ends of Four Big Inflations," in *Inflation, Causes, and Effects*, ed. by Robert Hall (Chicago: University of Chicago Press, 1982), pp. 41–97; and Rudiger Dornbusch and Stanley Fischer, "Stopping Hyperinflation Past and Present," *Weltwirtschaftliches Archiv*, Vol. 122, (1986) and "Moderate Inflation," *World Bank Economic Review*, Vol. 7 (January 1993).

³See for instance Robert King and Charles Plosser, "Money, Deficits, and Inflation," *Carnegie-Rochester Conference Series on Public Policy*, Vol. 22 (Spring 1985), pp. 147–96; and Stanley Fischer, Rama Sahay, and Carlos Végh, "Modern Hyper- and High Inflation" (unpublished; Washington: International Monetary Fund, 2000).

Long-Run Relationship Between Inflation, Fiscal Deficits, and Changes in World Prices¹

Government deficit/narrow money	
Coefficient	0.32
t-ratio	(18.1)
Change in world oil prices	
Coefficient	0.08
t-ratio	(9.4)
World inflation	
Coefficient	0.29
t-ratio	(7.3)

¹The sample covered Argentina, Brazil, Chile, China, Colombia, Egypt, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, South Africa, Thailand, Turkey, Uruguay, Venezuela, and Zimbabwe.

In general, this relationship is complex, and an important distinction needs to be made between the short and long run. In the short run, higher deficits do not necessarily lead to higher inflation, as they can be financed by additional borrowing. In the long run, however, high deficits will generally lead to higher inflation, as governments use seigniorage to finance them, although there will also be reverse causation through the impact of inflation on nominal interest rates. Because of this, it is useful to focus on the long-run relationship between fiscal deficits and inflation.

Some initial work by IMF staff indicates there is a positive long-run relationship between the size of fiscal deficits scaled by narrow money (as defined by the IMF's *International Finance Statistics*) and inflation for a sample of 23 emerging market economies during the period of 1970–99 (see the Table).⁴ The econometric specification used in this study has been derived from a small open economy that predicts that in the long run the ratio of government deficits to narrow money should be directly related to inflation. In other words, inflation will be higher the larger are the fiscal imbalances (as

⁴See Luis Catão and Marco Terrones, "Government Deficits and Inflation: A New Look at the Emerging Markets Evidence," IMF Working Paper (Washington: International Monetary Fund, forthcoming).

measured by the ratio of government deficit over GDP) and/or the lower the size of the inflation tax base (proxied by the ratio of narrow money to GDP).⁵ The existence of a long-run deficit-inflation relationship was tested using a dynamic panel regression.⁶ Despite the wide variety of inflation experiences in emerging market economies, a statistically significant long-run relationship between the ratio of government deficits to narrow money and inflation was found and was superior to including only the deficit as a ratio for GDP or narrow money as a ratio to GDP. Moreover, the hypothesis of long-run coefficient homogeneity could not be rejected.

This relationship is quite stable to the inclusion of other variables, as well as to the exclusion of countries that experienced hyperinflation episodes in the late 1980s/early 1990s (Argentina, Brazil, and Peru). The stability of the long-run relationship between deficits and inflation was explored by introducing into the long-run econometric specification indicators of openness, political instability, exchange rate regime, changes in oil prices, changes in non-oil commodity prices, and world inflation—variables that have featured prominently in previous empirical

studies.⁷ In addition to government deficits, changes in world oil prices and world inflation were found to be significant, suggesting that external factors matter, including overall global monetary stability. As in other studies, a negative long-run association between openness and inflation was found; however, once the fiscal deficit is introduced in the specification, openness changes sign and becomes statistically insignificant, suggesting that the effect of openness on inflation is indirect and in the long run works mainly through the fiscal channel. The analysis also found no evidence of a statistically significant relationship between pegged exchange rate regimes (as measured by a dummy variable created from the *de jure* exchange rate classification compiled by the IMF) and inflation, although other studies have found this link in the short run.

These results point to a significant long-run relationship between deficits and inflation. Based on the estimated parameters, the model predicts that a (permanent) reduction in the government deficit by 1 percentage point of GDP is associated with a drop in inflation by 2 to 6 percentage points depending on the level of private sector's holdings of narrow money. Likewise, a 10 percent reduction in oil prices changes would lead to a four-fifths of a percentage point reduction in the inflation rate, while a 10 percent change in world inflation translates into a reduction in domestic inflation of almost 3 percent.⁸

⁵A battery of tests confirmed that the specification derived from theory was statistically superior to other ones that included deficit over GDP and narrow money over GDP.

⁶A pooled mean group (PMG) estimator technique was used, as this is particularly good at dealing with dynamic processes and outliers, such as hyperinflation episodes. In addition, the PMG estimator is flexible enough to constrain the long-run parameters to be equal across countries while allowing other parameters (intercepts, short-run coefficients, and error variances) to vary freely from country to country. See M. Hashem Pesaran, Yongcheol Shin, and Ron Smith, "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels," *Journal of the American Statistical Association*, Vol. 94 (June 1999), pp. 621–34.

⁷See, for instance, Martha Campillo and Jeffrey Miron, "Why Does Inflation Differ Across Countries," in *Reducing Inflation: Motivation and Strategy*, ed. by Christina Romer and David Romer (Chicago: University of Chicago Press, 1997); and Chapter VI of the October 1996 *World Economic Outlook*.

⁸Short-run estimates are less informative, as they are country specific. The lag structure for each country was selected using the Schwarz Bayesian criterion, subject to a maximum lag of two (because of data considerations). In more than half of the countries at least one lag of inflation was included.

deficits—scaled by narrow money—and inflation. These results indicate that long-term inflation is positively related to fiscal deficits (measured as a ratio to GDP) and inversely related to the size of the inflation tax base (proxied by the ratio of narrow money to GDP).

As also discussed in Box 4.2, the same empirical study on emerging markets explored the stability of the long-run relationship between the fiscal deficit and inflation to the inclusion of other variables that have featured prominently in the literature. Among those, change in world oil prices and world inflation were the other variables found to have a long-run bearing on inflation, suggesting that global monetary stability also matters for emerging market inflation performance. In some specifications of the model, a negative long-run relationship between openness and inflation was also found, but became insignificant once the fiscal deficit variable was introduced. Similarly, no statistically significant relationship between (*de jure*) pegged exchange rate regimes was found, in contrast with the results of an earlier study.¹³ These results suggest that the influence of openness and exchange rate regimes on inflation may, over the long term, occur largely through fiscal policy and financial developments that affect the size of the inflation tax base.¹⁴

What Explains the 1990s Inflation Performance in Emerging Markets?

As noted above, inflation was reduced in almost all emerging countries in the 1990s, but the extent and speed at which countries reined it in varied considerably. Looking across the dif-

ferent regions, a variety of experiences can be identified.

In Latin America, *Argentina, Brazil, and Peru* experienced periods of hyperinflation during 1989–90. In each case, this had been preceded by persistent high inflation from the mid-1970s through the late 1980s, partly as a result of high fiscal deficits (itself reflecting political factors) and indexation in labor and financial markets. Moreover, access to international markets was limited in most cases following the 1980s debt crisis, forcing these countries to rely more on domestic financing of fiscal deficits, including seigniorage. As inflation increased, many of these economies saw money aggregates shrink as a ratio of GDP while the maturity of government debt shortened rapidly, laying the preconditions for hyperinflation. In these cases, the macroeconomic chaos and sharp collapse of output and employment associated with hyperinflation helped create political consensus over a relatively short time span for the ensuing stabilization. By the end of the 1990s, inflation in all three countries had been reduced to single digits (despite a sharp devaluation in Brazil in early 1999).

Other countries in Latin America, as well as Israel and Turkey, also experienced sustained moderate to high inflation—typically in the range of 20 to 80 percent—during the 1970s and 1980s, but without degenerating into hyperinflation. Most of these inflations were also reduced in the 1990s, although inflation remains high in Turkey (notwithstanding considerable progress before the collapse of its recent stabilization program—see Chapter 1) and to a lesser extent Venezuela.

In *Asia*, following some pickup in the wake of the oil price shocks of the 1970s, inflation was generally held at low levels during the 1980s and the 1990s. China experienced a marked but short-lived pickup in inflation during the early 1990s, associated with a surge in domestic investment, and a few countries—including Pakistan, the Philippines, India, and Indonesia—experienced persistent inflation in the high single or low double digits. With the exception of

¹³See Atish Ghosh, Anne-Marie Gulde, Jonathan Ostry, and Holger Wolf, “Does the Nominal Exchange Rate Regime Matter?,” IMF Working Paper 95/121 (Washington: International Monetary Fund, 1995).

¹⁴Indeed, a recent study has found a positive correlation between openness and government size. This correlation may reflect the use of government spending as an external risk-reducing device. See Dani Rodrik, “Why Do More Open Economies Have Bigger Governments?” *Journal of Political Economy*, Vol. 106 (October 1998), pp. 997–1032.

Table 4.3. Emerging Market Countries: Selected Variables

Periods	Inflation ¹	Deficit/GDP	Expenditures/GDP	Oil Prices ¹	Imports/GDP	Narrow Money/GDP
All Emerging Markets						
1971–80	22.8	5.1	23.5	43.9	24.0	14.8
1981–85	52.7	5.7	32.8	–5.7	26.1	15.6
1986–90	188.3	3.9	29.7	2.2	24.9	13.9
1991–95	93.4	2.6	28.1	–5.3	29.5	13.3
1996–2000	23.1	2.7	27.7	15.1	32.8	14.7
Latin America						
1971–80	58.0	2.1	14.2	43.9	15.2	11.2
1981–85	107.9	4.1	20.8	–5.7	14.2	9.1
1986–90	681.6	4.9	20.0	2.2	15.3	7.7
1991–95	195.9	1.0	18.1	–5.3	17.9	7.0
1996–2000	14.2	2.0	18.2	15.1	20.0	8.1
Asia						
1971–80	10.2	3.5	16.7	43.9	19.9	13.4
1981–85	8.3	5.0	20.1	–5.7	25.4	14.5
1986–90	6.5	3.2	19.8	2.2	26.4	15.8
1991–95	8.6	1.2	18.7	–5.3	33.5	17.3
1996–2000	6.8	2.8	18.9	15.1	38.5	19.7
Europe						
1971–80	6.1	2.5	18.6	43.9	24.4	16.2
1981–85	14.2	2.4	38.0	–5.7	24.3	18.5
1986–90	44.9	2.5	39.1	2.2	24.2	14.4
1991–95	156.6	4.4	37.9	–5.3	34.4	13.7
1996–2000	65.3	3.4	36.1	15.1	41.1	12.9
Africa and the Middle East						
1971–80	16.9	12.4	44.3	43.9	36.6	18.5
1981–85	80.2	11.2	52.2	–5.7	40.4	20.3
1986–90	20.3	5.3	39.8	2.2	33.4	17.6
1991–95	12.4	3.7	37.6	–5.3	32.0	15.3
1996–2000	6.0	2.4	37.8	15.1	31.4	17.9

Sources: IMF, *International Financial Statistics*; and IMF staff estimates.

¹Average annual percent change of the consumer price index.

Indonesia, low inflation was generally maintained during the Asian crisis, notwithstanding substantial currency devaluations.

Among *transition countries*, almost all experienced a sharp burst of inflation in the early 1990s, reflecting price liberalization, the unwinding of the monetary overhang inherited from the period of central planning, and fiscal pressures caused by the collapse of central planning.¹⁵ In many respects, these inflations are more reminiscent of historical bouts of inflation due to war and political collapse—as for example following the breakup of the Austro-Hungarian empire in the early twentieth cen-

ture. In most cases, aided by strong macroeconomic policies, inflation had been reduced to moderate double-digit levels in the mid-1990s and to close to single digit levels by 2000.¹⁶

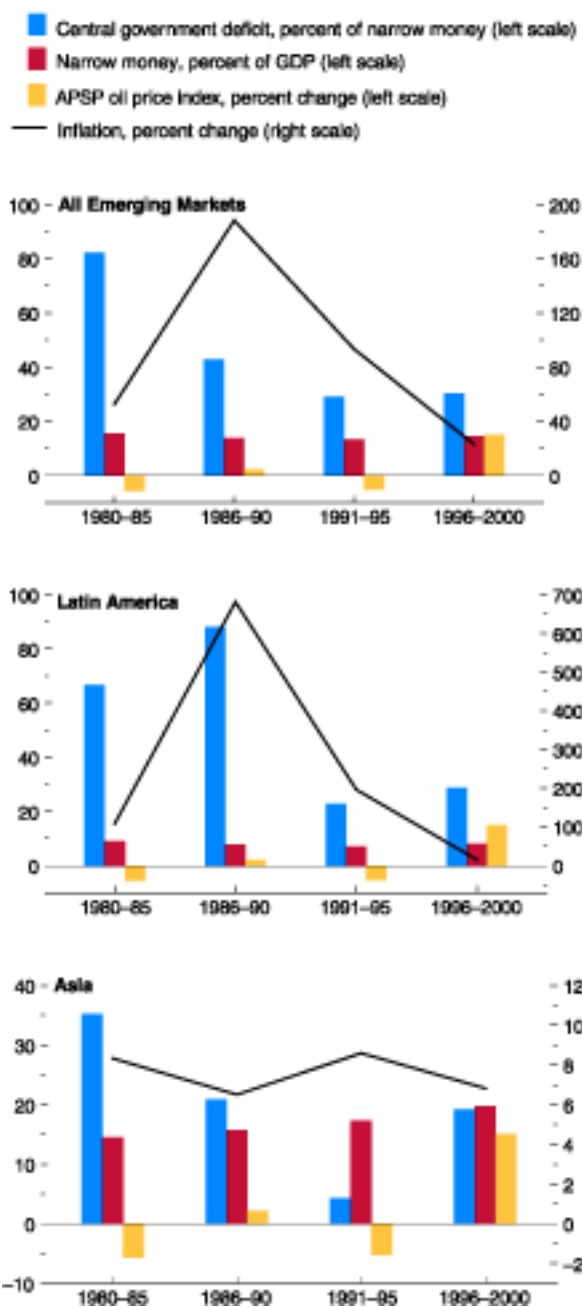
While the forces behind disinflation in all these groups varied, fiscal consolidation in each case played a crucial role. Indeed, as shown in Table 4.3, fiscal deficits in emerging markets as a whole were reduced by about one-half from the levels observed in the 1970s and 1980s. On average, calculations based on the IMF's empirical

¹⁵See, for instance, Carlo Cottarelli and Peter Doyle, *Disinflation in Transition 1993–97*, Occasional Paper No. 179 (Washington: International Monetary Fund, 1999).

¹⁶The two important relapses in the fight against inflation have been Bulgaria (1996) and Russia (1998–99). Since then, Bulgaria has managed to stabilize prices under a currency board arrangement, and Russia has made considerable progress in lowering inflation under a floating exchange rate regime.

Figure 4.3. Inflation and Its Determinants in Emerging Markets
(Simple annual averages)

In the late 1990s, improved fiscal balances and restrained monetary growth have lowered inflation in Latin America, Europe, and the Africa/Middle East regions. Other factors, such as world inflation and oil prices, have also played a role.



estimates reported in Box 4.2 suggest that the 2½ percentage points of GDP deficit reduction observed for the group of emerging markets (excluding transition economies) has led to a 5 to 15 percentage point reduction in inflation rates. With fiscal deficits in Asia already low, this fiscal consolidation effort in the emerging markets took place primarily in the Africa/Middle Eastern and Latin American regions (Figure 4.3 and Table 4.3).¹⁷ While the extent of fiscal adjustment is much more difficult to measure in transition economies—given the extent of quasi-fiscal activities, especially during the centrally planned period—it is clear that fiscal consolidation also played a central role in the disinflation process.¹⁸ Particularly in the second half of the 1990s, this was accompanied by financial deepening in all regions, which further reduced the need for seigniorage.

External developments also contributed to falling inflation in the 1990s. First, as discussed in the previous section, the decline in global inflation, both through its direct impact on import prices as well as indirectly (through, among other things, pressure on emerging markets’ external competitiveness and demonstration effects of the virtues of low inflation), clearly helped. Second, the decline in oil prices in the first half of the 1990s also provided modest support to disinflation programs at that time (although, with prices rising thereafter, oil prices likely had an adverse effect for the decade as a whole).

A number of other forces—while not directly captured in the econometric model described earlier—also contributed, although their impact likely varied considerably across different countries. These included:

- *Institutional reforms.* In most emerging markets, the independence of the central bank

¹⁷Fiscal deficits in Asia were mostly low to begin with, and only rose substantially during the 1997–98 financial crisis.

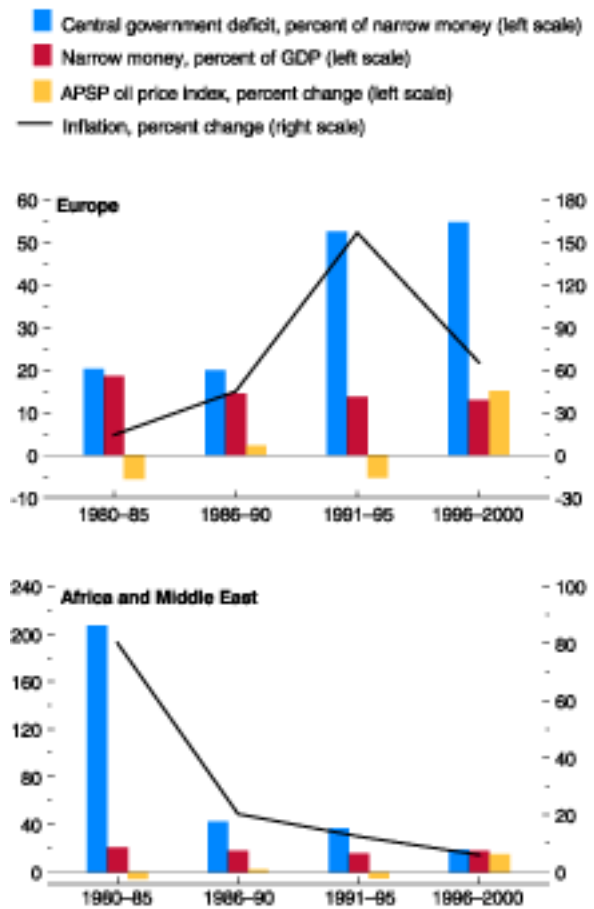
¹⁸See Stanley Fischer and Ratna Sahay, “The Transition Economies After Ten Years,” IMF Working Paper 00/30 (Washington: International Monetary Fund, 2000). The slight deterioration of the fiscal position indicator (scaled by M1) for merging Europe depicted in Figure 4.3 is entirely due to Turkey.

was enhanced, helping to address the time inconsistency problem discussed above. Many countries (most notably Argentina and Brazil) also greatly reduced or eliminated indexation of wage and financial sector contracts, helping to reduce inflation inertia. This was accompanied by some increase in political stability, primarily in emerging markets of Europe, Africa, and the Middle East.

- *Structural reforms.* Most countries undertook wide-ranging structural reforms in trade, product, and labor markets, which tend to reduce inflationary pressures. One outcome of these reforms was the substantial rise in trade openness for emerging markets as a group (Table 4.3), particularly in Asia and emerging Europe (less so in Latin America and the Middle East). In addition, financial sector regulations and supervisory frameworks were improved, fostering discipline in credit markets that, together with widespread privatization of public banks, posed an additional constraint on fiscal profligacy.
- *Access to global capital markets.* Capital flows to emerging markets substantially increased, particularly to Asia and Latin America in the first half of the 1990s, as well as to a number of emerging European countries, particularly Hungary and the Czech Republic. While this should in principle be beneficial for disinflation—for instance by reducing the need for seigniorage—it also contributed to overheating and inflationary pressures in countries with fixed exchange rate regimes or where the authorities were reluctant to let the exchange rate appreciate. The important role of capital inflows in slowing down the disinflation process has been observed in Eastern Europe.

A particular issue of importance in a number of Asian and Latin American countries in recent years has been the behavior of the exchange pass-through. While inflation picked up in all countries in the wake of dramatic currency devaluations, the effect was relatively short-lived and far from one-to-one in most countries

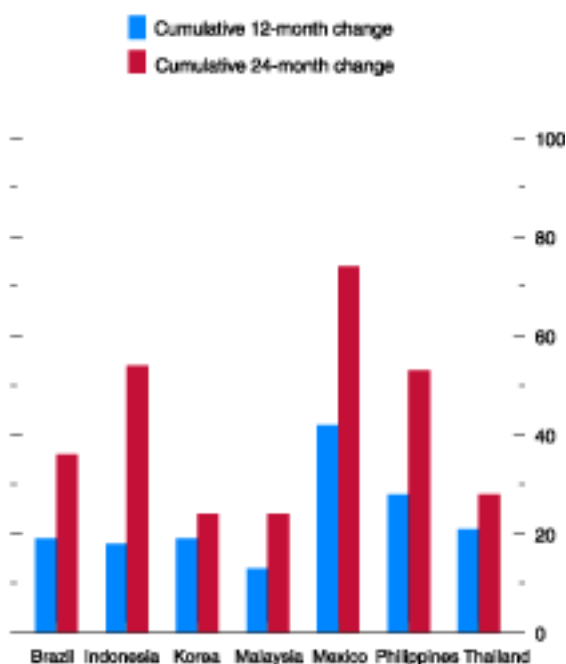
Figure 4.3 (concluded)



Sources: IMF, *International Financial Statistics*; and IMF staff estimates.

Figure 4.4. Exchange Rate Pass-Through in Emerging Markets in the 1990s¹
 (Inflation as a percent of change in nominal effective exchange rate)

Exchange rate pass-through has been well below unity in most emerging market countries in the aftermath of major devaluations.



Source: IMF staff estimates.

¹Calculated as the ratio of cumulative percentage change in the consumer price index over 12- and 24- month periods by the one-month lagged percentage change in the nominal effective exchange rate over 12- and 24- month periods, respectively.

(Figure 4.4). Recent studies, including work by IMF staff, have sought to explain this limited exchange rate pass-through in a broad sample of advanced and developing countries.¹⁹ They find that, in general, the extent of the pass-through is positively related to the size of the output gap and negatively related to the degree of real exchange rate appreciation immediately preceding the devaluation, with some evidence that it may also be a negative function of average inflation levels in the years preceding the devaluation. Since all emerging market countries that experienced sharp devaluations in the 1990s had already achieved low inflation levels and displayed some degree of real exchange rate appreciation on the eve of the devaluation, these two factors plus the severity of the subsequent output contractions explain the limited pass-through.

To summarize, lower rates of inflation in emerging markets during the 1990s appear to have been closely linked to domestic fiscal consolidation, aided by falling world inflation, and—in some cases—limited exchange rate pass-through. Other factors—such as institutional strengthening, financial sector development, trade, and product and labor market reforms—also played a role as well, although the precise extent is difficult to quantify. This is partly because of indirect effects through the fiscal channel, the lack of better proxy variables, and the fact that these contributions varied widely from country to country, making it harder to derive accurately their average impact from a wide range of countries.

Monetary Regimes and Inflation Performance

Although inflation is a monetary phenomenon, fiscal deficits are a key long-run determi-

¹⁹Ilan Goldfajn and Sergio R. C. Werlang, “The Pass-Through From Depreciation to Inflation: A Panel Study,” (unpublished; Brasilia: Central Bank of Brazil, 2000); and Eduardo Borensztein and José de Gregorio, “Devaluation and Inflation,” (unpublished; Washington: International Monetary Fund, March 2000).

nant of inflation through the seigniorage channel. The conduct and institutions of monetary policy, however, clearly play a central role in price determination, particularly in the short to medium term. As has already been noted, in the short run the relationship between fiscal deficits and inflation may be relatively weak, since in most cases governments have access to noninflationary sources of financing. Moreover, the conduct and institutions of monetary policy may themselves influence fiscal policy. For example, a currency board tends to discourage persistently large fiscal deficits and the use of inflation tax, which are incompatible with sustainable pegs. This section reviews the record with the use of different monetary policy regimes, and the extent to which they have contributed to falling inflation rates during the 1990s.

What Does the Recent Record Tell Us?

The past 15 years or so witnessed a significant broadening of possible choices of monetary regimes and far-reaching institutional changes in the arrangements underpinning those regimes in emerging markets. Moving along the spectrum ranging from strict rules to full discretion, these regimes can be grouped as:

- Hard exchange rate pegs, which comprise currency unions, the use of foreign currency as the only legal tender, and currency board arrangements;
- Soft exchange rate pegs, including crawling pegs or bands, where the parity can be changed at the sole discretion of the monetary authority without violating any national law or international agreement;
- Floating exchange rate regimes where the monetary authority has a statutory mandate to target inflation directly (inflation targeting); and
- Other floating exchange rate regimes, including those where the monetary authority specifically targets the growth of monetary aggregates (monetary targeting), as well as hybrid arrangements whereby no

single nominal anchor is systematically targeted.²⁰

At one extreme—under hard pegs—the monetary authority has virtually no room for discretion, as domestic monetary conditions are strictly linked to those of the foreign country (or countries) through a rigid peg. Seigniorage and monetary accommodation are constrained through a visible and strict rule. At the other extreme—a floating exchange rate with no explicit nominal targeting—room for discretion is considerable, allowing monetary policy to be tailored to domestic business cycle conditions or respond to other considerations. In between, seigniorage and monetary accommodation are somewhat constrained either by a fixed peg (which can be adjusted within limits and often at a cost) or by a set of domestic laws and institutional arrangements, such as those that underpin an inflation targeting regime (Box 4.3).

Figure 4.5 summarizes trends in the use of four main competing regimes since the mid-1980s. Two main developments stand out. One is the continuing move toward more flexible exchange rate regimes and the erosion of soft pegs—an ongoing trend since the early 1970s that has been accelerated in recent years by greater international integration (notably through higher capital mobility and more open capital accounts) and by the exchange rate and financial crises of the mid and late 1990s.²¹ Second, there is a gradual emergence of a bipolar distribution among countries with more open

²⁰The main features of the operation of each of these regimes are extensively described elsewhere. Useful reviews can be found in Carlo Cottarelli and Curzio Giannini, *Credibility Without Rules? Monetary Frameworks in the Post-Bretton Woods Era*, IMF Occasional Paper No. 154 (Washington: International Monetary Fund, 1997); and Frederic Mishkin, “International Experiences with Different Monetary Policy Regimes,” NBER Working Paper No. 7044 (Cambridge, Mass.: National Bureau of Economic Research, September 2000).

²¹See Cottarelli and Giannini, *Credibility Without Rules*; and Michael Mussa, Paul Masson, Alexander Swoboda, Esteban Jadresic, Paolo Mauro, and Andrew Berg, *Exchange Rate Regimes in an Increasingly Integrated World Economy*, IMF Occasional Paper No. 193 (Washington: International Monetary Fund, 2000).

Box 4.3. Inflation Targeting in Emerging Market Economies: Implementation and Challenges

In recent years, several emerging market countries have joined a number of industrial countries in adopting monetary frameworks that formally target inflation. Brazil, Chile, the Czech Republic, Israel, Poland, and South Africa have adopted full-fledged inflation targeting, while others are moving toward this framework.¹

The experience of the countries that have adopted inflation targeting suggests that the foundations for successful inflation targeting are built on the following:

- a mandate to achieve price stability;
- central bank instrument independence;
- transparent policies to build accountability and credibility;
- a good framework for forecasting inflation;
- a reasonable understanding of transmission channels between policy instruments and inflation;
- a well-developed financial system;
- absence of fiscal dominance (i.e., and the conduct of domestic monetary policy should not be dictated by fiscal needs);
- a reasonable degree of macroeconomic stability.

Although these elements need not be considered prerequisites for beginning the transition toward full-fledged inflation targeting, they can pose important challenges for many emerging market countries seeking to go down this path. In many cases, central banks have yet to be granted the operational independence (i.e., an ability to set policy instruments without government oversight) needed to set monetary policy in accordance with a price stability objective, and they are often reluctant to communicate their economic outlooks and policy intentions in a transparent manner. Ongoing structural change in their economies may impede their ability to forecast inflation, while weak links between monetary policy and inflation often associated with underdeveloped financial systems or partial dollarization complicate the assessment

¹For further reading, see Andrea Schaechter, Mark R. Stone, and Mark Zelmer, *Adopting Inflation Targeting: Practical Issues for Emerging Market Countries*, IMF Occasional Paper No. 202 (Washington: International Monetary Fund, 2000).

of the appropriate policy response. In addition, it might take some time to establish the credibility of an inflation targeting framework, particularly in cases where there are large fiscal debt burdens or an inadequate track record of entrenched macroeconomic stability. That said, it is also true that many of these issues pose similar challenges for other monetary regimes, particular those using floating exchange rates.

An examination of the differences between emerging market countries that target inflation and those that do not sheds some light on the preferred starting point and conditions that favor the choice of inflation targeting among other alternative monetary policy regimes. Usually, inflation targeting countries are relatively well developed and have more complex domestic financial systems, suggesting these attributes should be considered by other countries thinking of adopting this monetary framework. They are also countries that have opted for significant exchange rate flexibility, in part because their terms of trade may follow different cycles than those of their major trading partners.²

The legal frameworks of all inflation targeting countries give the central bank instrument independence, and make price stability a primary objective.³ A comparison suggests that emerging market countries tend to prefer a more formal institutional framework in support of inflation targeting than industrial countries. Emerging market countries usually modify the central bank legal framework before adopting inflation targeting, and all emerging market countries explicitly limit central bank financing of govern-

²For example, as a major exporter of precious metals, South Africa's terms of trade are significantly affected by swings in commodity prices. A floating exchange rate regime anchored by an inflation targeting framework helps it manage the effects of commodity price movements on its economy.

³In most inflation targeting frameworks, the inflation target is announced by the government or jointly by the government and the central bank. Thus, while the government can play an active role in setting the objectives for monetary policy, the central bank has the discretion to take the monetary actions it judges necessary to achieve the target, and is publicly held accountable for its actions.

ment deficits in the primary market. The more formal inflation targeting frameworks in emerging market countries compared to their industrial counterparts may reflect histories of greater government intervention in monetary policy, higher and more variable rates of inflation, less developed financial systems, greater vulnerability to inflationary monetization of government debt, greater susceptibility to exchange rate crises, and IMF involvement.

There are also differences in the operation and design of inflation targeting between emerging market and industrial countries. Central banks in emerging market countries tend to rely less on statistical models in the conduct of monetary policy, intervene more frequently in foreign exchange markets, use shorter horizons to achieve their objectives, and target wider bands than industrial countries. These differences presumably reflect underlying differences between the two groups of countries. Structural changes in underlying economic relationships are more prevalent in emerging market countries, and they are inclined to be more vulnerable to shocks, especially those emanating from volatile capital flows. By mixing and matching the elements of the framework (such as the choice of the price index to be targeted, a point target or a range, and escape clauses) an inflation targeting central bank can design a framework that gives it the appropriate trade-off between credibility and the discretion needed to respond to shocks, such as unexpected hikes in oil prices.⁴

Volatile capital flows are usually associated with rapid movements in the exchange rate and pronounced swings in the spreads between domestic and international interest rates, which can be particularly disruptive for countries that are relatively open to trade or are large borrowers. In an inflation targeting framework, clear explanations by the central bank of the rationale underlying its policy stance may help to ensure

⁴Issues surrounding the design of inflation targeting frameworks are discussed in Ben Bernanke, Thomas Laubach, Frederic Mishkin, and Adam Posen, *Inflation Targeting: Lessons from the International Experience* (Princeton: Princeton University Press, 1999) and associated references.

that such shocks are not compounded by uncertainty regarding the conduct of monetary policy. Over time, a proven track record of attaining the inflation targets should help financial markets develop greater confidence in the motivations underpinning monetary actions.⁵ Nonetheless, central banks that target inflation have occasionally found it prudent to take action to moderate exchange rate movements to ensure that excessive changes do not destabilize inflation expectations or the domestic financial system while retaining exchange rate flexibility. Taking steps to moderate a rapid depreciation of the exchange rate can thus help to avoid the more dramatic tightening that might otherwise occur in response to financial instability, rather than because a tighter monetary stance is desired. This can be particularly important for partially dollarized economies, where the financial condition of the private sector is often sensitive to exchange rate fluctuations. However, it is important to unwind such actions as soon as practical to avoid moving away from the inflation target.

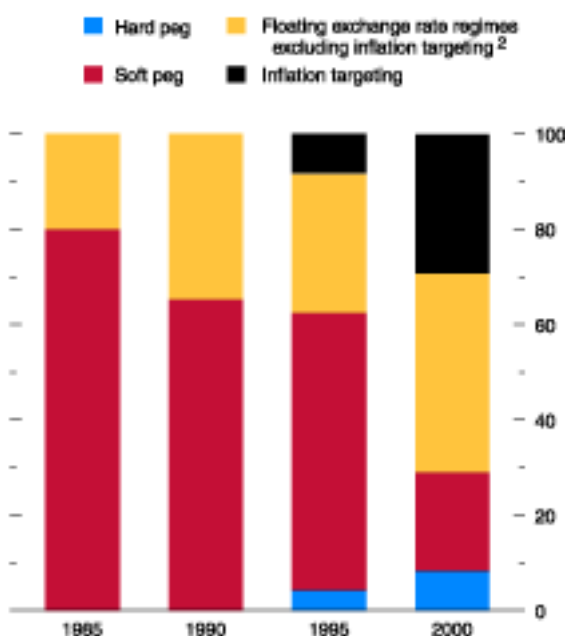
The transition to full-fledged inflation targeting is also an issue in many emerging market economies. Several countries have confronted the challenge of introducing this framework before they exited from an exchange rate targeting regime. The experiences of Israel and Poland suggest that a gradual shift from a fixed exchange rate regime to a looser exchange rate regime to an inflation targeting framework is feasible, but needs sound and supportive fiscal and structural policies to manage the transition and minimize the risk of undermining the credibility and effectiveness of the new framework by saddling the central bank with conflicting objectives.

⁵It is worth noting that many inflation targeting countries, such as Australia, Chile, and New Zealand, have found that the pass-through effects from exchange rate movements to domestic inflation declined as their inflation rates fell and inflation targeting frameworks gained credibility, implying that over time they can be more tolerant of exchange rate movements. However, it must be recognized that this fall in pass-through has also occurred in several countries that did not adopt inflation targeting frameworks but have been successful in lowering inflation.

Figure 4.5. Monetary Regimes in Emerging Market Countries¹

(Percent of all emerging market countries)

In recent years, countries have been moving away from "soft" pegs and instead gravitating toward either floating exchange rates in conjunction with inflation targeting or "hard" pegged exchange rates.



Source: IMF staff estimates.

¹Based on "de facto" classification following the method used in Stanley Fischer's "Exchange Rate Regimes: Is the Bipolar View Correct?" (speech to the American Economic Association, Jan. 6, 2001).

²Including monetary targeting regimes.

capital accounts, which have been leaning toward *either* hard exchange pegs or floating exchange rates, with inflation targeting being increasingly popular among the latter.²²

Partly reflecting these significant changes in the use of monetary and exchange rate regimes and the failure of many countries to reduce inflation on a sustained basis in the 1970s and 1980s, important institutional changes have taken place in recent years in central bank charters as well as in the overall design and goals of monetary policy in emerging markets. One of them is greater central bank independence and transparency. Following the pioneering experience of New Zealand and its adoption by other advanced countries, a growing number of emerging markets have given their central banks complete control over the instruments used to achieve a low inflation goal.

Along with central bank instrument independence, several emerging markets—inflation targeters or not—have also greatly increased the transparency and accountability of goals and procedures of monetary policy, often in the form of statutory arrangements, giving the central bank a well-defined mandate to pursue price stability. In Latin America, for instance, the Argentine central bank law of 1991 explicitly prescribes that "the primary and fundamental mission of the Bank is to preserve the value of the currency," while Chile's central bank act of the same year restricted the objectives of the central bank to "oversee monetary stability and the proper functioning of the internal and external payments system." In a similar vein, the new central bank charters for most transition economies—including the Czech Republic, Hungary, Poland, and Russia—which were passed into law in the early 1990s, clearly stated that the main goal for monetary policy was low inflation. In the particular case of countries

²²Reasons for this growing bipolar outlook are discussed in Stanley Fischer, "Exchange Rate Regimes: Is the Bipolar View Correct?" address to the American Economic Association Meeting (January 2001), available at <http://www.imf.org/external/np/speeches/2001/010601a.htm>.

adopting inflation targeting, such as Israel, Chile, and, more recently, Brazil, Colombia, Korea, Mexico, and South Africa, these statutory changes have been combined with the public announcement of multiyear targets for inflation. This has helped to reduce the room for monetary policy discretion in the medium to long run, thus helping anchor long-term inflation expectations. To the extent that these institutional changes limit the scope for seigniorage, they are clearly conducive to greater fiscal discipline.

The other change in monetary arrangements introduced by several emerging markets has been to allow domestic bank accounts and transactions to be conducted in either domestic or foreign currency.²³ Such a dual currency arrangement has often been coupled with hard exchange rate pegs (as in Hong Kong SAR since 1982, Argentina since 1991, and Bulgaria from 1997) or floating exchange rate regimes (as in Peru from the early 1990s). In most cases, foreign currency denominated assets and liabilities in the domestic financial system have expanded very rapidly, so that some of these economies have become highly “dollarized” or “euroized” (Figure 4.6). Once such freedom to choose between foreign and domestic currency denominated assets is combined with the elimination of capital account restrictions, allowing residents to switch freely between onshore and offshore asset holdings—as has been the case in most of these countries—a significant constraint on monetary policy discretion is imposed. Not only is the monetary authority given control of a smaller share of the money supply but also this share can rapidly shrink (via currency switching) if the credibility of domestic policies falters. Indeed, in

²³A few emerging market economies in the Western Hemisphere started allowing domestic banks to take foreign currency deposits and supply foreign currency denominated loans to residents already in the early 1970s, mainly to retain foreign exchange reserves within the country. However, in Argentina, Peru, and Mexico, for instance, the convertibility of foreign currency denominated deposits was temporarily suspended during macroeconomic crises in the 1980s, entailing a *de facto* partial confiscation of those deposits. Since the early 1990s, this arrangement been fully honored in those countries.

Figure 4.6. Foreign Currency Deposits

(Percent of M3)

The share of foreign currency deposits in the domestic banking systems rose significantly in recent years.



Sources: IMF, *International Financial Statistics*; and IMF staff estimates.

Table 4.4. Major Emerging Markets Exchange-Rate and Money-Based Stabilization Programs Since the 1970s

Country	Beginning Date	Exchange Rate/Monetary Arrangement ¹	12-Month Inflation			Did the Program End in a Currency Crash?
			At start of program	Third year of program	In 2000	
Chile	April 1975	Managed/Monetary aggregates	394.3	—	—	No. Ended December 1977.
Chile (Tablita)	February 1978	Crawling peg, peg.	52.1	28.7	4.5	Yes (February 1983).
Argentina (Tablita)	December 1978	Crawling peg	169.9	131.3	—	Yes (April 1982).
Argentina (Austral)	June 1985	Peg, crawling peg	1,128.9	—	—	Yes (September 1987).
Israel	July 1985	Peg, horizontal band, crawling band.	445.4	16.0	0.3	No.
Brazil (Cruzado)	February 1986	Peg.	286.0	—	—	Yes (March 1987).
Mexico	December 1987	Peg, crawling peg, widening band.	143.7	29.9	8.9	Yes (December 1994).
Argentina (Bonex)	December 1989	Float/Monetary aggregates	4,923.3	—	—	No. Ended February 1991.
Poland	January 1990	Peg, crawling peg, widening band.	639.6	39.8	8.6	No.
Brazil (Collor)	March 1990	Managed/Monetary aggregates	5,747.3	—	—	No. Ended January 1991.
Peru	August 1990	Float/Monetary aggregates	12,377.8	48.5	3.7	No.
Argentina (Convertibility)	April 1991	Currency board.	287.4	4.3	0.1	No.
Brazil (Cardoso)	July 1994	Managed float, crawling peg.	4,922.6	6.1	6.0	Yes (January 1999).
Russia	July 1995	Band, crawling band.	225.0	5.5	20.2	Yes (August 1998).
Bulgaria	July 1997	Currency board.	1,502.8	8.6	11.4	No.
Turkey	January 1998	Crawling peg.	99.1	—	39.0	Yes (February 2001).

Sources: G. Calvo and C. Végh, "Inflation Stabilization and BOP Crises in Developing Countries," in *Handbook of Macroeconomics*, ed. by John Taylor and Michael Woodford (New York, North Holland, 1999), pp. 1531–1614; and IMF staff estimates.

¹Where more than one arrangement is listed, the sequence of arrangements is indicated.

several countries the dollarization of financial intermediation appears to be quite sensitive to interest rate differentials, exchange rate volatility, and changes in devaluation risk.²⁴ At the same time, to the extent that partial dollarization reduces the scope for monetary policy discretion and the base for seigniorage, it also helps foster fiscal discipline.

How do these different monetary regimes (and the new institutional arrangements underpinning them) fare relative to each other in terms of: (1) the speed at which inflation is brought down after the regime is adopted; (2) the output cost of the policies designed to drive down inflation (the so-called "sacrifice" ratio);

²⁴The response of dollarization to interest rate differential in a few European emerging markets is examined in Fischer, Sahay, and Végh, "Modern Hyper—and High Inflation." Evidence on the impact of real exchange volatility on dollarization in large cross-section of countries is provided in Alain Ize and Eduardo Levy-Yeyati, "Dollarization of Financial Intermediation: Causes and Policy Implications," IMF Working Paper 98/28 (Washington: International Monetary Fund, 1998). For a theoretical analysis see Luis Catão and Marco Terrones, "Determinants of Dollarization: The Banking Side," IMF Working Paper 00/146 (Washington: International Monetary Fund, 2000).

and (3) their ability to foster fiscal discipline and *sustain* low inflation in the longer-term?

Most countries that experienced high inflation have at some point used exchange-rate-based stabilization programs to reduce price increases (see Table 4.4). Examples of soft pegs used to lower inflation from very high rates include the three attempted stabilizations in Argentina (including the Tablita and Austral plans) as well as stabilization programs in Brazil, Bulgaria, Chile, Israel, Mexico, Poland, Russia and, most recently, Turkey. In addition, some countries with moderate inflation also used soft pegs to help reduce it (e.g., Egypt, Pakistan, and Hungary), whereas others—notably in east Asia—pegged their exchange rates as much to achieve foreign trade stability as to keep inflation low. Examples of exchange-rate-based stabilizations using hard pegs include Argentina from 1991 and Bulgaria since 1997.

Exchange-rate-based stabilization programs generally succeeded in bringing inflation down rapidly in the short term, often accompanied by dramatic initial expansions in activity and appreciation of the real exchange rate (Figure 4.7), as inflation in the tradable goods sector slowed at a much faster

rate than in nontradable goods.²⁵ This appreciation of the real exchange rate often led to unsustainable increases in domestic demand, output, and imports (as consumers and firms took advantage of the lower prices of foreign goods by accelerating such purchases), posing a clear threat to the balance of payments. Less credible pegs have been particularly susceptible to this effect, leading to a sharply negative short-run sacrifice ratio (the ratio of lost output to inflation reduction) at first, but at the cost of a significant recession later, particularly if the peg is abandoned.

Regarding the long-term impact on inflation, the difference between soft and hard pegs is important. In the case of soft pegs, growing balance of payments pressures have often led to their demise. This was so, for instance, in Argentina following the stabilization programs of 1978–81 (the *tablita*) and the 1985–86 Austral plan; Brazil during the 1986 cruzado plan and (to a lesser extent) the 1994–98 Real plan; the Chilean *tablita* program of 1978–82; Mexico following the 1987–94 stabilization; Russia in 1995–98; and it was a contributing factor in Turkey more recently.²⁶ In addition, because fixed exchange rate regimes tend to encourage unhedged foreign currency borrowing (often backed by implicit or explicit government guarantees), the collapse of the peg has tended to produce severe domestic banking crises—as, for instance, in Mexico during the 1994–95 “Tequila” crisis, in several Asian emerging markets during 1997–98, and in Turkey more recently.²⁷

²⁵For a stylized graphical description of the main macroeconomic regularities of exchange-rate-based stabilizations, see Guillermo Calvo and Carlos Végh, “Inflation Stabilization and BOP crises in Developing Countries;” and Mussa and others, *Exchange Rate Regimes in an Increasingly Integrated World Economy*.

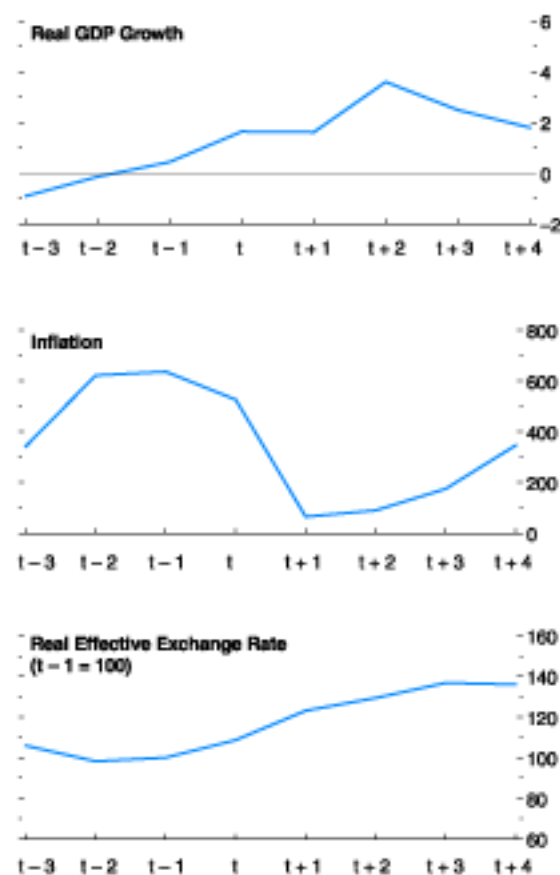
²⁶In recognition of such concerns, the Turkish program included an exit strategy to a floating exchange rate system (see Chapter I for more details). However, the pegged exchange rate collapsed before the exit strategy could be implemented.

²⁷The frequent juxtaposition of currency and banking crises (the so-called “twin crises”) has been documented in Graciela Kaminsky and Carmen Reinhart, “The Twin Crisis: The Causes of Banking and Balance-of-Payments Problems,” *American Economic Review*, Vol. 89 (June 1999), pp. 473–500.

Figure 4.7. Selected Exchange Rate Stabilization Programs, 1985–98¹

(Simple averages, three years prior and four years after program initiation, *t*)

Exchange rate stabilization has been generally associated with output growth in the early stages and a marked appreciation of the real exchange rate.



Source: IMF staff estimates.

¹Simple averages for the following nine exchange rate stabilization programs: Israel, July 1985; Brazil (Cruzado), February 1986; Mexico, December 1987; Poland, January 1990; Argentina (Convertibility), April 1991; Brazil (Cardoso), July 1994; Russia, July 1995; Bulgaria, July 1997; and Turkey, January 1998.

Part—but certainly not all—of the sustainability problem with soft pegs seems related to the ambiguous relationship between pegged exchange rate regimes and fiscal discipline.²⁸ On the one hand, fixed exchange rates should be expected to foster fiscal discipline, given that policymakers know all too well that fiscal discipline is required to maintain the peg and that failure to do so is likely to result in politically and economically costly devaluations.²⁹ On the other hand, one can argue that fixed exchange rates can (temporarily) mask excesses in fiscal policy that would manifest themselves much faster in a floating exchange rate regime.³⁰ This masking effect can be particularly hazardous at the onset of stabilization programs where inflation drops sharply following the introduction of the peg, giving a false impression that the stabilization gains are permanent and leading to procrastination in undertaking the necessary but unpopular fiscal measures. Indeed, a common pattern of several stabilization programs is that of monetary discipline being enforced first and fiscal adjustment coming later—sometimes too little and too late.³¹ This is largely because, as discussed earlier, consensus on fiscal adjustment and supportive reforms generally takes longer, is harder to achieve, and can be politically very costly. Consistent with these arguments about the ambiguous relationship between fiscal deficits and exchange rate regimes, a recent em-

pirical study has found that the magnitude of fiscal deficits (measured as a ratio to GDP) has varied widely across pegged exchange rate regimes, that differences in fiscal performance between pegged and floating regimes are not statistically significant, and that the net effect depends on the choice of group of countries.³²

That said, some soft exchange rate pegs have succeeded in bringing inflation down on a more sustained basis, particularly in the 1990s. Common general features of these experiences include fiscal restraint, broader structural and institutional reforms, and actions to break inflation inertia, such as wage freezes and labor market reform.³³ In addition, a variety of macroeconomic strategies have accompanied these stabilizations. In Egypt, inflation was reduced through an exchange-rate-based stabilization program and adherence to a soft-peg regime, which was supported by strong fiscal consolidation and gradually made more flexible. In other cases, such as Israel and Poland, inflation was reined in through a gradual loosening of the exchange rate band and, over time, the adoption of an inflation targeting regime (in Israel, capital controls also played a part). In Hungary, however the appreciation of the real exchange rate following stabilization was successfully contained through tight fiscal and monetary policies. In several Asian countries (notably Malaysia, Korea, and Thailand until the 1997–98 crisis), exchange rate

²⁸Other sustainability problems are discussed in Stanley Fisher and Ratna Sahay, “The Transition Economies After Ten Years.”

²⁹Paul Krugman first formalized the relationship between fiscal deficits and speculative attacks in what became subsequently known as a “first-generation” model of currency crises. See Paul Krugman, “A Model of Balance-of-Payments Crises,” *Journal of Money, Credit and Banking*, Vol. 11 (November 1979), pp.311–25.

³⁰This argument has been made by Aaron Tornell and Andres Velasco, “Fixed versus Flexible Exchange Rates: Which Provides More Fiscal Discipline?,” *Journal of Monetary Economics*, Vol. 45 (April 2000), pp.399–436. In other words, under flexible exchange rates the excesses of fiscal policy tend to be paid immediately, providing greater incentives to fiscal rectitude.

³¹This was the case, for instance, in Mexico in 1988–94, Brazil during 1994–98, and Turkey through much of the 1990s.

³²See Antonio Fatás, and Andrew K. Rose, “Do Monetary Handcuffs Restrain Leviathan? Fiscal Policy in Extreme Exchange Rate Regimes,” CEPR Discussion Paper No. 2692 (London: Centre for Economic Policy Research, 2001). A study for Latin America found no evidence that fixed exchange rates brought about greater fiscal discipline. See Michael Gavin and Roberto Perotti, “Fiscal Policy in Latin America,” in *NBER Macroeconomics Annual*, ed. by Ben Bernanke and Julio Rotemberg (Cambridge, Mass.: The MIT Press, 1997). At the other extreme, Aaron Tornell and Andrés Velasco, “Fixed versus Flexible Exchange Rates: Which Provides More Fiscal Discipline?,” find that floating exchange rate regimes have been more conducive to fiscal discipline in their sample of sub-Saharan African countries.

³³See Stanley Fischer and David Orsmond, “Israeli Inflation from an International Perspective,” IMF Working Paper 00/178 (Washington: International Monetary Fund, 2000).

pegs were also associated with low inflation. This history of monetary stability helped limit the exchange rate pass-through in the Asian crisis, enabling these countries to preserve low inflation.

In the case of hard pegs, devaluations have been much less frequent in both the recent and the distant past.³⁴ One reason is that a government's reputation tends to suffer following an exit from a hard peg; therefore, governments have been reluctant to abandon their hard pegs. The other reason is that countries under hard pegs have become highly "dollarized" or "euroized" following their adoption of dual currency arrangements in domestic banking and extensive foreign currency borrowing by the public and private sectors. As a result, the benefits of a devaluation on external competitiveness are smaller, while the impact on balance sheets can be highly contractionary if the nonfinancial private sector has a net short position in foreign currency. Yet, short-run output costs of sticking to the peg have at times been significant, as witnessed for instance by the experiences of Hong Kong SAR in 1997–98 and Argentina during the 1994–1995 "Tequila" crisis, as well as following the large external shocks associated with the Asian crisis of 1997–98 and the Russian crisis of 1998.

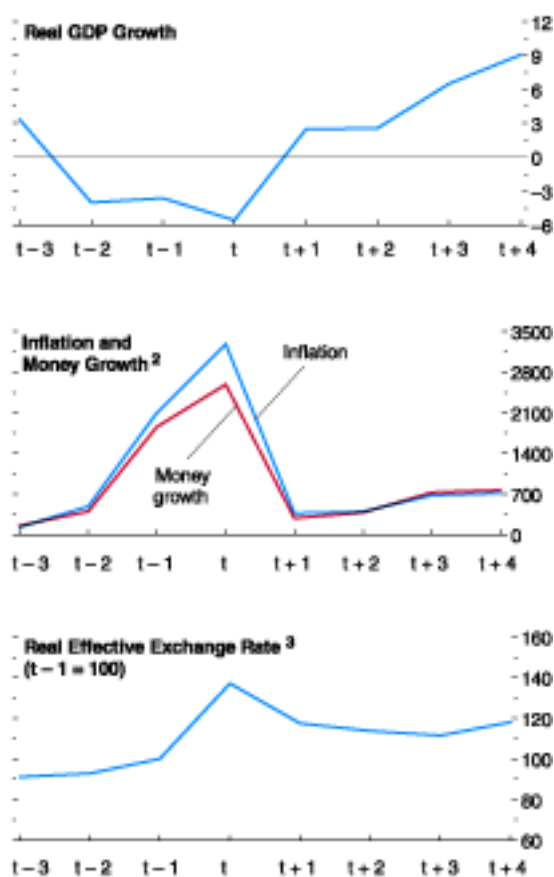
Until recently, the use of *floating exchange rate regimes* in stabilization programs has been mostly associated with the use of a monetary anchor. In this case, rather than pegging the exchange rate to that of a low inflation country, the central bank targets a monetary aggregate such as the monetary base or broad money, seeking to slow down its growth rate. Three main stylized facts have been generally associated with the use of monetary targeting in stabilization programs in emerging markets (Figure 4.8): (1) the slow convergence of inflation to the growth rate of the money supply, implying that dramatic monetary

³⁴In the case of currency boards, the historical record indicates that most exits from the regime have been voluntary, and primarily reflecting political factors rather than external macroeconomic shocks. See Atish Ghosh, Anne-Marie Gulde, and Holger Wolf, "Currency Boards: More than a Quick Fix?," *Economic Policy: A European Forum* (October 2000).

Figure 4.8. Selected Monetary Stabilization Programs, 1975–90¹

(Simple averages, three years prior and four years after program initiation, t)

Money-based stabilization programs have been generally associated with sharp output losses at their initial stages and limited appreciation of the real exchange rate.



Source: IMF staff estimates.

¹Simple averages for the following four monetary stabilization programs: Chile, April 1975; Argentina (Bonex), December 1989; Brazil (Collor), March 1990; Peru, August 1990. Data for Argentina in years $t+1$, $t+2$, $t+3$, and $t+4$ excluded because it adopted a new exchange rate stabilization program in $t+1$ (1991).

²Money growth measured as annual percent change in M1.

³Excludes Peru for which real effective exchange rate data was not available prior to 1978.

tightening is typically needed to produce a significant drop in inflation; (2) a real appreciation of the currency but without leading to a clear-cut deterioration of the current account; and (3) an initial contraction (often dramatic) in economic activity. The third item implies that, in contrast with exchange-rate-based stabilizations, recessions will come earlier rather than later, in line with the kind of Phillips curve trade-offs observed in industrial countries.³⁵ The initial recession tends to be very sharp.³⁶ Partly for this reason, and in marked contrast with exchange rate pegs, the external trade and current account balances do not typically move sharply into deficits that bring into question the sustainability of the regime.

There is also consensus that the use of monetary targeting to maintain low inflation has become increasingly problematic in emerging markets. As amply demonstrated by the experience of industrial countries, a major issue is the instability of the relationship between monetary aggregates and inflation, often exacerbated by growing international capital mobility and financial innovation.³⁷ The issue is likely to be even more acute among emerging markets with long histories of monetary instability (which, among other things, makes it difficult to characterize the money-inflation relationship using long time series data) and where continuing currency substitution, the dollarization of bank deposits (in countries where they are allowed), and large swings in capital inflows stemming from changes in external interest rates complicate the control of domestic money growth.³⁸ In addition, grow-

ing dollarization in several of these countries and associated currency mismatches in private sector balance sheets can make it very difficult for central banks to focus solely on the pre-set monetary target at the expense of exchange rate stability when conflict between them arises.³⁹ For these reasons, monetary targeting regimes seem a clearly inferior alternative to other existing regimes outside the realm of stabilization programs in emerging markets—a contention supported by the fact that they have been largely abandoned in both advanced and emerging market economies.

The international experience with *inflation targeting*, albeit very recent, has been so far significantly more favorable. Regarding its capacity to lower inflation, a recent study including both industrial countries and emerging markets that have adopted inflation targeting over the past decade finds that it has taken about 10 quarters (2½ years) on average for a country to achieve stationary inflation levels following the adoption of inflation targeting.⁴⁰ Among emerging markets, however, the variance has been higher—with Chile and Israel having experienced the longest transition periods (nine and six years, respectively) since they began to publicly announce inflation targets in the early 1990s—partly reflecting the wider discrepancies in inflation levels at the starting point of the new regime. Countries that adopted inflation targeting have also been generally successful in meeting their announced targets, a feature that stands in sharp contrast with the international experience with mone-

³⁵This difference in output performance between the two types of stabilization strategies has been dubbed in the literature as the “recession now vs. recession later” hypothesis.

³⁶See Guillermo Calvo and Carlos Végh, “Inflation Stabilization and BOP Crisis in Developing Countries.”

³⁷Between the early 1970s and early 1980s, about half of the industrial countries adopted monetary targeting, but most of them discontinued the practice since. See Cottarelli and Giannini, “Credibility Without Rules.”

³⁸See, for instance, Guillermo Calvo and Carlos Végh, “Currency Substitution in Developing Countries: An Introduction,” *Revista de Análisis Económico*, Vol. 7 (June 1992), pp. 3–28; Ratna Sahay and Carlos Végh,

“Dollarization in Transition Economies: Evidence and Policy Implications,” and Miguel Savastano, “Dollarization in Latin America: Recent Evidence and Policy Issues,” both in *The Macroeconomics of International Currencies: Theory, Policy, and Evidence*, ed. by Paul Mizen and Eric Pentecost (Gloucstershire, UK: Edward Elgar), pp. 193–224.

³⁹As discussed later, a similar trade-off may arise under inflation targeting.

⁴⁰See Vittorio Corbo, Oscar Landerretche Moreno, and Klaus Schmidt-Hebbel, “Does Inflation Targeting Make a Difference?” (unpublished; Santiago: Central Bank of Chile, 2000).

tary targets, which were frequently breached and revised.⁴¹

Sacrifice ratios have also been considerably lower under inflation targeting than under monetary targeting, though not as favorable as under exchange-rate-based stabilizations. In countries that have been under inflation targeting for several years (Chile and Israel, among emerging markets, and Australia, Canada, Chile, Finland, New Zealand, Spain, Sweden, and the United Kingdom), the sacrifice ratio has been estimated at 0.6 percent of annual GDP. For emerging market countries that adopted the framework over the past two years (Brazil, Colombia, Korea, Mexico, and South Africa) the average sacrifice ratio has to date been slightly negative (−0.4 of GDP).⁴² Both figures are substantially lower than traditional benchmark estimates of sacrifice ratios in advanced countries.⁴³

Inflation targeting's effect on fiscal performance is harder to establish, though the evidence is consistent with the hypothesis that it helps foster fiscal discipline. Table 4.5 shows that all countries that adopted inflation targeting experienced some improvement in their fiscal balances, typically with a one-to two-year lag (al-

though in some cases the improvement preceded the introduction of inflation targeting). As the absence of fiscal dominance appears to be a pre-condition to successful inflation targeting (Box 4.3), fiscal discipline and maintenance of a targeting regime should be linked without necessarily implying that one causes the other.⁴⁴ In any event, it is significant that in none of the countries where inflation targeting has been introduced has there been any evidence of a subsequent loosening of the fiscal stance.⁴⁵

Some aspects of inflation targeting remain controversial. First, in virtually all countries that adopted inflation targeting, inflation had already been slowing and several of them embarked upon the new regime with single-digit inflation levels. In two emerging markets where inflation was in the double-digits prior to the adoption of inflation targeting (Chile and Israel), the transition period was rather protracted, even though inflation had been already trending down. This may suggest that the main strength of inflation targeting as a monetary policy regime lies in its capacity to keep inflation under control *once it is already low*.

Second, economic theory maintains that a key ingredient to reduce inflation is regime credibility. This raises the question of where monetary policy credibility will come from in the case of emerging markets that are considering adopting inflation targeting following a long history of monetary instability and/or large devaluations. In this regard, a comparison between inflation targeting and its main competitor—exchange rate pegs—is illustrative. Under exchange rate pegging, credibility is largely imported—that is, it comes from a tangible (and hence credible) restraint on the behavior of tradable prices. In

⁴¹Corbo, Moreno, and Schmidt-Hebbel, "Does Inflation Targeting Make a Difference?," estimate an annual absolute average deviation between actual and target inflation of 66 basis points during the period 1989–2000 for a sample of countries consisting of Australia, Canada, Chile, Finland, Israel, New Zealand, Spain, Sweden, and the United Kingdom. Regarding the experience of emerging markets that have joined the sample more recently (Brazil, Colombia, Korea, Mexico, and South Africa) those deviations have averaged 2.74 percentage points. Another related indicator is the frequency of quarterly breaches in inflation targets. These have been relatively infrequent during both the disinflation period and the long-run target period. See Andrea Schaechter, Mark R. Stone, and Mark Zelmer, "Adopting Inflation Targeting: Practical Issues for Emerging Market Countries," IMF Occasional Paper No. 202 (Washington: International Monetary Fund, 2000).

⁴²See Corbo, Moreno, and Schmidt-Hebbel, "Does Inflation Targeting Make a Difference?"

⁴³Estimates of sacrifice ratios in developed countries are provided in Laurence Ball, "What Determines the Sacrifice Ratio?," in *Monetary Policy*, ed. by Gregory Mankiw (Chicago: The University of Chicago Press, 1994), pp. 155–188.

⁴⁴It may simply be that a country decides to adopt inflation targeting once the fiscal situation is reasonably under control or there is already a firm resolve to lower the deficit.

⁴⁵Ideally, the way to measure the performance would be based on cyclical adjusted measures of the fiscal stance, rather than based on actual fiscal deficits scaled by nominal GDP. However, as previously noted, such measures are hard to obtain for emerging markets, partly due to a lack of consensual estimates of the output gap.

Table 4.5. Fiscal Balances of Countries That Adopted Inflation Targeting¹
(Annual percent)

Country	1985–89	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<i>Early inflation targeters</i>												
Chile ²	1.01	3.48	2.38	3.02	1.75	2.26	3.63	2.58	2.10	-0.11	-2.37	-1.06
Israel ²	-3.49	-4.35	-6.08	-3.65	-2.50	-2.30	-4.10	-3.70	-2.70	-2.30	-2.25	-0.61
Australia	-0.18	0.91	-1.39	-3.44	-3.90	-3.27	-2.37	-1.48	-0.29	0.66	1.46	1.32
Canada	-5.33	-4.91	-5.45	-5.12	-5.48	-4.57	-3.93	-2.04	0.50	0.52	0.62	1.43
Finland	0.98	1.02	-4.54	-8.11	-10.65	-10.77	-8.72	-7.20	-3.67	-1.48	-0.78	1.34
New Zealand	-2.66	-1.68	-4.48	-4.61	-0.69	2.20	3.61	2.72	1.64	0.97	0.43	0.30
Spain	-3.84	-2.80	-2.20	-2.67	-5.91	-4.92	-5.92	-3.93	-2.67	-2.14	-1.09	-0.72
Sweden	-0.48	1.33	-3.93	-9.76	-14.66	-11.27	-8.72	-3.77	-1.79	0.64	3.66	3.92
United Kingdom	-1.42	-0.84	-2.78	-7.24	-8.18	-6.91	-5.48	-4.16	-1.48	0.25	1.48	3.80
Average	-1.71	-0.87	-3.16	-4.62	-5.58	-4.39	-3.55	-2.33	-0.93	-0.33	0.13	1.09
<i>Newcomers</i>												
Brazil	-1.51	2.64	0.19	-0.87	-0.10	0.10	-2.27	-2.57	-2.63	-5.40	-6.89	-3.20
Colombia ³	-1.56	-0.68	0.01	-1.81	-1.02	-1.47	-3.37	-4.63	-3.41	-5.37	-7.43	-6.05
Czech Republic	2.52	-2.07	4.15	-0.62	0.46	1.24	-0.25	-0.10	-0.94	-1.63	-1.61	-2.30
Mexico ³	-9.79	-2.60	0.20	1.46	0.77	-0.58	-1.74	-1.00	-1.86	-2.27	-2.22	-0.94
Poland	-2.03	0.71	-7.24	-7.27	-3.92	-3.39	-3.67	-3.53	-2.61	-2.97	-4.98	-5.28
South Africa	-4.46	-3.11	-4.76	-8.73	-9.42	-5.24	-5.19	-4.51	-3.84	-2.34	-2.06	-2.65
Thailand	-2.43	4.73	4.81	2.83	2.19	1.92	2.97	2.47	-0.86	-2.55	-2.94	-2.24
Average	-2.80	-0.85	-1.24	-2.97	-2.20	-1.56	-2.75	-2.72	-2.55	-3.33	-4.20	-3.40

¹Years under inflation targeting in bold.

²Date for starting with inflation targeting at the point inflation targets began to be publicly announced.

³Inflation targeting starting in 2001. Previously, monetary targets were announced.

particular, under currency unions or unilateral adoption of the currency of a low inflation country, credibility clearly stems from national constitutional arrangements and/or international agreements that tend to be hard to revoke. In the absence of those, inflation targeting countries have to rely on the various institutional arrangements discussed above, such as greater transparency and accountability of monetary policies, granting the central bank operational (instrument) independence, and giving the central bank a clear mandate to lower inflation above anything else. As noted before, there is evidence that such arrangements have played a significant role in helping to control inflation; yet, building such credibility may take a significant time and, hence, protract stabilization.⁴⁶

Third, inflation targeting may be a problem in countries that must maintain exchange rate sta-

bility to protect the unhedged balance sheet positions of the private sector. Indeed, because of potential financial fragilities arising out of large exchange rate movements, it has been argued that most developing countries tend to display a “fear of floating.”⁴⁷ In principle, inflation targeting does not rule out some attention being paid to exchange rate movements by the central bank to the extent that they have a bearing on future inflation. This generally produces a pattern of monetary tightening when the exchange rate depreciates, a similar response (but not necessarily of the same magnitude) to that if the exchange rate were being targeted directly. So, inflation targeting does take into account the “fear of floating” argument, but only indirectly. To the extent that conflicting objectives between exchange rate stability and inflation arise or the magnitude of tightening needed to stabilize the exchange rate differs substantially from that needed to achieve the inflation targets, balance sheet considerations

⁴⁶One possible alternative is to borrow temporarily such credibility from an external institution, such as the IMF, until the “nuts and bolts” of inflation targeting are put in place. Countries that adopted inflation targeting or started moving toward it while under IMF-supported programs include Brazil, Colombia, and Thailand.

⁴⁷See Guillermo Calvo and Carmen M. Reinhart, “Fear of Floating,” NBER Working Paper No. 7993 (Cambridge, Mass.: National Bureau of Economic Research, 2000).

(as in several partially dollarized emerging market economies) may become paramount, limiting the use of inflation targeting and undermining the transparency of monetary policy.

Finally, successful inflation targeting has generally been associated with significant preconditions that some other emerging markets currently may find difficult to meet (see Box 4.3). Particular examples are the existence of well-developed financial markets, absence of fiscal dominance, reasonably well-understood transmission mechanisms, and central bank instrument independence.

Safeguarding Low Inflation in Emerging Markets

As discussed above, the decline in world inflation and greater monetary stability in advanced countries, together with the strengthening of institutional arrangements in recent years, have helped to address one of the main causes of emerging market inflation in previous decades—namely, the lack of a credible nominal anchor for private sector inflation expectations. In addition, the substantial progress made over the past decades in the theory and practice of monetary policy has undoubtedly contributed to sounder central banking practices. This includes not only more sophisticated forecasting tools and a better understanding of policy instruments, but also—and perhaps more crucially—the emphasis on transparency and accountability of central bank decisions and awareness of the perils of saddling the monetary authority with multiple objectives other than that of preserving price stability. Finally, other structural policies have helped by making economies more efficient and reducing inflation inertia, such as labor market and trade reform.

However, lower external inflation, sounder central bank arrangements, and better understanding of monetary policy do not guarantee price stability. Because monetary and fiscal policies are intrinsically linked through the budget constraint of the consolidated government, monetary policy soundness, and hence a country's inflation performance, are dependent on

the stance of its fiscal policy. While recent institutional changes in monetary policy arrangements do appear to have helped curb fiscal excesses, they cannot of themselves prevent persistent fiscal deficits. Indeed, history points to episodes of significant loosening of fiscal policies under currency boards, central bank independence, and partial and even full dollarization; moreover, significant reductions in fiscal deficits in several countries that adopted inflation targeting in recent years are yet to be seen. This suggests that monetary arrangements *per se* have only limited power to fix “real” problems arising from a fiscal regime inconsistent with the goal of price stability.

There have, of course, been other general developments that have helped restrain fiscal excesses in emerging markets, some of which may be of a more permanent nature. One of them is the rapid growth of domestic financial systems. As mentioned above, inflation appears to be inversely related to the depth of domestic financial markets, insofar as the latter lowers the cost of noninflationary financing of fiscal deficits and reduces the need of seigniorage. Financial sector concerns about inflation, combined with the sector's growing economic importance, are also a contributing factor.⁴⁸ A second key development is greater financial integration of emerging market countries within the world economy. To the extent that national governments compete among themselves for a given pool of world savings, and international capital markets monitor country-specific fiscal developments and price the respective sovereign spreads accordingly, this provides a clear incentive for fiscal prudence. Third, public tolerance for inflation appears to be lower. This may be merely due to a demonstration effect stemming from low inflation in in-

⁴⁸The argument about financial sector distaste for inflation and its impact on macroeconomic discipline has been made by Adam Posen, “Why Central Bank Independence Does Not Cause Low Inflation: There Is No Institutional Fix for Politics,” in *Finance and the International Economy: The AMEX Bank Review Prize Essays*, ed. by Richard O'Brien, Vol.1 (New York: Oxford University Press, 1993).

dustrial countries, but it may also reflect greater political weight in newly democratic regimes of lower income groups that are bound to lose more from inflation (see Box 4.1).

Other factors, however, may pose a threat to recent gains in price stabilization. First, some of the underlying institutional arrangements now in place in several emerging markets—notably those underpinning inflation targeting—are fairly new and have not been extensively tested. It remains to be seen whether they will be sustainable and effective in controlling inflation under a variety of crisis situations, such as those that plagued many emerging markets over the past decade. Second, despite substantial improvement in recent years, fiscal deficits remain relatively high in several emerging market countries, and in some countries public debt/GDP ratios are approaching those of advanced economies that have much more extensive welfare systems and a significant elderly population. Perhaps even more worrisome, fiscal consolidation efforts have been halted in quite a few countries over the past five years (see Table 4.3). Reasons for concern seem especially justified in some countries with hard exchange rate pegs where the accompanying requirement of stringent fiscal discipline has been somewhat lacking. To the extent that fail-

ure in taking bold steps in this direction increase the temptation to tackle the fiscal problem by resorting to the inflation tax, long-term price stability could be threatened.

Finally, consensus on how to distribute the fiscal cost of price stabilization remains hard to forge. This has been particularly the case in emerging markets with wide income disparities, long histories of fiscal and monetary imbalances, and sharply divided governments—factors that no doubt increase the political cost of monetary and fiscal prudence. Although low inflation *per se* may help create a strong constituency in favor of price stability, this cannot be taken for granted, at least on the basis of historical experiences to date.⁴⁹ These political economy complications indicate that the achievement and preservation of price stability in those countries will require a firm political resolve and strong institutional arrangements to limit the discretion of *both* the monetary and the fiscal authorities.

⁴⁹This point is vividly illustrated in the words of Brazilian finance minister Pedro Malan in the wake of the 1994 Brazilian stabilization program: “We made a bet that the initial success at bringing down inflation would create the political support for the reforms required to consolidate those gains. This is a bet that’s still on the table,” *Wall Street Journal*, October 4, 1995, quoted in Alejandro M. Werner, “Building Consensus for Stabilization.”