INTERNATIONAL MONETARY FUND

Inflation Targeting and the IMF

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EXECUTIVE SUMMARY

1. **Inflation targeting is becoming the monetary policy framework of choice in a growing number of emerging market and developing countries**. This paper examines the experience of non-industrial inflation targeting countries to review the implications for the Fund's approach to surveillance, technical assistance, and the design of conditionality in Fund-supported programs. For this examination, the paper uses macroeconomic data, technical assistance reports, and a new survey of central banks in selected emerging markets.

2. **Subject to the caveat that the sample of non-industrial inflation targeters is relatively small, the paper presents evidence supporting the following conclusions**.

- Although macroeconomic performance improved in most non-industrial countries over the past decade, countries adopting inflation targeting have, on average, outperformed countries with other monetary policy frameworks.

- The evidence suggests that successful adoption of inflation targeting depends more on establishing a credible commitment to the strategy than on fulfilling a lengthy list of technical prerequisites. However, swift progress on improving these conditions is critical to maximizing the bonuses associated with inflation targeting.

- Many countries considering adopting inflation targeting have more favorable economic and institutional conditions compared with those in current inflation targeters at the time the latter countries adopted inflation targeting.

- The framework of inflation targeting can be adapted to particular characteristics of emerging market economies, taking into account greater vulnerability to exchange rate developments, or weaknesses in data availability or forecasting capabilities.

- The decision to adopt an inflation targeting framework should be based on an explicit comparison of the pros and cons of inflation targeting and alternative frameworks. Notwithstanding the flexibility of the framework, there are countries where institutional and operational capacity, and structural characteristics are likely to make inflation targeting unsuitable as a monetary policy framework in the foreseeable future.

3. **The findings of the paper have implications for various aspects of the Fund's work**. Further research is needed to develop models for use as frameworks for macro-economic forecasts, as well as more intensive training of staff on the use of these models. There are also implications for the Fund's technical assistance agenda, in particular a need for more applied work on topical operational issues such as foreign exchange intervention during the transition to inflation targeting, and on developing effective monetary operations under various market structures. Finally, the reviews-based approach for inflation targeters introduced in 1999 was worked satisfactorily, although a firmer application of this approach might be necessary in some future programs, particularly for members that have yet to establish strong monetary policy credibility.

I. INTRODUCTION

4. **Inflation targeting as a framework for monetary policy was first adopted in the early 1990s by industrial countries** like New Zealand, Canada, the United Kingdom and Sweden. In most cases, the adoption of this framework was in response to difficulties these countries faced in conducting monetary policy using an exchange rate peg or some monetary aggregate as an intermediate target.[2] For a time, it was exclusive to industrial countries. However, since the late 1990s, it has been adopted in a number of emerging market and developing countries. Currently, twenty-three countries can be classified as inflation targeters, of which 7 are industrial and 16 are non-industrial (Table 1).

5. **Inflation targeting entails the direct and explicit targeting of inflation.** Under inflation targeting, low inflation is the stated primary goal of monetary policy, and the only one for which a numerical target is announced, although other goals like full employment or low exchange rate volatility may be pursued on a secondary basis. In contrast, other monetary policy frameworks attempt to affect inflation indirectly by targeting exchange rates or monetary aggregates, or include inflation as only one of a number of policy objectives.

6. **Under inflation targeting, the forecast of inflation and other macroeconomic variables serves as a guidepost for policy, providing early warnings of inflationary pressures**. Monetary policy can only influence inflation with a lag, as outstanding price and wage contracts that are indexed to past inflation tends to make inflation sticky. In practice, inflation targeting involves adjusting monetary policy instruments in response to new information in order to bring inflation back toward the target in a manner that takes into account the implications for the real side of the economy, as well as the need to enhance or maintain policy credibility.

7. **This paper examines the experiences of the emerging market and developing countries that recently adopted inflation targeting with a view to drawing lessons for** the areas of surveillance, technical assistance and the design of monetary conditionality under Fund supported programs. To this end, the paper does four main things:

- First, it examines the role of inflation targeting in the wider context of available strategies for monetary policy, and projects how many countries could shift to inflation targeting in the coming years, using a survey conducted within the Fund's Area Departments.

- Second, it studies differences in macroeconomic performance between inflation targeting countries with countries that pursue money or exchange rate targets. Particular attention is paid to evidence on the ability of inflation targeting to weather currency and financial crises or other big shocks relative to other strategies.

[2] See Masson, Savastano and Sharma (1997).

Table 1. Inflation Targeters 1/

	Inflation Targeting Adoption Date	Inflation Rate at Start (percent)	Unique Numeric Target = Inflation	Current Inflation Target (percent)	Forecast Process	Publish Forecast
Emerging market countries						
Israel	1997Q2	8.5	Y	1–3	Y	Y
Czech Rep.	1998Q1	13.1	Y	3 (+/- 1)	Y	Y
Poland	1998Q4	9.9	Y	2.5 (+/- 1)	Y	Y
Brazil	1999Q2	3.3	Y	4.5 (+/- 2.0)	Y	Y
Chile	1999Q3	2.9	Y	2–4	Y	Y
Colombia	1999Q3	9.3	Y	5 (+/- 0.5)	Y	Y
South Africa	2000Q1	2.3	Y	3–6	Y	Y
Thailand	2000Q2	1.7	Y	0–3.5	Y	Y
Korea	2001Q1	3.2	Y	2.5–3.5	Y	Y
Mexico	2001Q1	8.1	Y	3 (+/-1)	Y	N
Hungary	2001Q2	10.5	Y	3.5 (+/- 1)	Y	Y
Peru	2002Q1	-0.8	Y	2.5 (+/- 1)	Y	Y
Philippines	2002Q1	3.8	Y	5–6	Y	Y
Slovak Rep.	2005Q1	3.2	Y	3.5 (+/- 1)	Y	Y
Indonesia	2005Q3	7.8	Y	5.5 (+/- 1)	Y	Y
Romania	2005Q3	8.8	Y	7.5 (+/- 1)	Y	Y
Industrial countries						
New Zealand	1990Q1	7.0	Y	1–3	Y	Y
Canada	1991Q1	6.2	Y	1–3	Y	Y
United Kingdom	1992Q4	3.6	Y	2	Y	Y
Sweden	1993Q1	4.8	Y	2 (+/- 1)	Y	Y
Australia	1993Q2	1.9	Y	2–3	Y	Y
Iceland	2001Q1	3.9	Y	2.5	Y	Y
Norway	2001Q1	3.7	Y	2.5	Y	Y

Source: National authorities.

1/ The listing of countries and timing of adoption is based on standard classifications. See e.g. Roger and Stone (2005), Truman (2003), or Mishkin and Schmidt-Hebbel (2005). Switzerland and the ECB are not included in this table because, although their monetary policy frameworks have many features of inflation targeting, the central banks reject this classification of their frameworks.

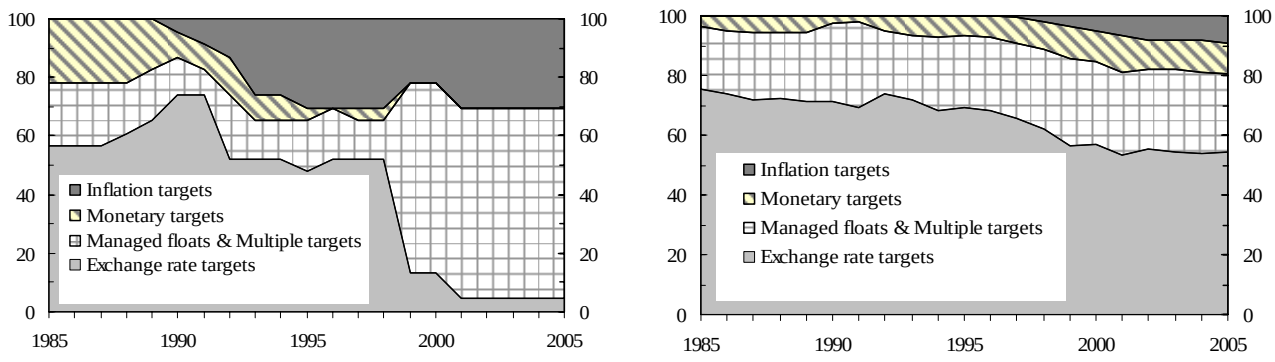
- Third, the paper discusses requirements for successful implementation of inflation targeting, as opposed to alternative policy frameworks. The discussion draws on survey evidence from 31 central banks (of which 21 are inflation targeters and 10 are non-inflation targeters), as well as econometric analysis.

- Lastly, the paper considers the issues raised for the Fund's own work on technical assistance, surveillance, and the design of monetary conditionality in Fund supported program as inflation targeting spreads in emerging and developing economies.

II. THE ONGOING SHIFT TOWARD INFLATION TARGETING

8. **Over the past 20 years there has been a marked shift toward more flexible exchange rate regimes and more open capital accounts by both industrial and non-industrial economies**. As shown in Figure 1, exchange rate pegs of various kinds accounted for over half of industrial country monetary policy regimes in 1985, but declined to just 5 percent of regimes by 2005, while in non-industrial countries the share fell from 75 percent to 55 percent.[3]

Figure 1. Evolution of Monetary Policy Regimes, 1985-2005

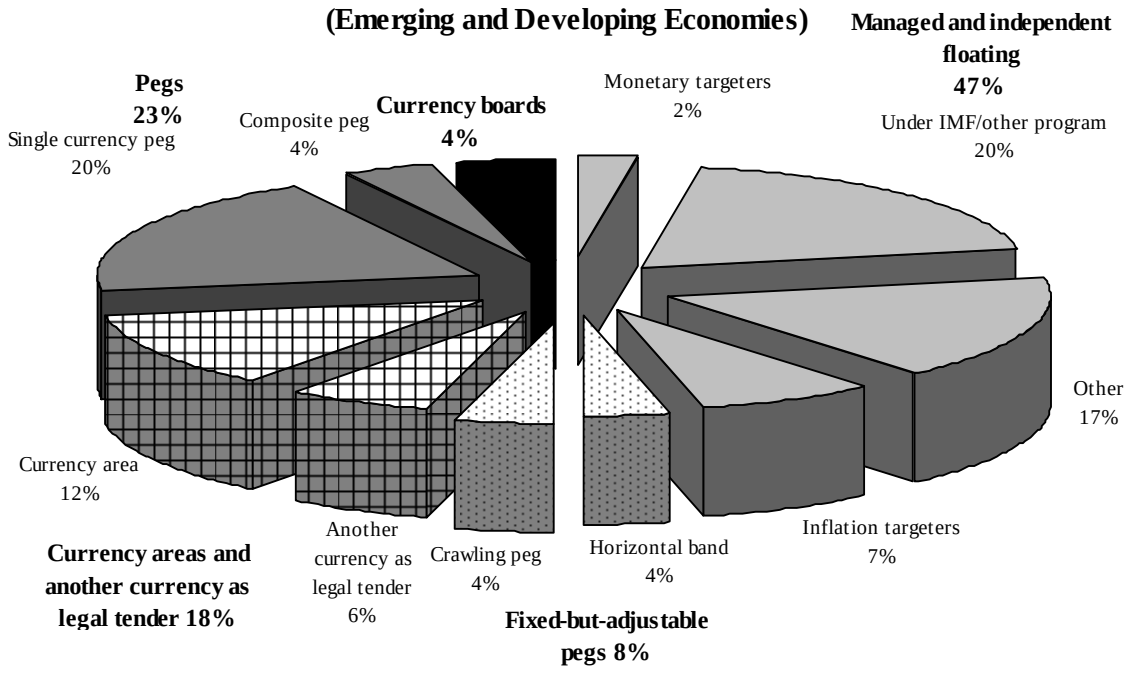


9. **The move to more flexible exchange rate regimes has been accompanied by a variety of frameworks to conduct monetary policy**, including inflation targeting, monetary

[3] To facilitate comparisons over time, the statistics include separately the various republics of the former Soviet Union and Yugoslavia which became independent during the 1990s. During the pre-independence period each of the constituent republics is treated as having the same monetary policy as the federation. This avoids having the break-up of the federations from affecting the relative proportions of different policy regimes. Note also that the large shift from exchange rate pegs to eclectic regimes in industrial countries in 1999 reflects the establishment of the ERM.

targeting, and more eclectic approaches involving multiple objectives. In the industrial countries, exchange rate pegs and monetary targets have been replaced by eclectic regimes, in G-3 countries, and by direct inflation targets almost everywhere else. In the non-industrial countries, exchange rate pegs were replaced mainly by money targets through to the mid-1990s. Since then, however, money targets as well as exchange rate pegs have been replaced by direct inflation targets. A more detailed picture of the different monetary policy regimes in existence today in developing countries is presented in Figure 2.

Figure 2. Regime Classification
(Emerging and Developing Economies)



10. **What explains the move to more flexible exchange rate arrangements in emerging markets and developing countries?** A key lesson from the experience with fixed exchange rates is that they do not appear able to provide a long-run solution to problems of monetary and fiscal instability in a world of high capital mobility (Bernanke, 2005). Exchange rate overvaluation, imperfect credibility of both monetary and fiscal policy, and a build-up of short-term external debt all contributed to a high incidence of costly speculative attacks and financial crises in many exchange rate targeting countries since the 1990s. As economies become more open to international financial markets, the vulnerability to shocks under fixed exchange rate increases, and floats become distinctly more durable and also appear to be associated with higher growth (Husain, Mody, and Rogoff, 2004).

11. **Over the next few years, the trend toward adoption of flexible exchange rate regimes, and inflation targeting in particular, is expected to continue.** A recent staff survey of 88 non-industrial countries found that more than half expressed a desire to move to

explicit or implicit quantitative inflation targets (Table 2).[4,5] Moreover, nearly three quarters of these countries envisage a shift to full-fledged inflation targeting by 2010. Discussion of technical assistance (TA) needs during the 2005 Annual Meetings provide an additional source of information on prospective adoption of inflation targeting. These discussions indicate that about 20 countries are seeking TA on inflation targeting, and at least 10 are likely to adopt inflation targeting within the next five years or so. These estimates probably represent the minimum number of likely new inflation targeters.

Table 2. Prospective Candidates for Inflation Targeting

Near term: 1-2 years (4) 1/	TA being requested/received: (4) Costa Rica, Egypt, Turkey, Ukraine
Medium term: 3-5 years (14)	TA being received/requested: (7) Albania, Armenia, Botswana, Dominican Republic, Guatemala, Mauritius, Uganda No TA being received/requested: (7) Angola, Azerbaijan, Georgia, Guinea, Morocco, Pakistan, Paraguay
Long term: >5 years (17)	TA being received/requested: (9) Belarus, China, Kenya, Kyrgyz Republic, Moldova, Serbia, Sri Lanka, Vietnam, Zambia No TA being received/requested: (8) Bolivia, Honduras, Nigeria, Papua New Guinea, Sudan, Tunisia, Uruguay, Venezuela
Source: Survey of IMF country desk officers and 2005 Annual Meeting TA discussion reports Notes: 1/ Turkey and Ukraine have announced that they will adopt inflation targeting in 2006 and 2007, respectively.	

III. Inflation Targeting and Macroeconomic Performance

A. Macroeconomic Performance Under Alternative Monetary Policy Regimes

12. **Before discussing the implications for the spread of inflation targeting for Fund work, it is useful to examine the macroeconomic impact, to date, of inflation targeting in non-industrial countries**. Until recently, the majority of empirical studies of countries' macroeconomic performance under alternative monetary policy regimes were based on the

[4] The survey covered all non-industrial countries that are members of the Fund, excluding current inflation targeters (13), countries in a currency area (16), EU acceded and accession countries (11), as well as all remaining countries with a population less than 1 million people (35), for a total of 88 countries surveyed.

[5] These results are consistent with the estimate by Husain, Mody, and Rogoff (2004) that the number of countries with exchange rate pegs (now accounting for roughly half of exchange rate regimes in the non-industrial world) may almost halve in the next 10-15 years.

experience of industrial economies where there was a track record of sufficient length to assess the policy's economic impact.[6] These studies universally found that inflation targeting was associated with improvements in macroeconomic performance, although the evidence was typically insufficient to establish statistical significance and causality of these improvements. More recently, however, Mishkin and Schmidt-Hebbel (2005) find that inflation targeters do experience significant improvements in performance relative to their own previous performance and relative to most non-targeters.

13. **Subject to important caveats, evidence from non-industrial countries suggests that inflation targeting has been associated with better macroeconomic performance than under alternative other monetary policy frameworks.**[7] Although most non-industrial countries have benefited from relatively buoyant growth and low inflation in industrial countries, the countries that adopted inflation targets have, on average, outperformed countries with other frameworks. The main caveats are first, a relatively short period of time has elapsed since the introduction of inflation targeting in most non-industrial countries. Thus, the findings are suggestive rather than definitive. Second, it is difficult to infer causality *from* inflation targeting *to* the observed outcomes in a definitive way, because in many cases inflation targeting coincided with a range of reforms consistent with a shift in preferences towards greater macroeconomic stability.

14. **The adoption of inflation targeting helped to clearly signal changes in policy priorities.** In particular, as noted in Masson, Savastano, and Sharma (1997), in countries adopting inflation targeting "improved inflation performance, as well as increased accountability of the monetary authorities and transparency in their operating procedures were all intended to improve the credibility of monetary policy..." Most importantly, for countries adopting inflation targeting, it was recognized that a key purpose in making a clear break in their regime was precisely to bring about a change in inflation expectations and bring inflation down at a lower cost in terms of output than would otherwise be achievable.

15. **Two analytical exercises are conducted to examine the differences in economic performance under inflation targeting compared with other monetary policy frameworks**. The first is an illustrative simulation exercise based on the IMF's Global Economic Model (GEM). The second is a statistical analysis of the actual key macroeconomic outcomes in non-industrial countries since they adopted inflation targeting.

A model-based comparison of monetary regimes

16. **Simulations of the performance of different monetary policy regimes in emerging markets suggest that exchange rate and money-targeting generate higher**

[6]See for example, Ball and Sheridan (2003), Levin, Piger, and Natalucci (2003), Truman (2003), Hyvonen (2004), and Masson, Savastano, and Sharma (1997).

[7] Mishkin and Schmidt-Hebbel (2005) reach similar conclusions.

macroeconomic variability relative to inflation targeting.[8] The simulations are based on a model calibrated for a typical emerging market economy and includes time-varying risk premia, volatility in capital flows, and terms of trade shocks. The model is "closed" assuming different monetary policy strategies—money targeting, inflation targeting and exchange rate targeting.

17. **The illustrative results are summarized in Figure 3.** For each monetary policy regime, the locus of points showing the variability of output and inflation variability is plotted in the upper panel and the locus of points showing the variability in the exchange rate and inflation is plotted in the lower panel. Points to the south and west in Figure 3 are welfare superior, and points to the north and east are inferior. The simulations suggest that (1) that exchange rate pegs are associated with greater inflation and output variability relative to more flexible exchange rate regimes; and (2) within flexible exchange rates, the variability in inflation and output is significantly higher under money targeting than under inflation targeting, especially when there are shocks to velocity.[9]

An empirical comparison of monetary regimes

18. **A statistical analysis of the data on key macroeconomic variables was also conducted to compare macroeconomic performance in emerging markets under inflation targeting with performance under alternative monetary regimes over the same period**. The analysis is based on data from 13 emerging market inflation targeters and 29 comparable emerging market countries that are not inflation targeters.[10] In line with Ball and Sheridan (2003), the analysis involves comparing the changes in selected indicators of inflation and output for the inflation targeters before and after they adopted inflation targeting, with changes over the same time period for the same indicators in the non-inflation targeters.[11] The indicators of macroeconomic performance are: inflation, the volatility of inflation, output growth, volatility of output growth, medium- and long-term inflation

[8] See Appendix I for a brief outline of the model.

[9] The shifts in velocity have been calibrated to reflect the magnitudes of shifts experienced in many emerging market countries.

[10]The comparator group consists of the 22 countries in the JP Morgan EMBI index that are not inflation targeters, plus 7 countries that are classified in a similar manner to those in the EMBI—namely, Botswana, Costa Rica, Ghana, Guatemala, India, Jordan, and Tanzania. We also experiment with excluding the latter seven countries from the control group.

[11] For inflation targeters, the period before inflation targeting is defined as 1985 until the quarter prior to adoption of inflation targeting, and the after period runs from the quarter in which inflation targeting was adopted through end-2004. For noninflation targeters, the dividing date is taken to be 1999Q4, which is when most non-industrial countries adopted inflation targeting.

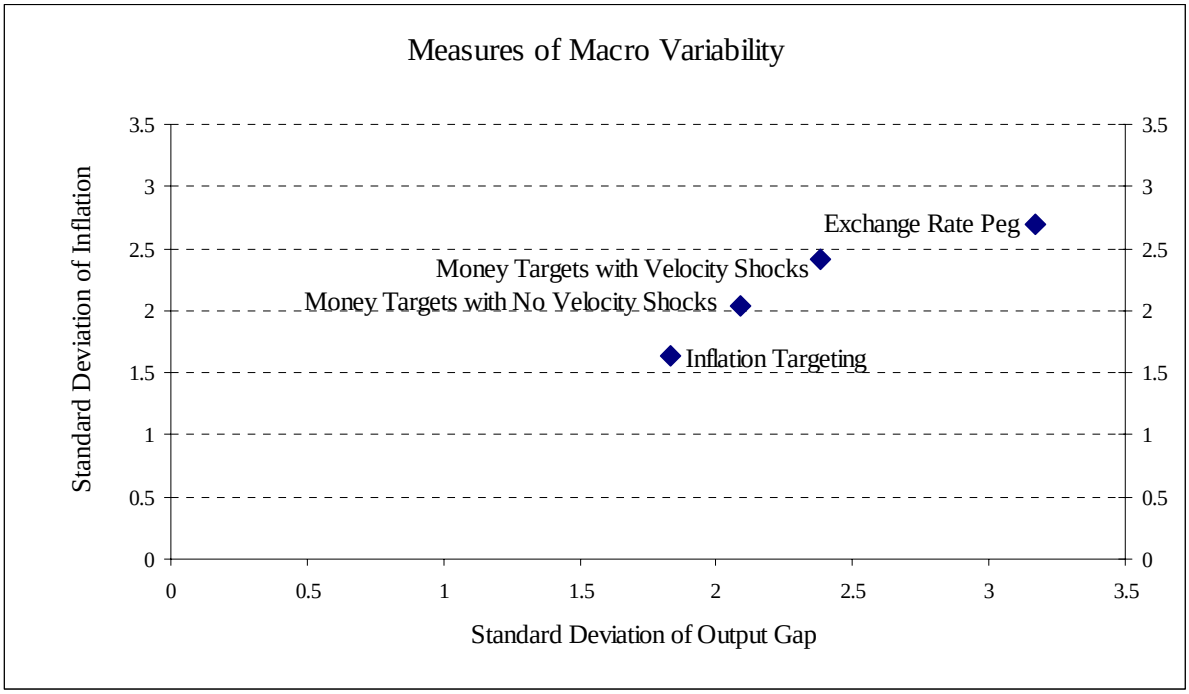
forecasts, and their volatility. The results obtained from this analysis on the full sample of emerging markets appear in Table 3.

19. **The results indicate that improvements in key measures of macroeconomic performance in emerging market economies under inflation targeting have been greater than under other monetary regimes.** Over the period and countries examined, inflation targeting has been associated with a 4.8 percentage point reduction in average inflation *relative* to other monetary policy regimes. Inflation targeting was also associated with a reduction in the standard deviation of inflation by 3.6 percentage points *relative* to other strategies. Under inflation targeting, long-run inflation expectations have been lower and more stable *relative* to alternative regimes (inflation expectations are between 2.1 and 2.7 percentage points lower, and the standard deviation of inflation expectations is between -1.7 and -2.1 percentage points lower). Importantly, there is no evidence that inflation targeters meet their inflation objectives at the expense of real output stabilization. Indeed, output volatility was slightly lower for the inflation targeters, and the difference from the comparison group of non-inflation targeters is statistically significant at the 5 percent level. Interestingly, inflation targeting also outperformed exchange rate pegs in reducing exchange rate volatility—even when only successful pegs are chosen for the comparison.[12]

20. **Are these findings being driven solely by the sample period?** A common view about the observed success of inflation targeting in developing countries is that the global economic environment has been relatively benign since the time of adoption in the late 1990s. Of course, the benign global environment has been a positive factor for all countries, regardless of their monetary policy regime. In these circumstances, examining the performance of inflation targeters and non-inflation targeters over the same period is one way to control for the impact of global economic factors. The findings in Table 3 suggest that, within the benign global environment facing all countries, those that adopted inflation targeting experienced a significantly greater improvement in macroeconomic performance than those that pursued alternative monetary policy strategies.

[12]This result suggests that concerns raised by, among others, Baltensperger, Fischer, and Jordan (2002), Meyer (2002), and Rivlin (2002), that inflation targeting is too rigid and constrains discretion inappropriately at the expense of the rate or variability of economic growth is not supported in the data, at least for emerging markets.

Figure 3. Macroeconomic Variability Under Alternative Monetary Policy Regimes
(Standard deviations measured in percentage points)



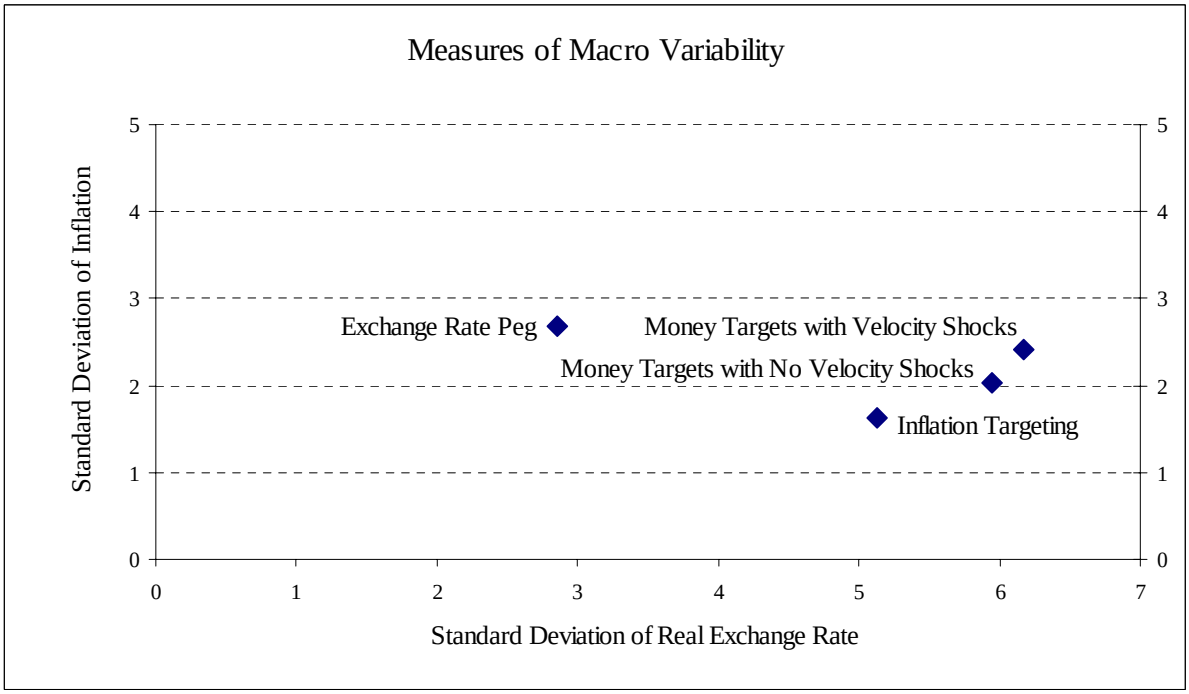


Table 3. Gains/Losses from Different Regimes

Variables	Inflation Targeting	Fixed Exchange Rate (currency board/ dollarization/ peg)	Monetary Targeting	Other Regime
CPI inflation	-4.8**	-0.1	1.8	4.5
Volatility of CPI inflation	-3.6**	1.1	2.9	0.8
Volatility of real output growth	-0.6	0.0	1.0	-0.1
Volatility of output gap	-0.01**	-0.001	0.01	0.003
5-year inflation forecast	-2.7**	3.1	n.a.	-0.1
Volatility of 5-year inflation forecast	-2.1**	2.3	n.a.	-0.0
6–10-year inflation forecast	-2.2**	2.2	n.a.	-0.1
Volatility of 6–10-year inflation forecast	-1.7***	1.2	n.a.	-0.0

Sources: IMF, *International Financial Statistics;* and IMF staff calculations.
Note: Gains/losses measured in percentage points changes in variables. One, two, and three asterisks denote statistical significance at the 10, 5, and 1 percent level, respectively. Volatility is measured by the standard deviation of the variable.

21. **Are the findings being driven by the way the sample is partitioned and by the choice of comparator countries**? The robustness of the results was tested by examining whether the results were sensitive to: (i) changing the year in which the sample was partitioned into "pre-inflation targeting" and "post-inflation targeting" periods; (ii) excluding countries whose inflation was high (more than 40 percent) in the "pre-inflation targeting" period; (iii) excluding "low income" countries and low income and lower middle income countries defined using the World Bank classification; (iv) excluding the seven non-inflation targeting countries that are not in the JP Morgan EMBI; (v) excluding countries that are severely indebted defined using to the World Bank classification of country indebtedness; and finally (vi) excluding countries with an exchange rate peg in the "post" period. (Appendix II describes the controls and the alternative sample partitioning schemes that were used and reports all the associated results). None of the key results presented in Table 3 change when these modifications are made. Inflation targeting continues to be associated

with a significantly larger reduction in the level and standard deviation of inflation relative to other regimes, with little or no effect on the volatility of output.[13]

B. Inflation Targeting and Crises

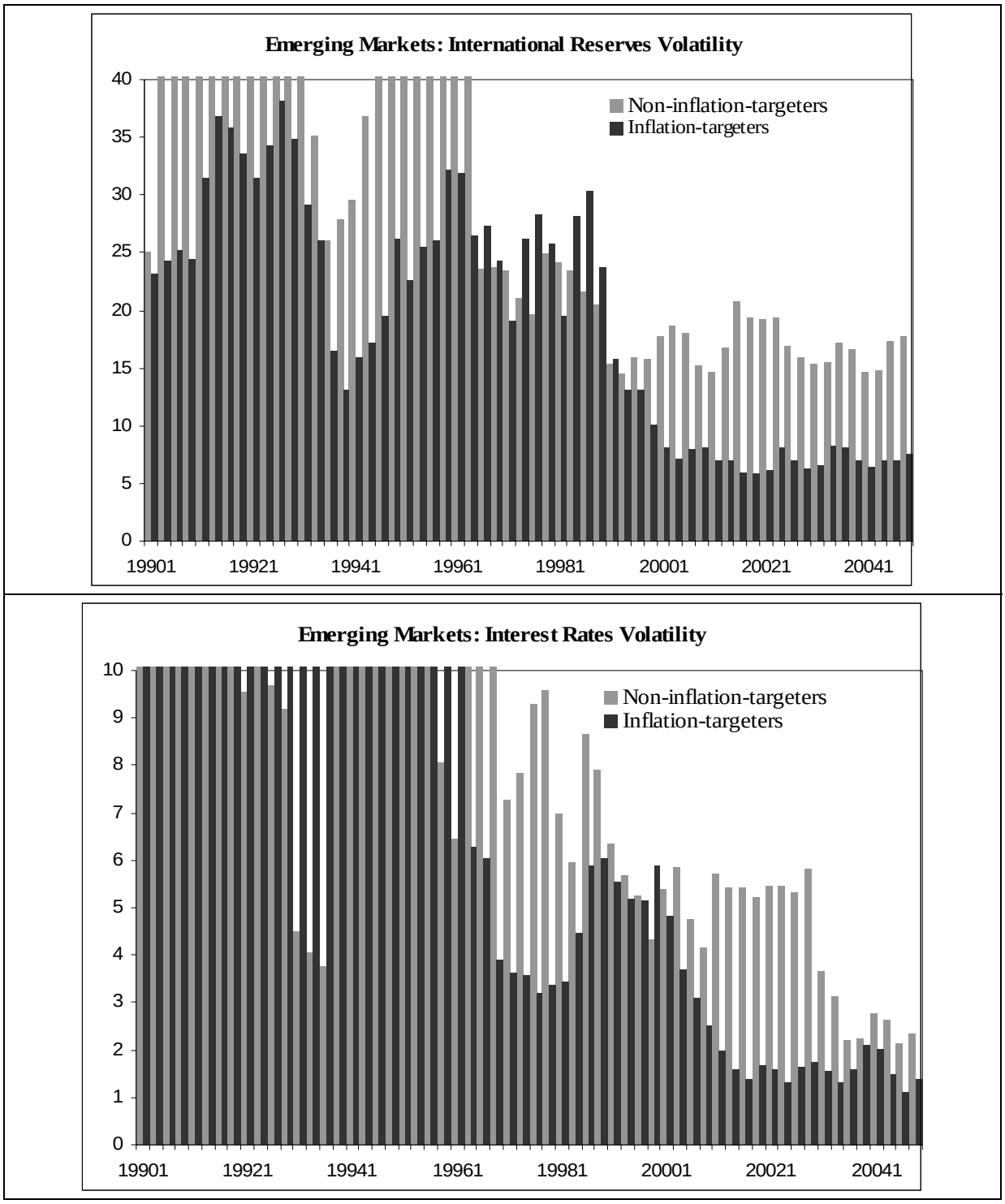
22. **Does inflation targeting deliver advantages over and above lower and more stable inflation, output, and inflation expectations?** In particular, given that inflation targeting is associated with an improvement in macroeconomic performance, is there evidence that the economy is less subject to shifts in investor sentiment and therefore a reduced probability of a crisis?

23. **The experience of individual inflation targeting countries is suggestive in this respect.** Although global macroeconomic conditions have been relatively benign since 1999—the year that several emerging markets adopted inflation targeting—some inflation targeting countries have weathered successfully major country or region specific economic shocks. For example, the shock of the Argentina crisis on Brazil and other Latin American inflation targeters, Brazil's political crisis in 2002, South Africa in late 2002, and Hungary which faced a massive fiscal shock in 2002.[14] Shocks of similar magnitude have destabilized these countries in the past, suggesting at least that the framework has contributed to the economy's resilience to shocks.

[13]The findings of stronger gains from inflation targeting relative to non-inflation targeting strategies are robust to the controls used. However, countries with an initial level of inflation above 40 percent show a relatively smaller reduction in inflation and inflation volatility between the pre and the post-inflation targeting adoption periods. Also, when severely indebted countries are excluded from the sample, inflation targeting still implies significant (in a statistical sense) macroeconomic improvements relative to alternative monetary policy strategies, although the reduction in inflation volatility and output gap volatility is no longer statistically significant. Exclusion of countries which are judged to have had little commitment to price stability during this period from the control group does not change the basic results—inflation targeting is still associated with lower real interest rate and reserves volatility, lower exchange market pressure, and lower inflation, inflation volatility, inflation expectations and volatility of inflation expectations compared with non inflation targeters.

[14] See Bevilaqua, Afonso and Eduardo Loyo (2004) for a discussion of how Brazil's fledgling inflation targeting regime was stress-tested in the first few years after its introduction.

Figure 4. Comparison of Volatility in International Reserves and Interest Rates in Inflation Targeting and Non-Inflation Targeting Countries



24. **Formal analysis of the data supports the view that inflation targeting is associated with lower financial market volatility.** Using the same Ball-Sheridan framework described above, the volatility of nominal exchange rates, foreign exchange reserves, and real interest rates is compared between inflation targeting emerging markets and non-inflation targeters (Figure 4). Next, a comparison is made between these two groups of emerging markets using an "exchange market pressure" index based on the seminal work by Girton and Roper (1977) and developed by Eichengreen and others (1994, 1995) (Table 5). The volatility of nominal exchange rates, real interest rates and international reserves is lower in inflation targeting countries, relative to non-inflation targeters.[15] Moreover, there is evidence at the 5 percent level that inflation targeting is associated with a lower probability of crises, perhaps in part reflecting greater flexibility of the exchange rate under inflation targeting. Similar tests on countries with flexible exchange rates and money targeting seems to generate significantly higher exchange rate and reserve volatility, as well as an increase in the probability of exchange rate crises.

Table 4. Crisis Resilience Under Different Regimes
(changes in variables, measured in percentage points)

Variables	Inflation Targeting	Fixed Exchange Rate (currency board/ dollarization/ peg)	Monetary Targeting	Other Regime
Exchange market pressure index	-0.3**	-0.2	0.5**	0.2
Volatility of the exchange rate	-11.1*	-4.2	15.8*	3.8
Volatility of reserves	-16.3***	-1.9	18.4*	5.4
Volatility of the real interest rate	-5.0***	0.6	3.3	2.6

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

Note: One, two, and three asterisks denote statistical significance at the 10, 5, and 1 percent level, respectively. Volatility is measured by the standard deviation of the variable in question, except for reserves, where volatility is measured by the standard deviation in the annual percentage change in reserves.

IV. Adopting Inflation Targeting in Emerging Market and Developing Countries

25. **In this section, we consider challenges involved in adopting inflation targeting in non-industrial countries.** Specifically, we consider whether the experience of the noninflation targeting countries supports the view that inflation targeting should be delayed

[15] Exchange rate volatility in inflation targeting countries is still lower than in non-inflation targeting countries even when countries with exchange rate targets are dropped from the non-inflation targeting control group.

until a demanding set of preconditions have been met. We also compare some technical and institutional conditions in prospective inflation targeters with initial conditions in countries that have successfully adopted inflation targeting. Finally, we consider how inflation targeting frameworks might be adapted to the particular circumstances and needs of emerging market and developing countries.

A. Are Developing Countries Good Candidates for Inflation Targeting?

26. **Until recently, inflation targeting was generally characterized as more demanding in terms of institutional and technical requirements than alternative frameworks, making it unsuitable for many emerging market and developing economies.**[16] The most detailed exposition of this point was made in Eichengreen and others (1999), who argued that technical capabilities and central bank autonomy were severely lacking in most emerging market economies (including several that subsequently adopted inflation targeting).[17] Such countries, the argument goes, would be better off sticking with a "conventional" policy framework, such as an exchange rate peg or money growth targeting.

27. **More recent studies, reflecting the successful adoption of inflation targeting in a growing number of emerging market economies, have taken a more neutral view.** For example, Carare and others (2002) take the view that the "...list of initial conditions is not meant to constitute strict prerequisites for IT. That is, the absence of some of these conditions should not stand in the way of adoption of IT, especially when policies are being introduced to establish them in the short and medium term." Truman (2003) also concludes that "Beyond [a serious commitment to achieve and maintain low inflation, and a sustainable fiscal policy]...the institutional and environmental elements that are often identified as preconditions for inflation targeting should be viewed as desirable, not essential."[18]

28. **Our findings also suggest the need for a more nuanced, less "mechanical" view of necessary, as opposed to desirable, conditions for successful adoption of inflation targeting**. Most of the conditions viewed as essential for successful inflation targeting are important for any successful monetary policy framework, and some may be more important for other frameworks than for inflation targeting. The evidence suggests that meeting tough technical preconditions may be less important to successful adoption of inflation targeting than the sustained pursuit of improvements once the framework has been adopted.

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[16] See Masson, Savastano, and Sharma (1997) who conclude that the "fairly stringent technical and institutional prerequisites cannot be met by developing countries" and "the way to improve the monetary and inflation performance of developing countries may not be through the adoption of a framework akin to IT...."

[17]Others who stress the relevance of "preconditions" include Agénor (2002), IMF (2001), and Khan (2003).

[18] Other relatively neutral views on the importance of "preconditions" can be found in Debelle (2001), Amato and Gerlach (2002), and Jonas, and Mishkin (2005).

29. **We focus on four broad categories of "technical" requirements that have typically been suggested as prerequisites for inflation targeting**.[19]

- *Institutional independence*. The central bank must have full legal autonomy, and be free from fiscal and/or political pressures that could create conflicts with the inflation objective.

- *Well-developed analytical capabilities and infrastructure*. Data requirements for inflation targeting are more demanding than for alternative regimes and the monetary authorities must have a well-developed capacity to forecast inflation.

- *Economic structure*. Inflation targeting requires that prices are fully deregulated, that the economy is not be overly sensitive to commodity prices and exchange rates, and that dollarization is minimal.

- *A healthy financial system.* In order to minimize potential conflicts with financial stabilization objectives, and guarantee effective monetary policy transmission, the banking system should be sound, and capital markets well-developed.

30. **We find that these conditions are essential for the success of virtually any systematic monetary policy framework, and some may be even more important for noninflation targeting regimes.** Obviously, some elements are more important for inflation targeting than for other regimes. For example, given the information intensive nature of inflation targeting, good data is more important than, say, for an exchange rate peg. At the same time, some conditions may be more critical for other monetary policy frameworks. For example, supportive fiscal policy (including an absence of fiscal dominance) is found to be most important for good performance under an exchange rate peg.[20] In countries that had high debt-GDP ratios or deteriorating fiscal positions, it was found that adoption of exchange

[19] See Appendix II for a description of the survey of central banks on which the following analysis is based.

[20] This conclusion is based on estimation of Ball and Sheridan (2003) type regressions which compare the change in indicators of macroeconomic performance before and after the adoption of inflation targeting with the change in the same indicators over the same period for exchange rate targeters. To evaluate the relevance of fiscal conditions for macroeconomic performance for inflation targeting versus exchange rate targeting, the regressions were augmented with one of the following fiscal indicators: a measure of the debt-to-GDP ratio prior to adoption of inflation targeting or a variable tracking the change in fiscal balance after the adoption. The coefficients on the fiscal indicators were not significant in the regression for inflation targeters—suggesting that weak fiscal conditions does not reduce the macroeconomic bonus offered by adopting inflation targeting. By contrast, the coefficients on the fiscal indicators were significant in the case of exchange rate targets—suggesting that weak fiscal conditions were associated with worse macroeconomic outcomes under exchange rate targets. More details are given in the Appendix II.

rate pegs was associated with significantly worse performance in terms of inflation, inflation volatility, and output volatility than in countries adopting inflation targets.

31. **Moreover, while improvements in conditions and institutions have been associated with better performance under inflation targeting, they have typically accompanied rather than preceded adoption of inflation targeting.** Survey evidence, together with a range of quantitative measures, show that all countries introducing inflation targeting fell well short of having ideal conditions in place at the outset.[21] The survey also shows, however, that countries have typically strengthened their frameworks following adoption of inflation targeting. In addition, Batini and Laxton (2005) do not find evidence to support the view that having strong initial conditions were a prerequisite to improved economic performance in emerging market economies adopting inflation targeting relative to alternative frameworks. Our interpretation of the evidence is not that improvements in conditions do not matter; indeed, the same econometric framework also indicates that improvements in conditions are associated with better macroeconomic performance.[22]

32. **Weaker initial conditions in non-industrial countries appear to be associated with more frequent misses of inflation target ranges, though mainly during an initial phase of disinflation.** non-industrial countries typically have missed their targets about ½ the time, while industrial countries have typically missed their target ranges about ⅓ of the time (Table 5).[23] The difference largely reflects the facts that: (i) a higher proportion of non-industrial countries than of industrial countries have gone through a disinflation phase at the outset of inflation targeting; and (ii) all countries tend to experience more variable inflation and more frequent target misses during disinflation than when pursuing unchanging medium-term inflation targets.[24]

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[21] The survey, completed by 21 inflation-targeting central banks, focused on how policy was formulated, implemented, and communicated—and how various aspects of central banking practice had changed both during and prior to the adoption of inflation targeting. Survey responses were cross-checked with independent primary and secondary sources, and in many cases augmented with "hard" economic data (see Appendix II).

[22] In particular, better data availability is significantly associated with an extra gain in terms of lower inflation of (-) 6 percent and in terms of lower volatility of (-)2.6 percent. As regards the forecasting ability, these numbers amount to -6.6 percent and -5.2 percent respectively. Improvements in the overall health of the financial system, as well as clarification of the operational mandate of the central bank are also associated with better inflation-targeting performance in terms of the level or volatility of inflation. Definitions of these concepts are provided in Appendix II.

[23] Roger and Stone (2005).

[24] Roger and Stone (2005) find that the differences between industrial and emerging groups of countries are not statistically significant within the disinflation phase or during the unchanging medium-term targeting stages.

33. **The evidence also suggests that weaknesses in initial conditions and inflation performance can be remedied fairly quickly.** The staff survey found that almost all countries report significant improvements in most aspects of inflation targeting capabilities within a few years of adopting the framework. Roger and Stone (2005) also find that, in disinflating countries, the variability of inflation declines by around half during the first three years of disinflation. This suggests that inflation targeting countries can develop quite quickly the range of requirements needed to strengthen policy performance and credibility.

34. **The finding that macroeconomic performance improves under inflation targeting even with relatively weak initial technical conditions points to the importance of other factors—particularly expectations and the credibility of the inflation targeting commitment.** As noted by Sherwin (2000) the degree of political support for the framework is a critical element, as may be the adoption of inflation targeting as part of a broader package of economic reforms underscoring the commitment to change. Nonetheless, Sherwin also emphasizes the importance of the adoption of the inflation targeting framework in locking in the shift in policy preferences, and this may play a key role in affecting credibility, expectations, and performance independently of changes in technical conditions. The experience of the Philippines with inflation targeting, discussed in Box 1, appears to corroborate this view.

35. **For many prospective inflation targeters, economic and institutional conditions look favorable in several respects compared with those in existing inflation targeters** (Figure 5). Although the first wave of emerging market inflation targeters included predominantly upper middle income countries, most of the prospective inflation targeters that were identified earlier in the paper are lower middle income or low income countries (Table 2). Generally, prospective inflation targeters boast better fundamentals than did existing inflation targeters before they adopted inflation targeting. Specifically, prospective inflation targeters typically have substantially lower levels of inflation, faster average real GDP growth, and stronger fiscal balances. Output growth volatility is typically similar, as are indicators of banking system soundness. One area in which prospective inflation targeters are, on average, significantly different from the first group of inflation targeters is with regard to the degree of dollarization of their economies.

Table 5. Inflation Outcomes Relative to Targets 1/

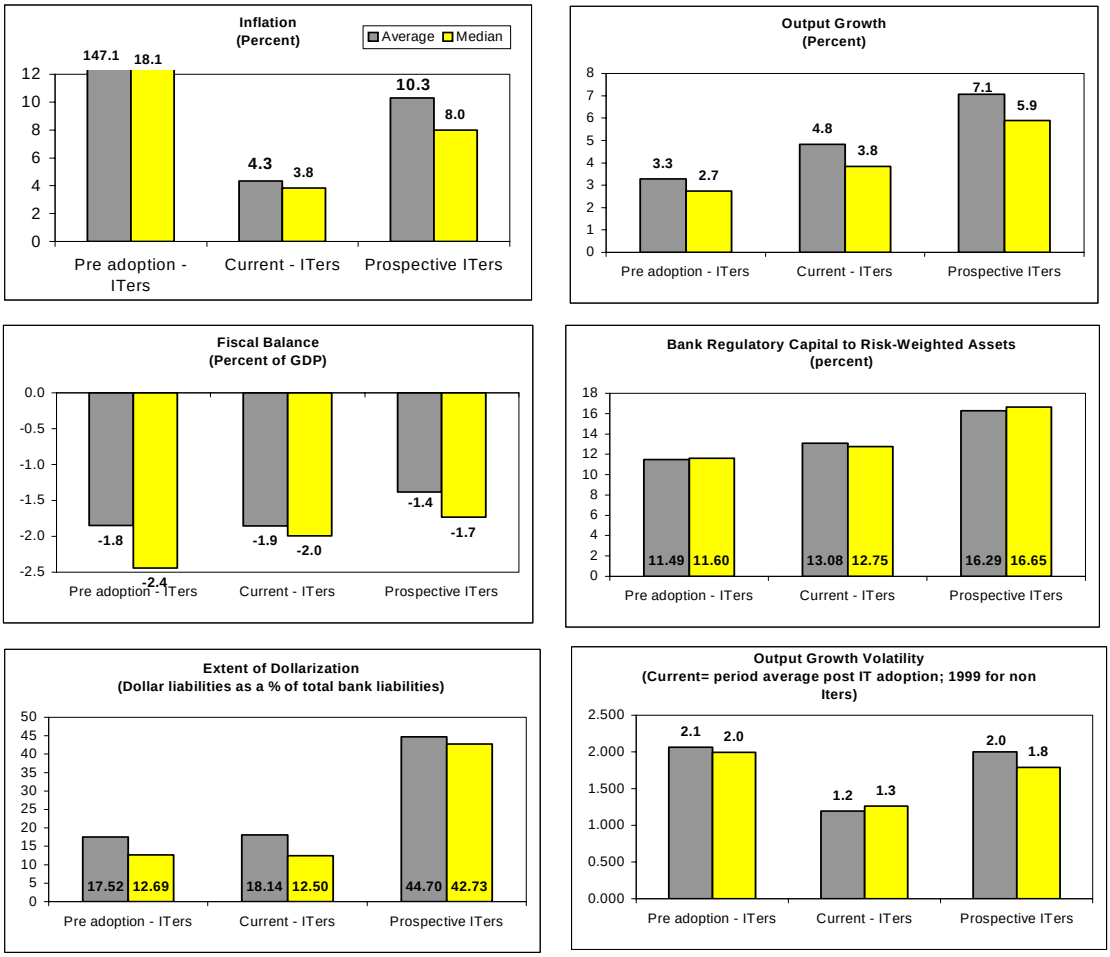
	Number of Countries	Mean Deviation from Range Center (percentage points)	Standard Deviation around Mean Outcome (percentage points)	Root Mean Squared Deviation from Range Center (percentage points)	Frequency of Outcomes Outside Target Range (percent of outcomes)	Persistence of Deviations from Range Center (months)
All countries	22	0.1	1.4	1.8	43.5	17.3
Industrial 2/	11	-0.2	1.1	1.3	34.8	15.5
EM and Developing Economies 3/	11	0.3	17	2.3	52.2	19.1
Disinflation Phase						
All countries	14	0.4	1.7	2.2	59.7	16.3
Industrial	5	-0.1	1.5	1.8	52.1	17.6
EM and developing economies	9	0.7	1.8	2.5	63.9	15.5
Unchanging or Medium-term Inflation Target Phase						
All countries	17	-0.4	1.0	1.3	32.2	15.1
Industrial	11	-0.3	0.9	1.1	28.6	13.9
EM and developing economies	6	-0.6	1.0	1.6	39.0	17.3

Source: Roger and Stone (2005).

1/ Data calculated as equally-weighted averages of corresponding statistics for individual countries in relevant groups. Individual country figures are based on monthly (quarterly for Australia and New Zealand) differences between 12-month inflation rates and target inflation or center of target range.

2/, 3/ See Roger and Stone (2005) for details of country composition of each group.

Figure 5. Comparison Between Current and Prospective Inflation Targeters



36. **At the same time, there are countries or circumstances where inflation targeting may be unsuitable as a monetary policy framework**:

- In some small, low income economies, the operational capacity of the central bank, and the degree of financial system development may be very limited, with little realistic prospect for substantial improvement.[25] In such cases, resource limitations may more or less rule out inflation targeting as a feasible possibility.

[25] See Laurens and others (2005).

- In some small, highly open economies, domestic wages and prices may be almost fully determined by foreign prices and the exchange rate. In such circumstances, inflation targeting—which tends to be more information intensive—would have very little benefit relative to an exchange rate peg.

- There has been little experience to date with countries with high inflation rates adopting full-fledged inflation targeting prior to bringing inflation down to single digits. As shown in Table 1, few countries have adopted inflation targeting with inflation rates above 10 percent. Although explicit inflation targets may help in disinflation by making expectations more forward looking, central banks may be reluctant to fully abandon exchange rates or monetary aggregates as guides for disinflation. In part this may reflect a perception that the introduction of inflation targeting in these circumstances—with the attendant risks of target misses—to carry severe reputation costs. In addition, inflation expectations may continue to be heavily conditioned on these variables, so that the central bank cannot afford to ignore them in setting policy. In practice, several countries, including Chile, Hungary, Israel, and Poland, combined inflation and exchange rate targets during an initial phase of disinflation.

- Adoption of inflation targeting may be inappropriate if there is inadequate political support and little prospect of adoption of consistent fiscal policy. At the very least, there would need to be a reasonable prospect that policy inconsistencies revealed by the adoption of a transparent and explicit inflation targeting framework would be resolved in favor of consistency with the target.

- Inflation targeting should only be adopted if the central bank decision makers are fully prepared to follow through in terms of decisions and actions. In particular, they must be prepared to subordinate other objectives to the inflation objective on a consistent basis. Inflation targeting is a flexible policy framework but it also requires a high degree of consistency and discipline on the part of policy makers to keep expectations well anchored. If the flexibility of the framework is abused by the pursuit of other policy objectives, the reputational damage would be very costly to remedy.

B. Adapting Inflation Targeting to Non-industrial Countries

37. **While there are undoubtedly countries where inflation targeting may not be a suitable framework, it is a flexible framework that can be adapted to particular needs of non-industrial countries**. [26] Non-industrial country inflation targeters face a number of challenges that differ in character or in degree from those faced in industrial economies. Calvo and Mishkin (2003) highlight five particularly important challenges for non-industrial countries. These include: (i) weak public sector financial management; (ii) weak financial sector institutions and markets; (iii) low monetary policy credibility; (iv) extensive dollarization of financial liabilities; and (v) vulnerability to sharp changes in capital flows

[26] See, e.g. Apel and others (1999).

and international investor sentiment.[27] In addition, many of these countries face considerably greater uncertainty about the structure of their economies, the monetary policy transmission mechanism, and the cyclical position of the economy than is typical of industrial country inflation targeters. These challenges are discussed in turn below.

38. **As already noted, the credibility of any systematic monetary policy framework requires bringing public sector finances under control.** However, a possible added benefit of inflation targeting is that it may help reinforce support for putting public sector finances onto a path precisely by highlighting the inconsistency of the goal of stable, low inflation with lack of fiscal discipline.

39. **Weak financial sector institutions and markets need to be taken into account in formulating and implementing inflation targeting.** As discussed in Laurens and others (2005), such weaknesses alter the relative efficiency and speed of monetary policy transmission through different channels, and these need to be taken into consideration in policy formulation, on a country-by-country basis. Weak or incomplete financial markets may also limit the scope for reliance on the use of market-based instruments for implementing policy, but this is not essential. What is essential is for the central bank to be able to move the interest rates faced by households and businesses, and to do so in a manner that is clearly linked to the inflation objective. Weaknesses in the financial system itself may complicate the conduct of inflation targeting, as with any other monetary policy. In such circumstances, development of the inflation targeting framework will also usually entail prudential measures and other reforms to strengthen the financial system.

40. **Although the credibility of the shift to inflation targeting is likely to be enhanced if it is adopted as part of a more comprehensive package of economic reforms, such reforms can also complicate the conduct of monetary policy under inflation targeting.** A comprehensive package of reforms could entail both an initial period of disinflation and large shifts in relative prices associated with tariff, subsidy, and tax reforms. These are difficult challenges for inflation targeting, but ones that can be tackled through the choice of the measure of inflation to be targeted, the level of the target, the acceptable range of variation of outcomes around the target, and the pace of disinflation toward a longer-term objective. For example, given the evidence that controlling inflation is relatively difficult during disinflation, countries may consider adopting a somewhat wider inflation target range during the disinflation process than the fairly standard +/- 1 percentage point band used by countries targeting low, stable, inflation.[28] In this context, an innovation being used in Brazil, in which

[27] See also Fraga, Goldfajn, and Minella (2003).

[28] For the experience of Brazil, see Fraga, Goldfajn, and Minella (2003). See also Mishkin (2003), and Roger and Stone (2005).

the path of disinflation is not fully independent of recent inflation outcomes, might potentially be adapted to use in other countries susceptible to large inflation shocks.[29]

41. **Extensive dollarization poses a significant challenge in formulating and implementing inflation targeting.** As noted by Mishkin (2003), extensive dollarization of the economy can substantially alter the transmission of monetary policy. In particular, high dollarization of the financial system will tend to amplify the importance of exchange rate changes relative to domestic interest rate movements in policy transmission, and may generate aggregate demand effects opposite to those in industrial countries.[30] In such circumstances, the central bank will typically pay greater attention to balance sheet effects of exchange rate movements on the economic outlook and place greater weight on a relatively smooth evolution of the exchange rate than otherwise. Dollarization, however, is a phenomenon that is largely endogenous to the monetary policy regime, so that a credible and successful policy of disinflation is likely to lead to reduced dollarization over time. Prudential policy may also have an important influence on the degree of dollarization, and countries adopting inflation targeting and a flexible exchange rate may need to review relevant prudential regulations with a view to increasing the resilience of their financial systems to exchange rate fluctuations.

42. **A number of non-industrial country inflation targeters have also had to deal with strong capital flows, raising questions about the appropriate response, including the role of foreign exchange intervention.** Some countries have tried to combine inflation targeting with exchange rate bands. In virtually all such countries, including Chile, Israel, Poland, and Hungary, however, conflicts between achievement of the inflation target and the exchange rate target have eventually arisen, and normally resulted in a widening of the exchange rate band and then abandonment of the band altogether.[31] Indeed, the dating of

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[29] The methodology and use is described in Fraga, Goldfajn and Minella (2003). See also Central Bank of Brazil (2002). It was introduced in late 2002, and used in 2003-2004. The target was adjusted for the estimated impact on inflation of (a) regulated price shocks and (b) inflation inertia from the previous year. The methodology and estimates are published. In the original application of this methodology, the adjusted target fell outside the original band but nothing was formally stated as to the margin for tolerance of deviations from the adjusted target. In subsequent use, the bands were explicitly left unchanged. In the modification of the methodology made in 2004, the Central Bank retained the ex ante component (b) of the adjustment but decided not to perform the continuous adjustment for component (a).

[30] For example, as Mishkin notes, a depreciation of the home currency will tend to boost the cost of servicing foreign liabilities, dampening demand. If dollarization is high enough, and the ability to borrow against future export revenue increases is limited, the overall demand impact of depreciation could be negative, at least in the short term.

[31] See, e.g., Leiderman and Bufman (2000), Morandé and Schmidt-Hebbel (2000), and Mishkin and Savastano (2000).

when such countries have effectively started inflation targeting is usually based on when they abandoned or greatly widened their exchange rate bands.

43. **In other cases, countries may opt for a gradual transition from an exchange rate peg to a more conventional inflation targeting framework, based on a managed float together with an informal inflation target.** Such regimes may be in place for an extended period, and may provide a useful period in which to develop some key elements of an inflation targeting framework.[32] At some point in that transition, however, the authorities will need to make an explicit shift from giving priority to the exchange rate commitment to giving priority to the inflation objective.[33] The full benefits of inflation targeting are only likely to be realized after the shift has taken place and is conveyed in a credible manner to the public.

44. **Overall, there are no definitive answers in this area but existing research does not support strong resistance to exogenous exchange rate pressures**. Caballero and Krishnamurthy (2003) argue in favor of restraining central bank intervention and interest rate responses to exogenous changes in capital flows, on the basis that the interest rate effects will tend to amplify output volatility, and that intervention may amplify the vulnerability of the economy to swings in private capital flows by introducing an element of central bank insurance against exchange rate movements. Mishkin and Savastano (2000) recommend that the central bank be very transparent regarding the role of the exchange rate, and foreign exchange market intervention, in the inflation targeting framework, to minimize confusion over the primacy of the inflation objective. Disyatat and Galati (2005) review the theory and evidence on the effectiveness of intervention in emerging markets. Although theory suggests that intervention might be more effective in such countries than in industrial countries, the empirical evidence is not supportive. Intervention does appear to have some effect on the level and volatility of the exchange rate over the short term, but effects appear to depend heavily on market conditions and expectations. Holub (2004) also suggests that that credibility of the intervention policy will be undermined if the financial cost of intervention threatens the central bank's solvency.

45. **Some simple rules to ensure that intervention is consistent with the inflation targeting policy are proposed by Holub (2004)**. Specifically: (i) interest rates should only be adjusted in response to the inflation outlook; (ii) intervention should be used as a supplementary tool; and (iii) intervention should not run counter to the direction of interest rate movements. Moreover, he suggests that the central bank should approach its intervention decisions in a much more systematic, transparent manner, more consistent with the approach taken to adjusting interest rates. Implementation of such principles would likely make

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[32] Such hybrid regimes are supported by Truman (2003) and regarded favorably by Mishkin and Savastano (2000), at least as a transitional regime.

[33] Mishkin and Savastano (2000) suggest that, in the Latin American cases that they reviewed, "[countries]...went too far for too long in the direction of limiting exchange rate flexibility."

intervention less frequent and more clearly focused on limiting exchange rate volatility, but also probably more effective and less likely to send confusing messages to markets.

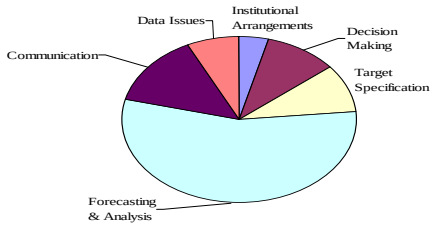
46. **Finally, data limitations and uncertainty regarding economic structure and monetary policy transmission can complicate the conduct of inflation targeting.** In many non-industrial countries, data availability and quality is much weaker than in more developed economies. In addition, although the general characteristics of the macroeconomy and financial system may be understood, more detailed knowledge of the structure and parameters describing the economy may be much more uncertain, and less stable than in more developed economies.[34] Implementing inflation targeting in such circumstances is undoubtedly challenging and will tend to result in greater variability of inflation and output than would be possible with better information. Importantly, however, the policy framework can be adapted to take information limitations into account. When data are missing or of poor quality, other indicators, including anecdotal information, can be used to supplement the information set. Uncertainties regarding the current state of the economy, as well as how quickly or strongly adjustments in policy settings will be transmitted through to inflation, can be reflected in the choice of policy horizon, as well as the degree of aggressiveness in adjusting policy settings to prospective inflation developments and risks.

V. Implications of the Move Toward Inflation Targeting for Fund Work

A. Technical Assistance

47. **The growing interest in adopting inflation targeting in non-industrial countries is already being reflected in the provision of technical assistance (TA)**. The focus of this type of TA is on developing an integrated inflation targeting framework tailored to the specific circumstances and needs of individual countries. Since 1998, MFD has provided this kind of TA to 14 countries, relying heavily on experts from inflation targeting central banks.[35] As shown in Figure 6, much of the assistance—amounting to a total of 2.6 person years—has focused on modeling and forecasting issues. One should also note that MFD has also continued to provide technical assistance to those countries in the more traditional areas of monetary and foreign exchange operations, and money and foreign exchange market development. Assistance by MFD to the 14 countries in those areas amounted

Figure 6. Topics Covered in Technical Assistance Reports on Inflation Targeting



[34] This is especially likely if adoption of inflation targeting is part of a larger package of economic reforms.

[35] Countries to which specific TA on inflation targeting has been provided include: Albania, Armenia, Belarus, Colombia, Costa Rica, Czech Republic, Guatemala, Indonesia, Kazakhstan, Poland, Romania, Slovak Republic, Turkey, and Ukraine.

to 7.6 person years.[36] Those trends are expected to continue, as evidenced by the high number of countries that requested technical assistance on inflation targeting topics during the 2005 Annual Meetings.[37]

48. **Therefore, as more developing countries strive to strengthen their capacity to implement monetary policy, including for moving to inflation targeting, technical assistance by MFD on general topics as well as on more specific areas related to inflation targeting frameworks is expected to continue**. Given the specific challenges faced by non-industrial countries, requests for technical assistance are most likely to expand on issues such as the modalities of central bank intervention in the foreign exchange market, and on developing effective monetary operations under various market conditions. Technical assistance needs may also shift towards policy decision-making processes and communications, since capacity in these areas may be relatively underdeveloped in central banks that shift directly from exchange rate pegs to inflation targeting. Finally, needs may well shift toward specific areas of inflation targeting frameworks, such as improving and developing key macroeconomic indicators, including measures of core inflation, in view of weaknesses in basic data in many countries.[38] All these potential demands on Fund technical assistance may require some adjustment in the types of expert skills needed to provide effective TA, as well as in the Fund agenda for applied research on operational issues.

49. **In view of the broad interest that has emerged in favor of inflation targeting, multilateral assistance, including through training courses, workshops and conferences, can also be expected to continue**. INS already provides a number of training courses on inflation targeting issues, and MFD has conducted several regional workshops on inflation targeting. A key advantage of this mode of providing technical assistance is that it promotes the sharing of experience among inflation targeting countries. As more and more countries express an interest in adopting inflation targeting, multilateral assistance allows a sharing of experiences among group of countries faced with similar initial conditions. It should be particularly valuable in grappling with issues that have not yet been discussed widely in the literature, and for which experiences from peers offers unrivaled benefits.

B. Fund Surveillance, Training, and Research

50. **Fund surveillance will also need to adapt to the challenge of providing effective surveillance for inflation targeting economies.** The forward-looking, information-inclusive nature of inflation targeting presents challenges for IMF surveillance. With assistance from RES, a number of country desks for inflation targeting countries have sought to develop

[36] MFD technical assistance in monetary policy implementation during the period 1999-2004 involved a total of more than 100 person years (see Laurens (2005)).

[37] Seventeen countries requested technical assistance on inflation targeting topics from the Monetary and Financial Systems Department.

[38] A thorough discussion of data issues is contained in IMF (2002).

small macro models to support forecasting and policy analysis.[39] In addition, INS now provides a practical course for Fund staff on inflation targeting.

51. **Increased research and staff training on inflation targeting issues is likely to be needed**. In order to be able to conduct effective surveillance, as well as to contribute to improving country authorities' policy decisions and analysis, INS training programs are likely to need to be enhanced, particularly in more technical aspects of inflation targeting. In addition, increased research into practical issues of inflation targeting, specifically in the developing country context, will be needed.

C. Fund-Supported Programs and Conditionality

52. **With the spread of the use of inflation targeting as framework for monetary policy, it is increasingly likely that the IMF will be called upon to provide financial resources to countries that have adopted or are about to adopt inflation targeting.** This section briefly reviews the existing policy on monetary conditionality under inflation targeting, and the experience thus far with implementing such conditionality.

The 2000 Framework

53. **Conditionality in Fund-supported programs is intended primarily to ensure that Fund resources are used to support adjustment toward sustained external viability, and thereby to safeguard the capacity to repay the Fund.** Traditionally, monetary conditionality consists of limits on monetary aggregates—specifically, a floor is set for the level of net international reserves (NIR) and a ceiling established on the net domestic assets (NDA) or on base money.

54. **In the context of inflation targeting, the NIR/NDA approach could serve as a parsimonious signal extraction device to assess whether an adjustment in the monetary stance may be needed in order to protect external viability.** In a case in which the NIR floor has been set to allow significant margin for unprogramed intervention, the additional NDA ceiling would serve as a secondary safeguard of the program's external objectives and of Fund resources. For example, if the country experiences a sudden capital outflow due to an external shock the authorities may react by drawing down NIR toward this floor to defend the exchange rate and to counteract the inflationary pressure stemming from the pass through. A ceiling on NDA would effectively limit sterilized intervention and instead prompt a monetary policy response, thereby heading off additional pressures on the balance of payments and on inflation.

55. **However, this traditional framework presents significant conceptual and practical problems in the context of inflation targeting**. First, there could be confusion if the Fund program focuses on the NDA ceiling while the authorities and the public are focused on the authorities' inflation target. Second, the same uncertainties and instability of structural relationships that make inflation targeting attractive also make traditional

[39] See Berg, Karam, and Laxton (2006).

conditionality more difficult to apply. For example, an exogenous increase in money demand may require increases in the interest rate to meet the NDA ceiling—which is based on the assumption of stable money demand—even though they may not be required to meet the inflation target. Furthermore, the NIR/NDA framework has no binding mechanism to prevent *larger*-than-programmed NIR increases from fueling monetary expansion and thus inflation.

56. **The Fund's 2000 policy on monetary conditionality under inflation targeting—also known as the reviews-based approach—attempted to minimize potential tensions between inflation targeting and the NIR/NDA approach to conditionality.**[40] Under this approach:

- monetary policy would be subject to periodic (quarterly or more frequently, in conjunction with program reviews or freestanding) reviews focusing on recent inflation outturns, together with indicators of the implications of monetary policy for future inflation;

- the Fund and the authorities would broadly agree *ex ante* on timely monetary responses to possible deviations from the targeted inflation path;

- a floor on NIR would continue to be essential as safeguard to the Fund's resources;

- some mechanism to limit sterilization would be needed in cases in which it was considered necessary to set the NIR floor allowing a significant margin for unprogramed intervention. This mechanism could entail a reaction function of monetary policy to unprogramed reserve losses or simply the traditional NDA ceilings, to be determined on a case-by-case basis. In the latter case, the relationship between NDA ceilings and inflation targets would need to be made clear to the public.

57. **This approach is predicated on the fact that various features of inflation targeting intended to hold the monetary authorities accountable with the public can also be used for IMF program design and monitoring.** In this way, Fund conditionality and the accountability features of inflation targeting would reinforce each other. The approach also takes as given that most flexible exchange rate regimes do not operate as pure floats so that trade-offs between inflation and external objectives would be unavoidable from time to time. As such, the setting of an NIR floor in the context of Fund-supported program conditionality should not be fundamentally incompatible with inflation targeting. In sum, the central bank's commitments regarding consultations with the Fund are not fundamentally different from their domestic accountability responsibilities.

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[40] See BUFF/00/11, SM/99/296, *Inflation Targeting—Implications for IMF Conditionality*, December 14, 1999, SM/99/296, Supplement 1, Blejer and others (2002), Fraga, Goldfajn, and Minella (2003), and Cerisola and Gelos (2005).

58. **The Fund's 2000 policy also deemed it essential to examine whether certain conditions were in place before determining whether it would be appropriate to make use of the reviews-based approach.** These include central bank independence and other supportive institutional features; the absence of fiscal dominance; a reasonably good understanding of the inflation process; and a considerable degree of exchange rate flexibility. Where these conditions are not in place, the policy allows for setting structural benchmarks to strengthen the inflation targeting framework and to facilitate the subsequent use of the reviews-based approach.

Experience with monetary conditionality in inflation targeting countries

59. **So far the experience with inflation targeting in Fund-supported programs is limited to three members (Brazil, Colombia, and Peru).** For Brazil, conditionality under its Fund-supported program was modified to accommodate inflation targeting in late 1999, The programs with Colombia and Peru were shifted to an inflation targeting framework in March 2001 and November 2002, respectively. Looking forward, among members with existing Fund-supported arrangements, Turkey is expected to shift to inflation targeting in 2006.

60. **Conditionality in Colombia's and Peru's programs generally followed the example set in the Brazil, and actual inflation performance was generally satisfactory (Box 2).** All three programs contained (and the programs with Colombia and Peru still do) a consultation mechanism under which deviations of inflation from program targets would trigger consultations with the staff or the Board. The programs established bands around the central inflation target at the start of the arrangement, with actual inflation results outside the band at the test dates prompting consultations with the staff (inner band) or the Executive Board (outer band). In practice, inflation has stayed within the program consultation bands in Colombia and Peru but initially exceeded the consultation bands in Brazil several times following several large shocks, while converging back toward the official target by 2004. The link between these consultations and Fund's decisions about whether the program was on track were vague, but in practice the required Board consultations for Brazil were completed in the context of broader program reviews. There have been no stand-alone Board reviews of monetary policy in these arrangements, unlike what had been envisaged in the 2000 policy, even though the program reviews in Colombia and Peru were scheduled at six month intervals.

61. **In two other respects, the three programs diverged from the framework envisaged in 2000.** First, none of the three programs involved an agreement *ex ante* on the monetary policy reaction to deviations of inflation from the targeted path, possibly because defining such a reaction in the absence of information on the magnitude and nature of the deviation proved impracticable. Thus, the program reviews were used to ensure monetary policy remained on track. Second, no specific mechanisms to limit sterilization was envisaged, although the August 2002 program with Brazil contained a commitment not to loosen monetary conditions and to consult with staff if accumulated intervention reached an amount of US$3 billion on a rolling 30-day basis. Such mechanisms were not required in Colombia and Peru because the margins for unprogramed intervention were smaller.

62. **While the pragmatic application of the 2000 policy in the programs with Brazil, Colombia, and Peru seems to have worked well, a firmer application of the 2000 policy might be necessary in some future programs,** particularly with members that have yet to establish strong monetary policy credibility. One concern relates to the absence of a sterilization rule in programs with large margins under the NIR floor. Such a margin is intended to allow room for foreign exchange intervention, but leaves the Fund without assurance that it will not delay a needed tightening of monetary policy. To satisfy the need to limit excessive sterilization while avoiding the difficulties related to the introduction of an NDA ceiling or a reaction function of monetary policy to unprogramed reserve losses, it is important to set NIR floors appropriately in programs.

63. **One issue that could be explored in future programs is whether Fund conditionality related to inflation targeting could be applied to indicators of future inflation.** As mentioned, the inflation consultation bands in Fund-supported programs currently apply to actual inflation outcomes. However, given the forward-looking nature of inflation targeting, it could be argued that consultations should be triggered by deviations of *forecasted* inflation from the target. This would allow for a more meaningful discussion about the appropriate monetary policy stance than a system based on actual inflation outcomes. At the same time, basing the consultation bands on forward-looking indicators of inflation would raise a host of thorny issues. Whose forecast of inflation should be used? Typically there is more than one model involved, and models are continuously refined. Market expectations provide another forward looking indicator, but this is difficult to use because it may build in an expected policy response. Finally, a backward looking approach can be useful as sizable deviations of inflation from the target (i.e. sizable errors in forecasting inflation) may question the adequacy of the inflation projection methodology, thus justifying a consultation. In any case, with still limited experience gathered and broadly satisfactory results in terms of inflation outcomes, revising the 2000 approach seems premature.

VI. Conclusions and Issues for Discussion

64. **Subject to some caveats, the experience of emerging market inflation targeters to date suggests that inflation targeting has been associated with improved macroeconomic performance and reduced vulnerability to crisis relative to other monetary policy frameworks**. The important caveats to bear in mind are: (i) the experience with inflation targeting in non-industrial countries is relatively short, and it is hard to draw definitive conclusions about the effects of inflation targeting; and (ii) it is difficult to rule out categorically that the observed benefits of inflation targeting arose from a broader shift in preferences to lower inflation and macroeconomic stability, rather than from the adoption of inflation targeting per se.

65. **The evidence also suggests that the necessary conditions for successful adoption of inflation targeting in non-industrial countries are not generally more demanding than those needed for successful operation of alternative policy frameworks.** The evidence suggests that it is not critical that strong initial conditions are fully in place before

the successful adoption of inflation targeting, but technical and institutional improvements do contribute to better inflation performance once the framework has been adopted. The latter is possibly because making rapid progress with such technical and institutional improvements signals the authorities' commitment to the framework and thus enhances its credibility.

66. **Taken together, the evidence supports the conclusion that, as non-industrial countries seek an alternative nominal anchor to fixed exchange rate, inflation targeting would be a good option for them to consider**. Moreover, some aspects of the standard approach to inflation targeting can be modified to take account of particular characteristics of non-industrial countries, e.g., the larger exposure of these countries to movements in the exchange rate.

67. **These findings have a number of implications for the work of the Fund**. First, it suggests that as more non-industrial countries adopt inflation targeting, the scope for sharing expertise with issues of particular relevance to emerging markets will increase as would the opportunity for the Fund to leverage its traditional bilateral TA through the delivery of multilateral workshops and conferences. Nevertheless, if past trends continue, increased demands for conventional TA in monetary operations and less traditional areas such as central bank communication can be expected. Second, it suggests the need for scaling up of the work on developing small models for inflation forecasting and analysis of sensitivity to shocks. Third, the early experience with the review-based conditionality approach for program countries that have adopted inflation targeting is broadly satisfactory, although it suggests that firmer implementation of the 1999 guidelines may be appropriate in some future programs particularly with members that have yet to establish strong monetary policy credibility.

68. **The following are suggested as issues for discussion:**

- Do Directors see any risks from having a period of transition toward more flexible exchange rates where inflation targeting is combined with some form of exchange rate bands? Should staff consider research into how best to reconcile foreign exchange intervention with inflation targeting a priority?

- Do Directors agree that follow-up work is needed as regards to the changing content of the Fund's technical assistance strategy, its prioritization and modes of delivery, as more countries adopt inflation targeting?

- Do Directors agree that priority should be given to research on inflation targeting in non-industrial countries, and to step up staff training on the technical aspects of inflation targeting to ensure effective surveillance?

- How do Directors view the experience with conditionality on inflation targeting the Fund-supported programs so far?

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Box 1. Inflation Targeting in the Philippines[41]

Inflation targeting (IT) was introduced in the Philippines in January 2002. Prior to IT, the Bangko Sentral ng Pilipinas (BSP) relied on a form of monetary aggregate targeting to guide monetary policy. The impetus for changing the monetary policy framework came in part from the observation that the relationship between money, inflation, and real activity had weakened considerably following an earlier period of financial liberalization. Beginning around the late 1990s, policy makers began to form the view that given the economy's vulnerability to shocks, adherence to monetary aggregate or exchange rate targeting would likely have considerable costs in terms of output or inflation.[42]

The economic environment was not benign when IT was introduced though some key preconditions existed. The macroeconomic framework was overshadowed by weak public finances—in 2001 the fiscal deficit was nearly 5 percent of GDP and nonfinancial public sector debt around 87 percent of GDP. Large external commercial borrowing requirements contributed to the economy's external vulnerability. As a legacy from the Asian crisis, over a quarter of the financial system's loan assets were non performing. Nevertheless, some key preconditions for IT existed. Importantly, a New Central Bank Act in 1993 had established the independence of the BSP and given it the primary mandate of maintaining price stability. The law also provided for the BSP's fiscal and administrative autonomy and, perhaps most importantly, limited the amount and tenor of any liquidity assistance provided to the government which helped to address concerns of fiscal dominance. The BSP also devoted considerable resources to developing databases and econometric models for forecasting inflation.

Since its adoption, the IT framework has served the Philippines well. Inflation has averaged 5 percent since 2002 compared to 7¼ percent in the 10 years preceding introduction of IT, though it is too soon to judge the impact of the IT framework on inflation and inflation expectations. By giving a central role to transparency and accountability, the new framework has helped to establish the authorities' commitment to maintaining price stability. The regular public communication—such as through the quarterly inflation report and press releases—has helped to orient the public's thinking on the forward looking aspects of monetary policy. Over time, the BSP has devoted greater resources to further developing the IT framework. At the same time efforts have recently been made to lessen fiscal and external vulnerabilities and strengthen the financial system, providing a better environment for IT, though more work remains to be done.

A key recent challenge has been adverse supply-side shocks which have pushed inflation above target. Primarily on account of shocks to agricultural and energy prices, inflation exceeded the target ranges for 2004-05. High international oil prices had a particular

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[41] Drafted by Reza Baqir.

[42] See Guinigundo (2005) for a comprehensive discussion of the Philippines' experience with IT. See also Houben (1997), and Debelle and Lim (1998).

role to play since, unlike many other countries in the region, the Philippines did not suppress the pass-through to domestic gasoline prices. The challenge for the BSP was to not let the misses of the inflation target affect the credibility of the IT framework. The BSP developed a framework to define the conditions under which it would react to supply-side price shocks and communicated it clearly to the public through press releases, the quarterly inflation report, press conferences, and public briefings.[43] When it became apparent in 2005 that continued above target inflation may threaten inflation expectations, the BSP acted to raise policy rates to guard against possible second round effects of supply shocks.

Another challenge for the BSP has been to manage periods of financial market pressure driven by a confluence of political instability and a vulnerable fiscal position. The BSP acted to smooth volatility of the exchange rate and took monetary policy action when trends in the foreign exchange market threatened the inflation target and inflation expectations. At the same time the exchange rate has moved considerably—since the adoption of inflation targeting the peso has fluctuated in a 13½ percent range against the U.S. dollar. In recent consultations, the Executive Board of the IMF has commended the monetary authorities for their handling of financial market pressure within the IT framework.

[43] The BSP also supported the use of non-monetary government measures to address bottlenecks in the transportation and importation of food items.

Box 2. Fund Conditionality Under Inflation Targeting Regimes

Brazil

When Brazil adopted inflation targeting in the midst of a crisis in 1999, the Fund was confronted with the need to adapt its conditionality. During the fourth review in November the performance criterion on net domestic assets (NDA) was downgraded to an indicative target and replaced with a consultation mechanism. The authorities committed to discuss with Fund staff the appropriate policy response and to complete a consultation with the Executive Board should the 12-month rate of consumer inflation (IPCA) exceed the upper limit of an inner band and the upper limit of an outer band respectively.

The inflation targeting regime in Brazil was subject to severe shocks. The economy came under stress at different points during the program due to a domestic energy crisis, adjustments in administered prices, and a depreciating exchange rate, which was later exacerbated by pre-election uncertainty. The authorities reacted first with significant foreign exchange intervention and to prevent vulnerabilities to further shocks commenced with a tightening of monetary policy in October 2002, after NIR had fallen by some US$13 billion.

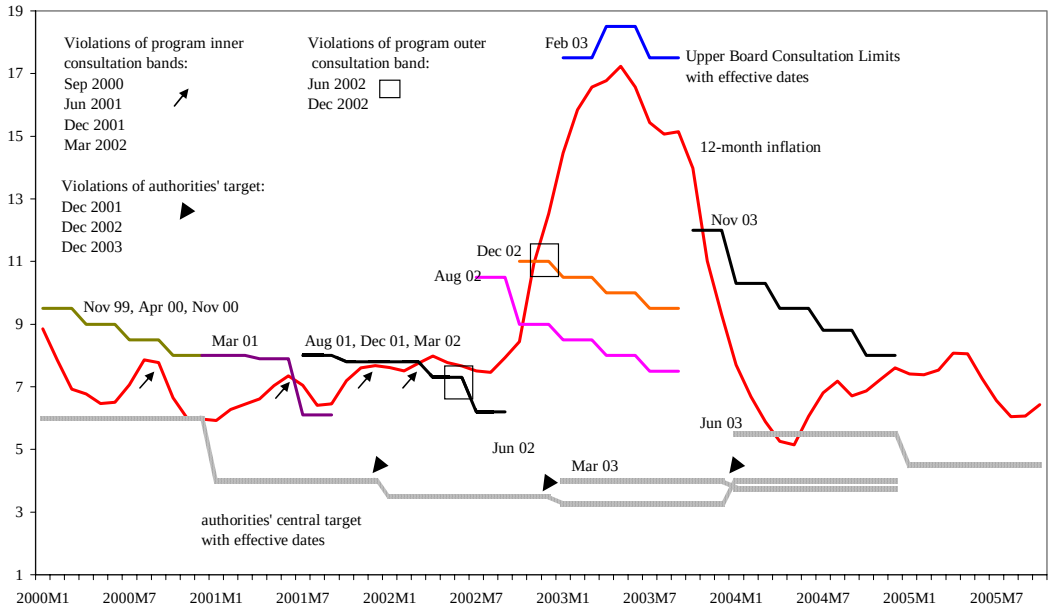
Following various shocks the consultation mechanism was triggered many times during the series of arrangements Brazil had with the Fund until 2005. The inner consultation mechanism was triggered in September 2000, June 2001, December 2001 and March 2002 while consultations with the Board were completed following the June and December 2002 excesses each (Figure 1). The authorities also exceeded the official targets in the three years 2001-03. Staff consultations were conducted in the context of program review discussions. The Board consultation was accompanied by a letter by the central bank governor explaining the reasons for exceeding the consultation mechanism and how the actions of the central bank are expected to bring inflation back to its targeted level.

Several issues are noteworthy in the experience in Brazil:

- **There is a tension between the need to reach agreement on an appropriate monetary policy response to deviations from the intended inflation path and not micromanaging policy**. For example, after the outer consultation band was exceeded in June 2002, and given that inflation expectations were at the upper band around the authorities' target, the staff cautioned that there was little margin for further interest rate cuts. In the event, interest rates were lowered in July.

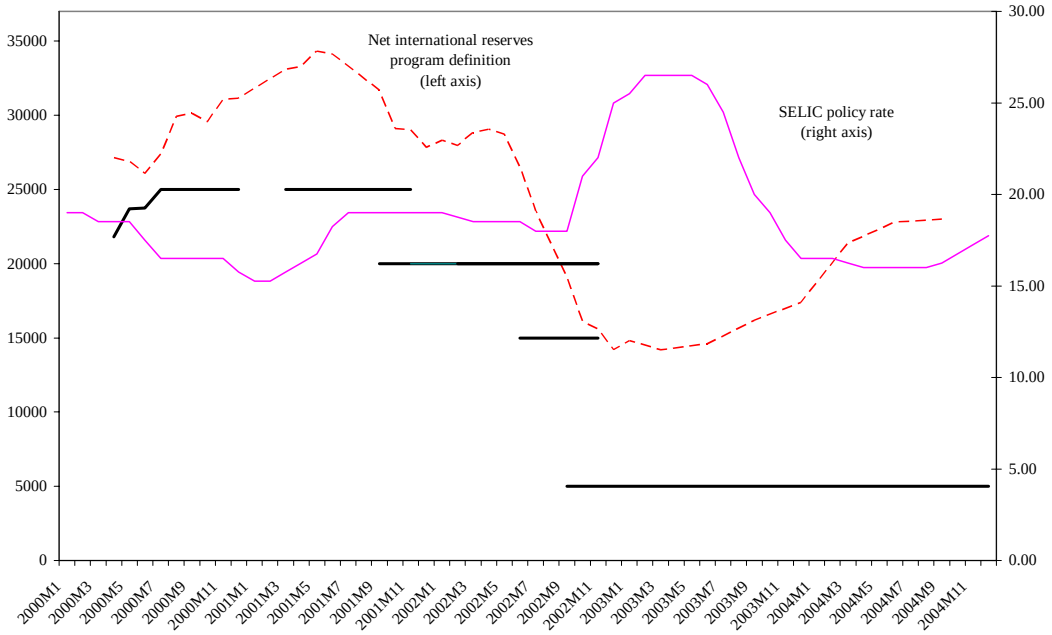
- **Although the level of NIR never fell below the program floor, there was significant foreign exchange market intervention.** Net international reserves did not fall below US$14 billion, well above the US$5 billion floor set in the August 2002 program (Figure 2). However, spot market interventions were in the order of US$3.3 billion in 2001 and US$13.6 billion in 2002 and the net issuance of foreign exchange indexed debt was in the amount of US$18.4 billion in 2001. As mentioned, interest rates were increased after NIR had fallen by US$13 billion.

Figure 1. Brazil: Inflation, Upper Board Consultation Limits and Central Official Targets, 2000-2005



Source: International Monetary Fund

Figure 2: Brazil--Monetary Policy Response, 2000-2004



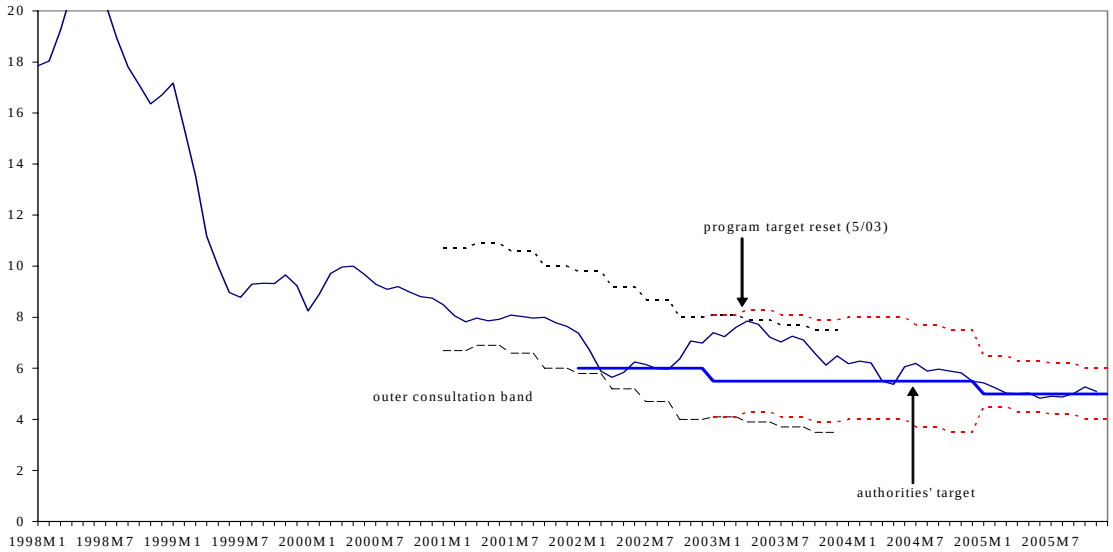
Colombia

Conditionality included information sharing requirements. At the time of the request for a new SBA in December 2002, the authorities committed in the Technical Memorandum of Understanding to provide Fund staff with monthly information and analysis of inflationary developments and forecasts, and to keep staff informed of all policy actions taken to achieve the inflation objectives of the program. In December 2003 the staff also urged the authorities to share more information about their inflation forecasting model with the public so as to shift the focus of public discussion of inflation away from recent outcomes to the inflation outlook.

The consultation mechanism on inflation targeting was elevated to performance criterion. Since introduction of the consultation mechanism the band was revised upward once in early 2003 by 0.4 percent to reflect the direct effect of previously approved VAT increases while the authorities target remained unchanged. The two targets were later unified again. To signal their readiness to take the necessary action to meet the inflation target the authorities narrowed the consultation band from a width of 2 percent on either side of the central target to 1 percent at the time of the request for a new SBA in April 2005.

As in the case of Brazil, the authorities did engage in foreign exchange market intervention in an environment of first downward and then upward pressure on the peso. The central bank tended to combine changes in the policy rate with foreign exchange market intervention through its options-based mechanism. Through pre-determined sales or purchases of foreign exchange at certain levels the authorities intended to slow the rate of change of the peso while letting the market determine its level.

Figure 3. Columbia: Inflation and Inflation Targeting bands 1998-2005

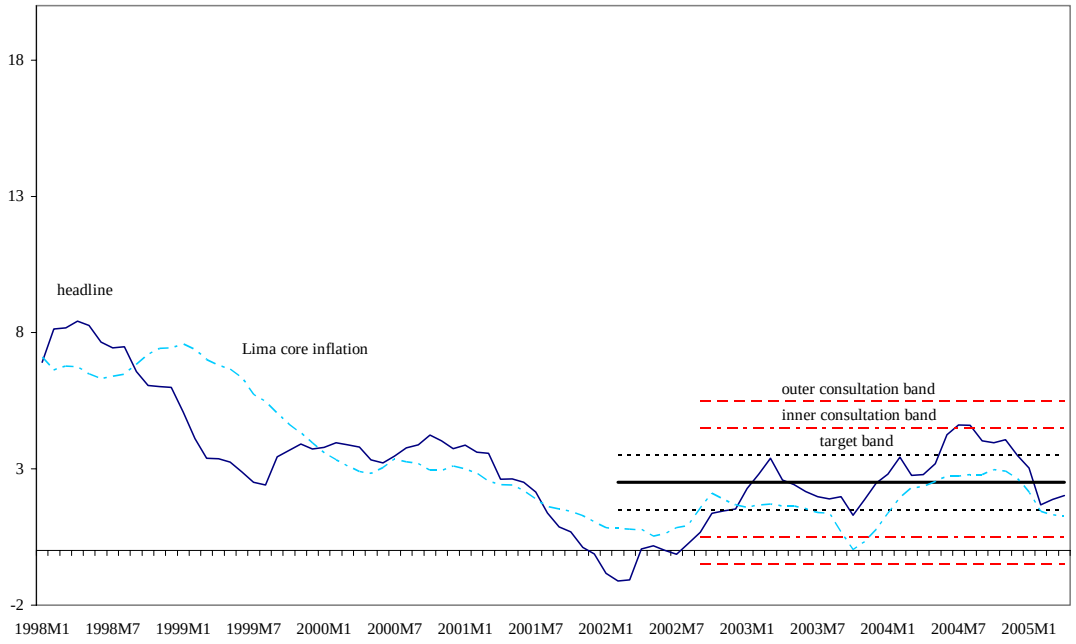


Peru

The program's consultation bands around the central target are significantly wider than under the official target. While the official target provided for a margin of only 1 percent on either side of the official target, the consultation band permitted 2 percent for staff consultations and 3 percent for Board consultations. The central target remained flat during the program period and the consultation bands were never exceeded at the test dates.

The operation of the inflation targeting regime in Peru was complicated by the high degree of dollarization. Although the authorities intervened heavily to offset the strong upward pressure on the *Nuevo Sol* in the second half of 2004 and the first half of 2005, there is no evidence that the primacy of the inflation target was ever compromised. They saw it as an opportunity to build international reserves to reduce vulnerabilities ahead of the elections in 2006, but continued to express their commitment to the inflation target. Since October 2005, the authorities have been using these reserves to stem depreciation pressures in the wake of political uncertainty.

Figure 4. Peru: Inflation and Inflation Targeting bands 1998-2005



Macroeconomic Performance Under Three Monetary Policy Regimes

This appendix provides information about the model and assumptions that are used to compare macroeconomic performance under inflation targeting, an exchange rate peg, and money targeting. The analysis is based on extending results presented by Laxton and Pesenti (2003), which shows that monetary policy rules that were designed to support inflation-targeting regimes for advanced economies need to be extended in two ways to allow for the special features of emerging-market economies. First, because of greater uncertainty in equilibrium measures of the real interest rate in emerging-market economies they argue it may be prudent to focus on rules that exclude such measures. Second, because of greater variability in supply shocks associated with the catch-up process, optimal simple rules should place more weight on expected inflation and less weight on conventional measures of the output gap.

Laxton and Pesenti (2003) develop a model of the Czech Republic and to capture important trade linkages they close the model by including a model of the Euro area. The model includes trade in intermediate inputs, which are combined with capital and labor to produce another more-refined tradable good as well as nontradable good. These features are necessary to model incomplete exchange rate pass-through as well as important trade linkages where imports are used as a factor of production to produce goods that are either consumed at home or exported to foreign markets. The model includes a number of assumptions that are necessary to generate plausible dynamics such as: nominal wage inertia and imperfect competition in the labor market and product markets; and a host of real rigidities that slow down the responses of consumption, investment and imports in response to changes in relative prices. Both economies are assumed to be subjected to a full array of standard supply and demand shocks. These include the standard list of shocks that have been used in closed-economy models (wage and price markups, labor supply, consumption, investment, and productivity) as well as shocks that have open-economy dimensions such as time-varying risk premium or shocks that affect the demand for Czech exports.

As in other studies in this area, the performance of alternative rules is based on a loss function that places weights on the unconditional variances of inflation, interest rates and conventional measures of the output gap. For any given policy rule, estimates of these variances can be obtained by linearizing the model and then deriving the model's reduced-form representation, which will be a function of the underlying parameters of the policy rule. The optimal weights in any particular policy rule can then be derived by finding the parameters that minimize the loss function. This appendix extends the analysis presented in Laxton and Pesenti (2003) in two ways. First, using a conventional loss function that places equal weights of one on variability in inflation and output as well as a lower weight of one half on changes interest rates, we compute the optimal horizon of the inflation forecast in a

simple Inflation-Forecast-Based (IFB) rule.[44] Second, we then compare the macroeconomic performance produced by these rules to the performance obtained under an exchange rate peg or a regime that targets the rate of growth of the money supply.

The IFB reaction function that we consider is reported at the bottom of Table 1. This reaction function excludes direct measures of the equilibrium real interest rate and changes in the nominal interest rate depend only on a measure of the model's year-on-year inflation forecast *j* quarters into the future as well as the contemporaneous value of the output gap. The table reports the value of the loss function for various forecast horizons that range from zero to 6 quarters into the future and for each horizon it also includes the optimal parameters and standard deviations for inflation, the output gap and changes in interest rates. The loss function is minimized at 6.36 when the inflation-forecast horizon is 2 or 3 quarters into the future. This is significantly shorter than the horizon in relatively closed economies such as the Euro area that have longer lags in the monetary transmission mechanism. However, it produces good macroeconomic performance in open economies such as the Czech Republic, which respond faster to changes in monetary conditions because of higher levels of competition and lower structural inflation persistence.

The second table compares the values of the loss function for the optimized IFB rule where the horizon is equal to 3 with an exchange rate peg and money targeting, where in the last two cases interest rates are adjusted to achieve the targets precisely. For the case of money targeting we consider a situation where there are no shocks to the money demand function while in the second case we consider a more realistic case where there are unpredictable shifts in velocity, which have been calibrated to represent the historical shifts that have occurred in velocity of narrow money over the last decade in the Czech Republic. We also report measures of real exchange rate variability, which are measured as standard deviations of the detrended real exchange rate. This table shows that there is substantial increases in macroeconomic variability associated with both pegs and money-targeting rules, especially when the latter have large and unpredictable shifts in the demand for money.

[44] Laxton and Pesenti (2003) use the same form of rule, but they fix the horizon of the inflation forecast to be one year ahead.

Appendix Table I.1. Comparison of Inflation Targeting, Money Targeting and an Exchange Rate Peg

		Measures of Macro Variability			
		Inflation volatility	Output gap volatility	Interest rate volatility	Real exchange rate volatility
	Λ	$\sigma_{(P_t / P_{t-4})}$	σ_{ygap}	$\sigma_{\Delta i}$	
Inflation Targeting	6.7	1.6	1.8	0.8	5.1
Exchange Rate Peg	53.8	2.7	3.2	8.5	2.9
Money Targets with no velocity shocks	8.8	2.0	2.1	0.7	5.9
Money Targets with velocity shocks	12.6	2.4	2.4	1.5	6.2

1/ Loss function is $\Lambda = \sigma^2(P_t / P_{t-4}) + \sigma^2(ygap) + .5\sigma^2(i_{t+1} - i_t)$

Details on Econometric Specifications and on Data from the Survey on Preconditions and Current Conditions

This appendix provides details on the baseline and alternative econometric specifications discussed in Section III of the main text measuring the relative macroeconomic performance of inflation targeters versus non-inflation targeters. The appendix also gives details on data used in the empirical analysis of the main text, including data from the survey.

Econometric specifications used in the main text

In line with Ball and Sheridan (2003), macroeconomic performance is considered to depend partly on its own past history, and partly on some underlying mean value of the variable in question. In the case of the inflation rate for inflation targeters, this mean should, of course, correspond to the inflation target; for other countries, this would simply be the "normal" level of inflation to which observed inflation reverts. Mathematically, this process can be expressed as follows:

$$(1) \qquad X_{i,t} = \phi\,[\alpha^T d_{i,t} + \alpha^N (1 - d_{i,t})\,] + (1 - \phi)\, X_{i,t-1}$$

where $X_{i,t}$ is the value of a macroeconomic performance indicator X for country i at time t, α^T is the mean to which X reverts for inflation targeters, α^N is the mean to which X reverts for *non*-inflation targeters, and $d_{i,t}$ is a variable equal to 1 for inflation targeters and 0 for non-inflation targeters. The parameter ϕ represents the speed with which X reverts to its group-specific α: a value of ϕ equal to 1 means X reverts completely after one period, while a value of ϕ equal to 0 would imply that X depends only on its past history, with no tendency to revert to any particular value.

The regression used by Ball and Sheridan (2003), and in the results reported in Tables II.1 to II.4 in this appendix, is simply a version of equation (1), re-written in terms of the change in X, appending an error term e, and assuming there are two periods: "pre" and "post"

$$(2) \qquad X_{i,\text{post}} - X_{i,\text{pre}} = \phi\alpha^T d_i + \phi\alpha^N (1 - d_i) - \phi\, X_{i,\text{pre}} + e_i\,,$$

or, letting $a_0 = \phi\alpha^N$, $a_1 = \phi(\alpha^T - \alpha^N)$ and $b = -\phi$,

$$(3) \qquad X_{i,\text{post}} - X_{i,\text{pre}} = a_0 + a_1\, d_i + bX_{i,\text{pre}} + e_i\ .$$

As discussed in the main text, the "pre" period for inflation targeters is defined as 1985 until the quarter prior to the adoption of inflation targeting, while the "post" period runs from IT adoption through 2004. The break date for non-inflation targeters is taken to be 1999Q4, which corresponds to the mean adoption date for emerging-market inflation targeters.

In this framework, the relevant parameter for gauging inflation targeting's economic impact is a_1, the coefficient on the IT dummy variable, and this is what is reported in Tables II.1 to II.4. Note that if ϕ were known to be zero (i.e., complete mean reversion), the estimated a_1

would be nothing more than the difference in average $X_{post} - X_{pre}$ for inflation targeters versus non-inflation targeters; the only advantage of the regression method is to be able to control for the initial level of X_{pre}. Furthermore, by focusing on relatively long periods of time, the analysis is largely a comparison of steady-states, saying nothing about what happens during the transition to inflation targeting (or any other) policy framework; to do so would obviously require a very careful control of cyclical conditions in order to distinguish transition effects from the normal trajectory of the business cycle.

The baseline results obtained from estimating equation (3), on the full sample of 35 emerging market economies of the JP Morgan EMBI Index plus the Czech Republic and Israel (the latter two being inflation targeters but not part of the index) plus seven countries often classified as emerging markets, appear in the text in Table 3. Included in the set of *X* variables are the same gauges of core macroeconomic performance that appear in Table 3: CPI inflation, inflation volatility, and the volatility of real GDP growth, and the output gap.

Robustness checks

One issue that arises in the context of the baseline analysis described above is that the partitioning of the sample into "pre" and "post" periods is somewhat arbitrary—both in determining the starting date for the calculation of the "pre" period averages, and in the assigning of 1999Q4 as the hypothetical break date for the non-inflation targeters. In an effort to assess any distortion created by the arbitrariness of the partitioning, the regression equation (3) was re-estimated using three alternative sample partitioning schemes.

- The first is to start the "pre" period in 1990 rather than 1985, thus largely removing any effects of the Latin American debt crisis from the sample.

- The second is to change the break date for non-inflation targeters from 1999Q4 to the date of the most recent change in monetary policy framework (based on staff calculations and the Annual Report on Exchange Arrangements and Exchange Restrictions).

- Under the previous partitioning, however, the "pre" and "post" samples vary across countries. To eliminate any possibility that simple time effects could account for the results, a third alternative partitioning was tried, using a standardized 1994-96 "pre" period, and a standardized 2002-2004 "post" period.

A number of additional checks were also performed in order to ensure that the results are robust to sample selection, and to the inclusion of other potentially important factors affecting macroeconomic outcomes. The various country samples used are shown at the end of this appendix.

- First, to guard against the possibility that a handful of extreme inflation observations might be exerting undue influence on the regression, a control was included for countries whose inflation rate exceeded 40 percent in the "pre" period; a threshold of 100 percent was also tried.

- Second, equation (3) was re-estimated over a smaller sample excluding countries defined as "low income" by the World Bank and also over a sample that excluded the seven countries in our control group not listed in the JP Morgan EMBI.

- Third, a control was included for countries that are severely indebted externally, in line with the World Bank classification of countries external indebtedness.

- Fourth, a control for countries with an exchange rate peg during the "post" period was used.

- And finally, controls were included for the public debt-to-GDP ratio in the "pre" period, and the change between "post" and "pre" periods to rule out the possibility that the observed gains in macroeconomic performance are ascribable not to the introduction of IT but, rather, to improvements in fiscal discipline. Results for these two sets of robustness checks are reported in Tables II.1, II.2 and II.3.

Variable descriptions and data sources

Unless otherwise noted, all data run from 1985Q1 through 2004Q4.

- *Inflation rate*: calculated as the annual growth rate of the consumer price index. Quarterly data were obtained from the IMF, International Financial Statistics and the OECD.

- *Output growth rate*: annual growth rate of real GDP in local currency. Quarterly data were obtained from the IMF, International Financial Statistics and WEO; and from the OECD .

- *Output gap*: calculated as the residual from a regression of the logarithm of real GDP on a constant term, a linear trend, and a quadratic trend.

- *Nominal short term interest rate:* 3-month money market interest rate or deposit rate. Quarterly data were obtained from the IMF, International Financial Statistics and WEO; and from the OECD.

- *Foreign exchange rate:* local currency per U.S. dollar. Quarterly data were obtained from the IMF, International Financial Statistics.

- *International reserves minus gold*: in U.S. dollars. Quarterly data were obtained from the IMF, International Financial Statistics.

- *Broad money:* in local currency, broadest definition available. Quarterly data were obtained from the IMF, International Financial Statistics and WEO.

- *Inflation expectations*: survey data obtained from Consensus Economics. Availability varies by country.

Table II.1. Different Classifications

Variables	World Bank Classification by Income		World Bank Classification by Foreign Indebtedness	Emerging Markets	EMBI Classification
	No low income country	No lower middle income country	No severely indebted country		
			IT Dummy Variable		
CPI inflation	-5.0**	-9.4*	-3.8**	-5.0**	-4.7**
Volatility of CPI inflation	-4.1**	-4.2	-1.8	-4.8**	-4.0**
Volatility of real output Growth	-0.9	-3.1*	-0.4	-1.2	-0.9
Volatility of output gap	-0.0**	-0.0**	-0.0	-0.0**	-0.0**

Sources: IMF, *International Financial Statistics;* J.P. Morgan; national sources; World Bank; and IMF staff calculations.

Note: One, two, and three asterisks denote statistical significance at the 10, 5, and 1 percent level, respectively. Volatility measured by standard deviation of the variable in question.

Indicators of preconditions and current conditions

Central bank infrastructure

These three survey-based indicators are intended to measure central bank's data resources, modeling and forecasting capabilities. For the regression analysis shown in Table II.4, an index of central bank infrastructure was created as the simple average of these three measures.

- *Data availability*. Survey questions #78 and #84 asked whether all essential macroeconomic data were available at the time of IT adoption. Answers were coded as 1 if all data were available, reliable and of good quality, and 0 if any data were missing; a value of 0.25 was assigned if all data were available but most were either highly unreliable because, for example, typically subject to large revisions, or only available at low frequencies; if data were all available but one or few were not reliable or of good quality a value of was assigned 0.25.

- *Systematic forecast process*. Survey questions #47 through #52 asked about the forecasting capabilities in place at the time of adoption. From the responses to these questions, a variable was created and set to if a periodic, systematic forecast process was already in place; the variable was set to 0 if no such process was in place.

- *Models capable of conditional forecasts*. From the same set of questions as the previous question (#47 through #52), a variable was created and set to1 if forecasting models capable of generating conditional forecasts were available; the variable was set to 0 if no such models were available.

Health of the financial system

The following six indicators measure the degree of development and degree of soundness of the banking and financial system. Two are taken from the survey responses, and four are based on non-survey data sources. For the regression analysis, an index of banking and financial conditions was created as the simple average of these six measures. In most cases the health of the U.K.'s financial system was taken as the benchmark in the construction of components of the index itself, on the grounds that the United Kingdom is widely considered financially developed and sound from a financial regulatory point of view.

- *Percentage of banks' risk-weighted assets*. Using data compiled and reported in a previous IMF study,[45] a variable was created and set to 1 for countries in which the banking system, in aggregate, had regulatory capital in excess of 10 percent of risk-weighted assets; the variable was set to 0 for countries not meeting this standard.

- *Stock market capitalization.* Using data from the World Bank, the ratio of stock market capitalization to GDP was calculated for each country in the sample, and scaled to the ratio for the United Kingdom so that a value of 1 indicates a degree of stock market capitalization comparable to that of the United Kingdom.[46]

- *Depth of private bond market.* Using the same World Bank data, the ratio of privately-issued bonds outstanding to GDP was calculated for each country in the sample, and scaled to the ratio for the United Kingdom, so that a value of 1 indicates a degree of private bond market depth comparable to that of the United Kingdom.

[45] IMF Global Financial Stability Report: "Market Development and Issues" April 2005; data are taken from Table 22, "Bank Regulatory Capital to Risk-Weighted Assets.

[46] The underlying data were obtained from the World Bank Financial Structure and Economic Database, http://www.worldbank.org/research/projects/finstructure/database.htm.

- *Stock market turnover*. Using the same World Bank data, the ratio of stock market turnover to GDP was calculated for each country in the sample, and scaled to the ratio for the United Kingdom, so that a value of 1 indicates a transaction volume comparable to that of the United Kingdom.

- *Lack of currency mismatch*. Survey question #106 asked central banks to characterize the degree of currency mismatch faced by domestically-owned banks. From the responses to this question, a variable equal 1 was created if the degree of mismatch was described as "none" or "low". The variable was set equal to 0.5 if "some" or "moderate" mismatch was reported, and set to 0 of the degree of reported mismatch was "high".

- *Maturity of bonds*. Survey question #114 asked central banks to report the maximum maturity of actively-traded bonds. The response to this question was converted to years and divided by 30, so that countries with actively-traded 30-year bonds were assigned a value of 1 for this variable.

Institutional independence

The following six indicators are intended to gauge the degree to which the central bank is able to pursue its monetary policy objectives free from conflict with other, competing objectives. Three are based on the responses to the survey administered to the central banks in our sample (checked for consistency against other central bank sources), and three are derived from independent data sources. For the regression analysis, an index of institutional autonomy was created as the simple average of these six measures.

- *Absence of fiscal obligation*. Survey questions #3 and #7 asked central banks whether there was an obligation, either implicit or explicit, to finance government budget deficits. From the responses, a variable was created and set equal 1 if no such obligation existed, and 0 otherwise.

- *Operational independence*. Survey questions #4 and #7 asked whether the central bank had full "instrument independence," giving it sole responsibility for setting the monetary policy instrument. A variable was created and set to 1 for those countries reporting full instrument independence, and 0 otherwise.

- *Inflation-focused mandate*. Survey questions #14 and #18 asked central banks to describe their legal mandate. From these responses, a variable was created and set to 1 if inflation is the only formal objective; to 0.5 if other objectives are specified, but inflation takes precedence; and to 0 if other objectives are specified on an equal footing with inflation.

- *Favorable fiscal balance*. Using primary fiscal balance data from the IMF and the OECD, a variable was created indicating a lack of pressure to finance fiscal deficits. For each country in the sample, the primary fiscal balance-to-GDP ratio was calculated, and averaged over the two years prior to the adoption of IT. (For non-Inflation targeters, the

most recent two years were used). This ratio was converted to a score ranging from 0 to 1 using a logistic transformation, scaled in such a way that a budget that was in balance or in surplus was assigned a value of 1, and a budget deficit in excess of 3 percent of GDP was assigned a value of 0.[47]

- *Low public debt.* Using data from the OECD and the FAD/WEO public debt database, the public debt-to-GDP ratio was calculated for the year prior to the adoption of IT. (For non-Inflation targeters, the most recent available observation was used). From this, a variable equal to the maximum of: 1, and 1 minus the debt-to-GDP ratio was created; thus, a country with no public debt would receive a value of 1, and one with a debt-to-GDP ratio equal to, or greater than 100 would receive a value of 0.

- *Central bank independence*. This variable is the "overall" measure (the average of political and economic) of central bank independence reported by Arnone et al. (2004). [48] These data are available for two periods: 1991-92, and for 2003, and are scaled in such a way that a value of 1 indicates complete independence, while values closer to 0 indicate a diminishing degree of independence.

Economic structure

The final set of five indicators, which draw on the survey results and independent data sources, are intended to capture a variety of economic conditions that are often thought to affect the likelihood of success of inflation targeting. For the regression analysis, an index of economic conditions was created as the simple average of these five measures

- *Low exchange rate pass-through*. Survey question #96 asked central banks to characterize the degree of exchange rate pass-through. In constructing this variable, the responses were coded as follows: 1 for "not sensitive," 0.5 for "sensitive", and 0 for "very sensitive."

- *Low sensitivity to commodity prices*. Survey question #97 asked central banks to characterize the degree of sensitivity of inflation to commodity price fluctuations. In constructing this variable, the responses were coded as follows: 1 for "not sensitive," 0.5 for "sensitive", and 0 for "very sensitive."

Extent of dollarization. Survey question #98 asked central banks to characterize the degree of dollarization in their economies. Using these responses, and data from Ramon-Ballester and Wezel (2005), a variable was constructed whose value was set to 1 for countries with little or

[47] The transformation used is: $\exp(2\times(\text{balance} + 1.5))/[1 + \exp(2\times(\text{balance} + 1.5))]$, where "balance" is the fiscal balance, expressed as a percentage of GDP.

[48] See Arnone, Laurens, Segalotto, and Sommer (2004).

no dollarization, to 0.5 for countries with some dollarization, and to 0 with a high degree of dollarization.[49]

Extent of trade openness. Using data from the IMF (International Financial Statistics and WEO) and the OECD, the ratio of exports plus imports to GDP was calculated. This ratio was then scaled to that of Singapore (the economy with the largest trade share relative to GDP) and subtracted from 1, resulting in an index that would equal 1 in the hypothetical case of a completely autarchic economy, and equal 0 for an economy with a degree of trade openness comparable to that of Singapore. Inflation targeters' preconditions are calculated using an average of the trade-to-GDP ratio over the two years prior to IT adoption; for non-inflation targeters, the score is based on the most recent (2004) data.

[49] See Ramon-Ballester and Wezel, "International Financial Linkages of Latin American Banks: The Effects of Political Risk and Deposit Dollarization" ECB Working Paper, 2005.

Table II.2. Robustness Checks by Date and Control Variables

Variables	Different Dates: Starting Date 1990	Different Dates: Actual Dates for Non-Inflation-Targeters Starting Date: 1985	Different Dates: Time Periods 1994–96 vs. 2002–04
		IT Dummy Variable	
CPI inflation	-4.8**	-6.5***	-4.5***
Volatility of CPI inflation	-3.6**	-4.2***	-2.4**
Volatility of real output growth	-0.7	-1.2	-1.0
Volatility of output gap	-0.0**	-0.0**	-0.0*

Variables	Control Variables: Fiscal discipline: Debt/GDP (Pre) [1]	Fiscal discipline: Debt/GDP (Change) [2] [3]	Inflation: Pre-Inflation > 40 percent [4]	Inflation: Pre-Inflation >100 percent [5]	Exchange rate regime pegs
			IT Dummy/Control Variables		
CPI inflation	-5.2***	-5.9**	-4.4**/10.0**	-4.8**	-5.8**
Volatility of CPI inflation	-3.5**	-4.1**	-3.5**/7.7**	-3.6**	-3.8**
Volatility of real output growth	-0.6	-0.9	-0.7/2.7**	-0.6	-0.8
Volatility of output gap	-0.0**	-0.0**	-0.0**/0.0**	-0.0**	-0.0**

Sources: IMF, *International Financial Statistics*; national sources; and IMF staff calculations.

Note: One, two, and three asterisks denote statistical significance at the 10, 5, and 1 percent level, respectively. Control variables missing when not significant.

[1]Debt in percent of GDP prior to adoption of inflation targeting.

[2]Difference in debt in percent of GDP between latest available and prior to adoption of inflation targeting.

[3]The sample does not include Argentina and China because fiscal changes in these countries were many times larger than the average in non-inflation targeting countries, and so were biasing the results (showing when included that an improvement in the fiscal stance worsens inflation expectations).

[4]Period average inflation prior to adoption of inflation targeting above 40 percent.

[5]Period average inflation prior to adoption of inflation targeting above 100 percent.

Table II.3. Additional Performance Indicators
(Baseline model robustness checks)

Variables	Starting Date		Actual Dates for Non-Inflation-Targeters	Time Periods
	1985	1990	Starting Date: 1985	1994–96 vs. 2002–04
			IT Dummy Variable	
5-year π forecast 5/	-2.7**	-2.7**	-3.0**	-2.2
Volatility of 5-year π forecast	-2.1**	-2.1**	-1.3**	-1.7**
6–10-year π forecast	-2.2**	-2.2**	-2.6**	-2.2
Volatility of 6–10-year π forecast	-1.7***	-1.7***	-1.2**	-1.6**
Exchange market pressure index	-0.3**	-0.3*	-0.3	-0.5*
Exchange rate volatility	-11.1*	-11.1**	-9.3	-3.7
Reserves volatility	-16.3***	-16.4***	-22.0***	-14.8**
Volatility of real interest rate	-5.0***	-5.0**	-4.7***	-3.0**

Variables	Fiscal Discipline		Inflation		Exchange Rate Regime Pegs
	Debt/GDP (Pre) [1]	Debt/GDP (Change) [2 3]	Pre-Inflation >40 percent [4]	Pre-Inflation >100 percent [5]	
			IT Dummy/Control Variables		
5-year π forecast [6]	-2.9**	-2.9**	-2.6**	-2.7**	-1.7
Volatility of 5-year π forecast	-1.8*	-1.8**	-1.8**	-2.1**	-1.5**
6–10-year π forecast	-2.2*	-2.4*	-2.1**	-2.2*	-1.6*
Volatility of 6–10-year π Forecast	-1.4**/ 0.0***	-1.5***	-1.6***	-1.7**	-1.7*
Exchange market pressure index	-0.3**	-0.3**	-0.3**	-0.3*	-0.5***/ -0.4*
Exchange rate volatility	-9.5**	-8.0*	-9.7*	-11.9*	-13.2**
Reserves volatility	-15.5**	-20.9*** /0.2**	-16.0***	-16.3***	-20.1***
Volatility of real interest Rate	-5.0**	-6.2**	-5.1**/ 8.8**	-5.0**	-5.8**

Sources: IMF, *International Financial Statistics;* national sources; and IMF staff calculations.

Note: One, two, and three asterisks denote statistical significance at the 10, 5, and 1 percent level, respectively. Control variables missing when not significant.

[1]Debt in percent of GDP prior to adoption of inflation targeting.

[2]Difference in debt in percent of GDP between latest available and prior to adoption of inflation targeting.

[3]The sample does not include Argentina and China because fiscal changes in these countries were many times larger than the average in non-inflation targeting countries, and were, therefore, biasing the results (showing when included that an improvement in the fiscal stance worsens inflation expectations).

[4]Period average inflation prior to adoption of inflation targeting above 40 percent.

[5]Period average inflation prior to adoption of inflation targeting above 100 percent.

[6]π refers to CPI inflation.

Table II.4. Preconditions and Current Conditions
(1 => Best current practice)

	Inflation Targeters				Non-Inflation Targeters	
	Emerging markets		Industrial countries		Emerging markets	
	Pre-adoption	Current	Pre-adoption	Current	Pre-adoption of current regime	Current
Technical infrastructure	**0.29**	**0.97**	**0.74**	**0.98**	**0.51**	**0.62**
Data availability	0.63	0.92	0.84	0.94	0.65	0.70
Systematic forecast process	0.10	1.00	1.00	1.00	0.60	0.80
Models capable of conditional forecasts	0.13	1.00	0.38	1.00	0.28	0.35
Financial system health	**0.41**	**0.48**	**0.53**	**0.60**	**0.40**	**0.49**
Bank regulatory capital to risk-weighted assets	0.75	1.00	0.75	1.00	0.71	0.86
Stock market capitalization to GDP	0.16	0.21	0.28	0.44	0.16	0.19
Private bond market capitalization to GDP	0.10	0.07	0.40	0.31	0.29	0.20
Stock market turnover ratio	0.29	0.22	0.28	0.35	0.37	0.45
Currency mismatch	0.92	0.96	1.00	1.00	0.67	0.97
Maturity of bonds	0.23	0.43	0.46	0.52	0.18	0.29
Institutional independence	**0.59**	**0.72**	**0.56**	**0.78**	**0.49**	**0.64**
Fiscal obligation	0.77	1.00	0.75	1.00	0.50	0.70
Operational independence	0.81	0.96	0.63	1.00	0.70	1.00
Central bank legal mandate	0.50	0.62	0.16	0.44	0.40	0.55
Governor's job security	0.85	0.85	1.00	1.00	0.80	0.80
Fiscal balance in percent of GDP	0.48	0.47	0.45	0.78	0.38	0.42
Public debt in percent of GDP	0.47	0.47	0.53	0.54	0.35	0.46
Central bank independence	0.26	0.64	0.44	0.72	0.32	0.55
Economic structure	**0.36**	**0.46**	**0.47**	**0.55**	**0.55**	**0.44**
Exchange rate pass through	0.23	0.44	0.31	0.50	0.33	0.42
Sensitivity to commodity prices	0.35	0.42	0.44	0.56	0.67	0.55
Extent of dollarization	0.69	0.75	1.00	1.00	0.63	0.60
Trade openness	0.18	0.21	0.13	0.16	0.56	0.19

Sources: Arnone and others (2005); IMF, *Global Financial Stability Report;* IMF, *International Financial Statistics;* national sources; OECD; Ramón-Ballester and Wezel (2005); World Bank, Financial Structure and Economic Development Database; and IMF staff calculations.

Inflation Targeting and the IMF—Country Classifications

Inflation Targeters

13 Countries	
Brazil	Jun-99
Chile	Sep-99
Colombia	Sep-99
Mexico	Jan-02
Peru	Jan-02
Thailand	May-00
Philippines	Jan-02
Korea	Apr-98
Poland	Jan-99
Czech Republic	Jan-98
Hungary	Jul-01
South Africa	Feb-00
Israel	Jun-97

Control Group (Non Inflation Targeters)

29 Countries	
Botswana	China
Ghana	Costa Rica
Guatemala	Côte d'Ivoire
India	Croatia
Indonesia	Ecuador
Malaysia	Jordan
Nigeria	Lebanon
Pakistan	Morocco
Russia	Ukraine
Tanzania	Venezuela
Turkey	Egypt
Uruguay	Argentina
Algeria	Serbia
Dominican Republic	El Salvador
Tunisia	

Exchange Rate Targeters*

12 Countries	
China	Salvador
Bulgaria	Ukraine
Botswana	Venezuela
Côte d'Ivoire	
Ecuador	
Jordan	
Lebanon	
Malaysia	
Morocco	

We include in this category conventional pegs, currency boards and countries with another currency as legal tender. We consider a "de facto" classification, based on the methodology of Obstfeld and Rogoff (1995).

Money Targeters and Countries Under a Program*

Money Targeters
Tunisia
Uruguay
Argentina
Croatia
Dominican Republic
Ghana
Serbia
Tanzania

Note that of the 22 developing countries that declare themselves money targeters, only 9 periodically disclose their numeric money targets. Five of these nine were on IMF programs at the time of writing.

Emerging Markets*

35 Countries	
Indonesia	Morocco
Malaysia	Ukraine
Nigeria	Venezuela
Pakistan	Egypt
Russia	Argentina
Turkey	Serbia
Uruguay	Dominican Republic
Algeria	Salvador
China	Tunisia
Côte d'Ivoire	Brazil
Croatia	Chile
Ecuador	Colombia
Lebanon	Mexico
Peru	Thailand
Philippines	Korea
Poland	Hungary
South Africa	Czech Republic**
Israel**	

* This classification excludes Botswana, Costa Rica, Ghana, Guatemala, India, Jordan, and Tanzania

** Not included in the EMBI index

JP Morgan EMBI Countries

33 Countries	
Indonesia	Morocco
Malaysia	Ukraine
Nigeria	Venezuela
Pakistan	Egypt
Russia	Argentina
Turkey	Serbia
Uruguay	Dominican Republic
Algeria	Salvador
China	Tunisia
Côte d'Ivoire	Brazil
Croatia	Chile
Ecuador	Colombia
Lebanon	Mexico
Peru	Thailand
Philippines	Korea
Poland	Hungary
South Africa	

Upper- and Lower-Middle Income Countries*

37 Countries	
Argentina	Poland
Botswana	Russia
Chile	South Africa
Costa Rica	Turkey
Croatia	Uruguay
Czech Republic	Venezuela
Hungary	Algeria
Israel	Brazil
Korea	Bulgaria
Lebanon	China
Malaysia	Colombia
Mexico	Dominican Republic
Ecuador	Egypt
El Salvador	Guatemala
Indonesia	Jordan
Morocco	Peru
Philippines	Serbia
Thailand	Tunisia
Ukraine	

* World Bank Classification

Upper Middle Income Countries

18 Countries	
Argentina	Poland
Botswana	Russia
Chile	South Africa
Costa Rica	Turkey
Croatia	Uruguay
Czech Republic	Venezuela
Hungary	Israel
Korea	Lebanon
Malaysia	Mexico

Not Severely Indebted Countries*

30 Countries	
Algeria	Korea
Botswana	Malaysia
Chile	Mexico
China	Morocco
Colombia	Nigeria
Costa Rica	Pakistan
Czech Republic	Philippines
Dominican Republic	Poland
El Salvador	Russia
Egypt	South Africa
Ghana	Tanzania
Guatemala	Thailand
Hungary	Tunisia
India	Ukraine
Israel	Venezuela

* World Bank Classification of country external indebtedness