An Overview of Inflation Targeting in Emerging Market Economies

by

Scott Roger

Senior Economist
Monetary and Capital Markets Department
International Monetary Fund

Bank of Thailand International Symposium 2006
“Challenges to Inflation Targeting in Emerging Countries”
13–14 November 2006
Bangkok, Thailand
I. INTRODUCTION

1. Inflation targeting was first adopted in the early 1990s by industrial countries, but is being adopted by a growing number of emerging market and developing countries. As of late 2006, 24 countries are classified as inflation targeters, including 8 industrial countries and 16 emerging market and developing countries. This paper provides an overview of the experience of non-industrial inflation targeter countries.

2. Section II briefly documents the increasing adoption of inflation targeting by industrial and non-industrial countries, and the prospect of a substantial increase in the number of non-industrial inflation targeting countries over the next several years.

3. Section III reviews the specification of inflation targeting frameworks. Frameworks in emerging market and industrial countries are quite similar in almost all key respects: the price stability goal is typically established by legislation (even if in vague terms); the target specification is usually established jointly by the government and central bank; there is a quite a high degree of standardization of technical specifications of inflation targets; and there has been a trend toward increased stress on policy transparency to provide public accountability.

4. Section IV examines two dimensions of the performance of emerging market inflation targeters. First, an examination of performances in achieving targets indicates that most countries miss their targets quite frequently, but that the differences between industrial countries and emerging market countries in this respect are less important than the differences between countries targeting stationary inflation targets, and those in the process of disinflation. The greater difficulty that some emerging market economies have had in that process may be attributed in part to higher initial inflation rates and also partly to the difficulty of coping with substantial reforms to administered prices during the disinflation phase. Second, econometric analyses of macroeconomic performances under alternative monetary policy frameworks suggests that emerging market inflation targeters have tended to achieve greater reductions in inflation, without any sacrifice in terms of output, than similar economies with different policy frameworks, and that the inflation targeting regimes are more crisis resistant than alternative regimes. To what extent these results can be attributed to the difference in monetary policy regimes, alone as opposed to the impact of a whole package of reforms including adoption of inflation targeting is more difficult to establish.

1 I would like to thank Inese Buzeneca for excellent research assistance.

2 The 8 industrial countries are Australia, Canada, Iceland, Israel, New Zealand, Norway, Sweden, and the United Kingdom. The 16 non-industrial countries are Brazil, Chile, Colombia, Czech Republic, Hungary, Indonesia, Korea, Mexico, Peru, Philippines, Poland, Romania, Slovakia, South Africa, Thailand, and Turkey. In the 1990s, Finland and Spain also adopted inflation targeting prior to joining the ESCB. The industrial/non-industrial classification used here is based on average 1991-2001 real GDP per capita on a PPP basis. Countries with average real GDP per capita above $15,000 were classified as industrial.
Section V concludes with a discussion of challenges to adoption of inflation targeting in emerging market and developing countries. Views on the need for countries to meet a stringent set of pre-requisites before adopting inflation targeting appear to have softened as countries with less-than-ideal initial conditions have nonetheless been able to adopt inflation targeting successfully. The econometric evidence supports this change of view. Finally, the paper also discusses some of challenges in adapting inflation targeting to the circumstances of emerging market and developing economies. In some cases, inflation targeting may be precluded by lack of technical capacity, fiscal dominance, or financial system fragility. However, in most cases, the challenges may require modification of the approach to implementation (e.g. a higher degree of exchange rate smoothing than might otherwise occur), or the use of other measures (such as improved prudential policies), but do not preclude adoption and successful implementation of inflation targeting.

II. THE SHIFT TOWARD INFLATION TARGETING

Over the past 15 years there has been a marked shift by industrial economies toward flexible exchange rate regimes, including inflation targeting. 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 2001. A major element in this decline was the establishment of the currency union in Europe in 1999, based on a mix of inflation and monetary targets. The second major development was the progressive adoption of IT since 1990 by most other industrial countries by 2001.

Among emerging market economies, there has also been a shift toward inflation targeting. The collapse of the Soviet Union and the Asian financial crisis in 1997 triggered a major shift among emerging market economies toward flexible exchange rate regimes (Figure 1). Initially, these were predominantly based on IMF supported monetary targeting frameworks, but there has also been an increasingly widespread adoption of inflation targeting regimes among emerging market economies. By 2006, inflation targeting had been adopted by 16 emerging market economies, slightly under 10 percent of all emerging markets. IMF discussions with member states on technical cooperation needs suggests that the number of inflation targeters in developing and emerging market economies is likely to double within the next five years or so, and to double again over the next decade.

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.

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.
8. **International financial integration and domestic financial market development have played key roles in the evolution of monetary regimes.** Experience with fixed exchange rates suggests that they cannot 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). At the same time, domestic financial systems have been evolving rapidly in response to financial innovation and structural reforms—including dismantling of capital controls. For many countries this has made monetary aggregates unreliable as intermediate nominal targets for monetary policy. As a consequence, an increasing number of countries have opted to target low inflation directly.

---

### Figure 1. Evolution of Monetary Policy Regimes, 1985-2006

**Industrial Countries**

- Inflation targets
- Monetary targets
- Managed floats & Multiple targets
- Exchange rate targets

**Non-industrial Countries**

- Inflation Targets
- Monetary targets
- Managed floats & Multiple targets
- Exchange rate targets

---

### III. Characteristics of Inflation Targeting Frameworks

9. **IT frameworks comprise the following basic elements:**

- An explicit central bank mandate to pursue price stability as the primary objective of monetary policy, together with accountability for performance in achieving the objective;

---

5 This section draws heavily on Heenan, Peter, and Roger (2006)

6 See also Mishkin (2004)
• Explicit quantitative targets for inflation;
• Policy actions based on a forward-looking assessment of inflation pressures, taking into account a wide array of information;
• A high degree of transparency of monetary policy strategy and implementation.

10. The objective of price stability is typically embedded in central bank legislation and the target specification. In emerging market economies, as in industrial economies, central banks lack goal autonomy. Instead, the goals of monetary policy are established by the central bank act. As shown in Table 1, however, legislated goals often do not clearly define price stability as the primary objective of monetary policy. Consequently, the specification of the inflation target plays a particularly important role in defining the IT mandate. In most countries, target specifications are established jointly between the central bank and the government, but even in countries where one or the other has sole authority to specify the target, close consultation is the norm.

11. IT central banks typically have a high degree of instrument or operational autonomy. In several emerging market economies, revisions to central bank acts have explicitly ruled out provision of credit to the government, as well as eliminated government vetoes over policy decisions, and increased the independence of the central bank policy decision-making body from direct government influence.

12. Even where there are limits on instrument autonomy, these do not appear to be binding in practice. As indicated in Table 1, in many countries where inflation targeting has been implemented successfully, instrument autonomy is, in principle, potentially constrained by scope for central bank financing of government, government powers to over-ride the central bank’s instrument setting decisions, or direct participation by government officials in monetary policy decision-making. This underscores the fact that it is de jure autonomy may matter less than the de facto autonomy. As long as there is a strong government commitment to the inflation-targeting framework, the government is unlikely to use its powers to interfere in monetary policy decisions.

13. Central bank accountability for performance in relation to the inflation target is a natural corollary of autonomy in policy implementation, and can help to reinforce such autonomy. In a democratic environment, an autonomous central bank requires some form of accountability to provide it with legitimacy and credibility. Further, accountability provides incentives to the central bank to seek to meet its targets and to communicate its decisions and actions transparently.
### Table 1. Central Bank Autonomy

<table>
<thead>
<tr>
<th>Country</th>
<th>Goal Autonomy</th>
<th>Target Autonomy</th>
<th>Instrument Autonomy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Legislated</td>
<td>Government</td>
<td>Credit to Government</td>
</tr>
<tr>
<td></td>
<td>Goal</td>
<td>Override 2/</td>
<td>3/</td>
</tr>
<tr>
<td></td>
<td>Specification 1/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>Multiple goals</td>
<td>G+CB</td>
<td>Yes</td>
</tr>
<tr>
<td>Brazil</td>
<td>Inflation target</td>
<td>G</td>
<td>No</td>
</tr>
<tr>
<td>Canada</td>
<td>Multiple goals</td>
<td>G+CB</td>
<td>Yes</td>
</tr>
<tr>
<td>Chile</td>
<td>Price + financial stability</td>
<td>CB</td>
<td>Yes</td>
</tr>
<tr>
<td>Colombia</td>
<td>Price stability</td>
<td>CB</td>
<td>Yes</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>Price stability</td>
<td>G+CB</td>
<td>No</td>
</tr>
<tr>
<td>Hungary</td>
<td>Price stability</td>
<td>G+CB</td>
<td>No</td>
</tr>
<tr>
<td>Iceland</td>
<td>Price stability</td>
<td>G+CB</td>
<td>No</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Currency stability</td>
<td>G+CB</td>
<td>No</td>
</tr>
<tr>
<td>Israel</td>
<td>Price stability</td>
<td>G</td>
<td>No</td>
</tr>
<tr>
<td>Korea</td>
<td>Price stability</td>
<td>G+CB</td>
<td>No</td>
</tr>
<tr>
<td>Mexico</td>
<td>Price stability</td>
<td>CB</td>
<td>No</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Price stability</td>
<td>G+CB</td>
<td>Yes</td>
</tr>
<tr>
<td>Norway</td>
<td>Low, stable inflation</td>
<td>G</td>
<td>Yes</td>
</tr>
<tr>
<td>Peru</td>
<td>Monetary stability</td>
<td>CB</td>
<td>No</td>
</tr>
<tr>
<td>Philippines</td>
<td>Price stability</td>
<td>G+CB</td>
<td>No</td>
</tr>
<tr>
<td>Poland</td>
<td>Price stability</td>
<td>CB</td>
<td>No</td>
</tr>
<tr>
<td>Romania</td>
<td>Price stability</td>
<td>G+CB</td>
<td>No</td>
</tr>
<tr>
<td>Slovakia</td>
<td>Price stability</td>
<td>CB</td>
<td>No</td>
</tr>
<tr>
<td>South Africa</td>
<td>Currency stability</td>
<td>G+CB</td>
<td>Yes</td>
</tr>
<tr>
<td>Sweden</td>
<td>Price stability</td>
<td>CB</td>
<td>No</td>
</tr>
<tr>
<td>Thailand</td>
<td>Monetary stability</td>
<td>CB</td>
<td>No</td>
</tr>
<tr>
<td>Turkey</td>
<td>Price Stability</td>
<td>G+CB</td>
<td>No</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Price stability</td>
<td>G</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Notes and Sources:
1/ G = Government; CB = Central Bank
2/ Roger and Stone (2005), Table 3
3/ Tuladhar (2005), Table 6
4/ Tuladhar (2005), Table 3
5/ Finance Minister may delay implementation of decisions for 2 weeks.
Mechanisms for providing central bank policy accountability vary across countries, with some having quite formal arrangements and others less so (Table 2). The main accountability mechanisms used to hold the central bank accountable for its policy performance and actions include:

- Publication of regular inflation or monetary policy reports;
- Publication of special reports or open letters in the event of significant misses of the target;
- Use of “escape” clauses to limit central bank accountability in particular circumstances, as well as to indicate, in advance, how policy will react to certain kinds of shocks;
- Publishing minutes of policy meetings within a reasonable time frame.

Over time, policy transparency appears to have become the main focus of accountability. In the early years of inflation targeting, accountability arrangements tended to stress fairly formal accountability procedures in the event of target misses, such as the use of “escape clauses” to limit central bank accountability in certain circumstances, as well as special reporting requirements in the event of target misses. In more recent years, the trend appears to be to put more emphasis on explaining policy decisions to the public in a timely manner and de-emphasizing the importance of target misses. To some extent this may reflect the fact that keeping inflation within a fairly narrow range has proven harder, or perhaps less sensible, than was believed in the early days. More fundamentally, it may also reflect the view that, with a forward-looking policy framework, the appropriate focus of accountability should be primarily on the appropriateness of forward-looking policy decisions, and less on outcomes. This sort of accountability relies heavily on the provision of well-reasoned inflation reports, as well as clear explanations of policy decisions either in announcements of policy decisions or in published minutes of policy discussions.

---

7 See Roger and Stone (2005), Tuladhar (2005), and Lybek and Morris (2004)
Table 2. Central Bank Accountability and Policy Transparency

<table>
<thead>
<tr>
<th>Country</th>
<th>Publication of Policy Minutes</th>
<th>Testimony / Reporting to Parliament</th>
<th>Monetary Policy Report</th>
<th>Specific Reporting on Large Target Misses 1/</th>
<th>Use of Escape Clauses 2/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>No</td>
<td>Yes</td>
<td>Quarterly</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Brazil</td>
<td>Yes, 8-day lag</td>
<td>Yes</td>
<td>Quarterly</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Canada</td>
<td>No</td>
<td>Yes</td>
<td>Semi-annual + update</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Chile</td>
<td>Yes, 90-day lag</td>
<td>Yes</td>
<td>Quarterly</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Colombia</td>
<td>No</td>
<td>Yes</td>
<td>Quarterly</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>Yes</td>
<td>Yes</td>
<td>Quarterly</td>
<td>No</td>
<td>Explicit description</td>
</tr>
<tr>
<td>Hungary</td>
<td>Yes</td>
<td>Yes</td>
<td>Semi-annual + update</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Iceland</td>
<td>No</td>
<td>No</td>
<td>Quarterly</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Indonesia</td>
<td>No</td>
<td>Yes</td>
<td>Quarterly</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Israel</td>
<td>Yes</td>
<td>Yes</td>
<td>Semi-annual</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Korea</td>
<td>No</td>
<td>Yes</td>
<td>Semi-annual</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Mexico</td>
<td>No</td>
<td>Yes</td>
<td>Quarterly</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>New Zealand</td>
<td>No</td>
<td>Yes</td>
<td>Quarterly</td>
<td>Yes</td>
<td>Explicit description</td>
</tr>
<tr>
<td>Norway</td>
<td>No</td>
<td>Yes</td>
<td>3 per year</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Peru</td>
<td>No</td>
<td>No</td>
<td>3 per year</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Philippines</td>
<td>Yes</td>
<td>Yes</td>
<td>Quarterly</td>
<td>Yes</td>
<td>Explicit description</td>
</tr>
<tr>
<td>Poland</td>
<td>No</td>
<td>Yes</td>
<td>Quarterly</td>
<td>No</td>
<td>Explicit description</td>
</tr>
<tr>
<td>Romania</td>
<td>No</td>
<td>No</td>
<td>Quarterly</td>
<td>No</td>
<td>Explicit description</td>
</tr>
<tr>
<td>Slovakia</td>
<td>No</td>
<td>No</td>
<td>Quarterly</td>
<td>No</td>
<td>Explicit description</td>
</tr>
<tr>
<td>South Africa</td>
<td>No</td>
<td>No</td>
<td>Semi-annual</td>
<td>No</td>
<td>Explicit description</td>
</tr>
<tr>
<td>Sweden</td>
<td>Yes</td>
<td>Yes</td>
<td>3 per year</td>
<td>Yes</td>
<td>Explicit description</td>
</tr>
<tr>
<td>Thailand</td>
<td>No</td>
<td>No</td>
<td>Quarterly</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Turkey</td>
<td>Yes</td>
<td>No</td>
<td>Quarterly</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Yes</td>
<td>Yes</td>
<td>Quarterly</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Notes & Sources:
1/ Roger and Stone (2005), Table 3.
2/ Tuladhar (2005), Table 2.
16. **Details of inflation target specifications are fairly standardized across both industrial and emerging market economies:**

- **In almost all inflation targeting countries, the target is specified in terms of the headline CPI rather than a measure of core inflation.** Although inflation targeting countries routinely calculate, report, and use measures of core inflation in policy formulation and communications, the headline rate is generally used as the official target because it is more familiar to the public and is calculated by the statistics agency. In addition, all countries set targets in terms of the percentage change in the price index over the corresponding period of the previous year—usually the 12-month rate, partly because this measure is usually most familiar to the public, but also because it strikes a reasonable balance between smoothness and timeliness of the information content.

- **Inflation target midpoints and ranges are similar for most countries** (Figure 2). For advanced economies the midpoint of targets all fall within a range of 2 to 3 percent. Targets in emerging market economies are more widely dispersed, but mainly for countries that have not yet completed disinflation; for those that have stationary, medium-term targets, almost all are 3 percent or less. The main exceptions are for a number of countries in the process of bringing inflation down from relatively high levels. In a few countries, targets are defined as ranges, without specifying a center, and in some others a point or “thick” point is specified without a range, but in both industrial and non-industrial countries the standard practice is now to specify a target point together with a symmetric band. Target ranges or bands are rarely more than 2 percentage points from top to bottom, except in countries in the process of disinflation.

- **Target horizons are also fairly standardized.** During disinflation, targets are typically set for the end of year inflation rate, and set over a year ahead. In several countries, targets are set two years into the future to provide a clearer sense of the projected path of disinflation. It is less common for the central bank to set a target date for completion of the disinflation process, although several central banks do indicate what the medium term inflation objective is. Once disinflation has been accomplished, it is standard for countries to announce a shift from end-of-year inflation targets to continuous or indefinite horizon targets. Within the medium-term framework it is also standard for the central bank to provide an indication of the

---

8 In the Czech Republic and Korea targets were initially defined in terms of core or underlying inflation measures, but both have subsequently switched to headline inflation. Thailand is currently the only country setting its target in terms of core inflation.

relevant horizon for policy formulation, based on its assessment of the policy transmission lag to inflation. In general, this is on the order of 1-2 years.

### Figure 2. Inflation Target Levels and Bands in 2006

![Graph showing inflation target levels and bands in various countries](image)

**IV. PERFORMANCE UNDER INFLATION TARGETING**

17. In this section we consider how well IT has worked in emerging market economies. There are several ways in which try to address this question, and two approaches are examined here. The first is to see how well inflation targeting central banks in emerging market economies performed in meeting their stated inflation objectives. Essentially, this focuses on how well emerging market central banks have done in implementing IT. The second is a more broadly-based assessment of macroeconomic performance under inflation targeting compared with alternative policy frameworks. This approach focuses more on the issue of the suitability of IT for emerging market economies.

#### A. Performance in Achieving Inflation Targets

18. Misses of inflation target ranges are common for most countries, especially when they are in an initial phase of disinflation. Table 3 indicates that inflation targeters have been outside their ranges, on average, about 45 percent of the time, with industrial countries missing a bit less than 40 percent of the time, while non-industrial countries miss around 50 percent of the time. This strongly suggests that inflation targeters do not typically pursue

---

10 This section updates the analysis in Roger and Stone (2005), which was based on data through to mid-2004. The analysis in this paper is extended to mid-2006, and includes data for Indonesia, Romania Slovakia, and Turkey, all of which adopted inflation targeting since the beginning of 2005.
strict inflation targeting: either they are not “inflation nutters,” or they are not very good “nutters.”

Table 3. Inflation Outcomes Relative to Targets 1/

<table>
<thead>
<tr>
<th>Number of Countries</th>
<th>Inflation Rate at IT Start (in percent)</th>
<th>Mean Deviation from Range Center (percentage points)</th>
<th>Standard Deviation around Mean Outcome (percentage points)</th>
<th>Root Mean Squared Deviation from Range Center (percentage points)</th>
<th>Frequency of Outcomes Outside Target Range (percent of outcomes)</th>
<th>Persistence of Deviations from Range Center (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All countries</td>
<td>26</td>
<td>5.3</td>
<td>0.5</td>
<td>1.5</td>
<td>1.9</td>
<td>46.0</td>
</tr>
<tr>
<td>Industrial 2/</td>
<td>10</td>
<td>4.0</td>
<td>-0.2</td>
<td>1.1</td>
<td>1.3</td>
<td>38.2</td>
</tr>
<tr>
<td>EM and Developing Economies 3/</td>
<td>16</td>
<td>6.1</td>
<td>0.9</td>
<td>17</td>
<td>2.3</td>
<td>50.9</td>
</tr>
<tr>
<td>Disinflation Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All countries</td>
<td>18</td>
<td>6.7</td>
<td>0.9</td>
<td>1.7</td>
<td>2.2</td>
<td>57.4</td>
</tr>
<tr>
<td>Industrial</td>
<td>5</td>
<td>5.3</td>
<td>-0.1</td>
<td>1.5</td>
<td>1.8</td>
<td>52.1</td>
</tr>
<tr>
<td>EM and developing economies</td>
<td>13</td>
<td>7.3</td>
<td>1.4</td>
<td>2.0</td>
<td>2.7</td>
<td>59.4</td>
</tr>
<tr>
<td>Stationary Inflation Target Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All countries</td>
<td>17</td>
<td>4.3</td>
<td>-0.3</td>
<td>1.0</td>
<td>1.3</td>
<td>36.9</td>
</tr>
<tr>
<td>Industrial</td>
<td>10</td>
<td>4.0</td>
<td>-0.3</td>
<td>1.0</td>
<td>1.2</td>
<td>35.7</td>
</tr>
<tr>
<td>EM and developing economies</td>
<td>7</td>
<td>4.7</td>
<td>-0.3</td>
<td>0.9</td>
<td>1.3</td>
<td>38.6</td>
</tr>
</tbody>
</table>

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/ Australia, Canada, Finland, Iceland, Israel, New Zealand, Norway, Spain, Sweden, United Kingdom.

3/ Brazil, Chile, Colombia, Czech Rep., Hungary, Indonesia, Korea, Mexico, Peru, Philippines, Poland, Romania, Slovakia, South Africa, Thailand, Turkey.

19. **Differences in performance between industrial and non-industrial countries primarily reflect differences during the disinflation stage of inflation targeting.** A key finding in the research by Roger and Stone (2005) is that differences in performance between industrial and non-industrial countries are less significant than the differences between countries pursuing disinflation and those pursuing stationary inflation targets (Figure 3).11 A

11 T-tests of differences in sample means, assuming unequal variances, lead to rejection of the null of no difference at the 97% confidence level for disinflating versus stationary inflation targeters, while for industrial (continued)
striking feature of the results shown in Table 3 is that there is essentially no difference in performance between industrial and non-industrial countries pursuing stationary inflation targets: both groups are almost identical in terms of average performance relative to their targets, variability of outcomes relative to targets, and frequency of target misses. It may also be noted that, in this phase of inflation targeting, misses of targets average a little over one-third of the time. This implies that the typical range width is set at around the one-standard deviation mark for inflation outcomes relative to target.

During the disinflation phase of inflation targeting, both industrial and non-industrial countries have experienced substantially more volatile inflation than during the stationary targeting phase. As a consequence, both groups have been much more prone to missing inflation targets than in the stationary target phase. A notable difference between industrial and non-industrial economies during this phase, however, is that while, average inflation outcomes have, on average, been close to the center of target ranges for industrial countries, in non-industrial economies outcomes have averaged 1.4 percentage points above targets. This, together with the higher variability of inflation in the non-industrial countries versus non-industrial economies, rejection is only at the 93% confidence level. With regard to the variability of inflation around targets, F-tests lead to rejection of the null of no difference at the 99% level for disinflating versus stationary inflation targeters, while for industrial versus non-industrial economies, rejection is only at the 89% confidence level.
largely accounts for the higher frequency of target misses than for industrial countries during this phase.\footnote{As shown in Table 3, the average outcome was 1.4 percentage points above target. This result is skewed upward by the outcomes for Brazil, Mexico, and Indonesia, but even the median outcome was 0.8 percentage points above target.}

21. **Higher initial inflation may help explain why disinflating countries tend to have more difficulty achieving targets than stationary inflation targeters, and why non-industrial countries have tended to perform less well than industrial countries in achieving targets.** An obvious correlation evident from Table 3 is that countries that began inflation targeting with higher inflation rates have tended to find keeping inflation within target ranges more difficult. Countries that have gone through an initial disinflation phase have typically had higher initial inflation rates than countries in the stationary phase of inflation targeting.\footnote{To some extent this reflects the fact that some countries went through a disinflation phase prior to formal adoption of inflation targeting, so that they adopted stationary inflation targets at the outset.} Moreover, non-industrial countries, especially in the disinflation phase have typically begun with inflation rates roughly 2 percentage points higher than disinflating industrial countries. This difference may not seem large, but with medium-term inflation targets generally around 2 percent, it implies that the typical non-industrial country has needed to achieve roughly twice the magnitude of disinflation as the typical industrial country. If it is harder to manage disinflation than to maintain stable, low inflation, then the differences in initial inflation can partly account for different degrees of success in meeting disinflation targets.

22. **An additional important factor appears to have been significantly different experience between industrial and non-industrial countries with relative price shocks during the period of disinflation.** If performances of industrial and non-industrial countries are compared in terms of core inflation measures differences between the two groups are substantially reduced (Figure 4). During the disinflation phase, the average outcome for disinflating industrial countries is right on target, while the average outcome for disinflating non-industrial countries is just 0.3 percentage points above target. For both groups, unsurprisingly, the volatility of core inflation is lower than for the target measure, but in the case of non-industrial countries, the reduction in volatility (from 2 percentage points to 1.6 percentage points) is twice as large as for industrial countries. These results point to the fact that in emerging market economies, even more than industrial countries, adoption of inflation targeting has tended to be accompanied by broader economic reforms, including substantial deregulation of administered or subsidized prices. Such reforms may be appropriate from a medium-term perspective, but clearly makes achievement of inflation targets more difficult than otherwise during the reform period.
23. The persistence of deviations of inflation from targets suggests that neither industrial nor emerging market economies typically pursue “strict” inflation targeting. The persistence of deviations of inflation from target appears to be consistent with standard characterizations of monetary policy transmission lags. The measure of persistence reported in the sixth column of Table 3 is simply the average length of time between changes in the sign of deviations of inflation from target, and indicates the amount of time needed, on average, for deviations of inflation from the center of the range to be reversed.\textsuperscript{14} Persistence is typically in the range of 12-18 months, slightly less than the 6–8 quarters often referred to by central banks as the time it takes for changes in the stance of monetary policy to influence inflation, but longer than might be expected if countries relied heavily on exchange rate pass-through effects to control inflation strictly. Deviations of inflation from target in disinflating countries, especially emerging market countries, appear to be somewhat less persistent than in countries with stationary targets, suggesting a slightly stricter approach during the disinflation phase, but the differences are not great.

24. The evolution of inflation targeting performance over time points to important differences among countries. Figure 5 shows how the mean and variability of inflation have evolved over the first 3 years of inflation targeting for countries that (a) adopted stationary targets at the outset; (b) began with disinflation but have subsequently adopted stationary targets; and (c) which have yet to complete the disinflation process. Three features of the

\textsuperscript{14} The measure is inspired by and very closely related to the persistence measure developed by Marques (2004). The measure of persistence used in this paper is defined as $T(n+1)$, where $T$ is the number of observations and $n$ is the number of times that the deviation of inflation from the target rate changes sign. Marques’s measure of persistence is defined as $\gamma = 1 - \frac{n}{T}$. 
figures may be highlighted. First, countries which adopted stable inflation targets at the outset show almost no change in performance, in terms of either average outcomes or variability relative to targets. Second, countries that have successfully transitioned to stationary inflation targets manage to sustain convergence toward inflation performances comparable to the stationary inflation targeters. Third, countries that have not successfully managed to transit to stationary inflation targets do succeed in bringing down the volatility of inflation, but clearly have had more difficulty in making sustained gains, and have also made slow progress, on average, in meeting their inflation reduction objectives.

![Figure 5. Evolution of Inflation Performances](image)

B. Macroeconomic Performance Under Alternative Monetary Policy Regimes

25. Evidence from non-industrial countries suggests that inflation targeting has been associated with better macroeconomic performance than under alternative other monetary policy frameworks. Over the past decade, most non-industrial countries have benefited from relatively buoyant growth and low inflation in the world’s major economies. However, the countries that adopted inflation targeting have, on average, outperformed countries with other frameworks. What is less certain is how much of the improvement in performance can be credited to the adoption of inflation targeting, and how much should be attributed to the range of other policy reforms that have often occurred at the same time as the adoption of inflation targeting.

---

15 This section draws extensively on IMF (2005), Batini and Laxton (2005), and on Batini and others (2006).
26. **Statistical analyses of the benefits of adopting inflation targeting are based on a “difference in differences” approach, comparing how performance for key macroeconomic variables has changed in countries adopting inflation targeting with performance in other countries under alternative monetary regimes over the same period.** Ball and Sheridan (2003) applied this approach to industrial countries, finding no significant benefit from adoption of inflation targeting. Using similar methodology, however, subsequent research by Mishkin and Schmidt-Hebbel (2005), IMF (2005), and Vega and Winkelried (2005) finds clearer evidence of a favorable that inflation targeting in emerging market economies has been associated with better macroeconomic performance than alternative policy regimes.

27. **A critical issue in such analyses is the choice of relevant comparators.** As discussed in Vega and Winkelried, the ideal analysis would compare performance in countries which adopted inflation targeting with how they would have performed had they not adopted inflation targeting. Since this is not possible, the challenge is to find another group of countries which can be used as relevant comparators. In this context, Mishkin and Schmidt-Hebbel emphasize that the choice of comparators should take into account the endogeneity of the decision to adopt inflation targeting. The main differences in the results in the various papers largely reflect their handling of the way in which comparator countries are selected:

- The IMF (2005) analysis is based on a comparison of performance in 13 emerging market inflation targeters with 29 comparable emerging market countries that are not inflation targeters.\(^16\)

- Mishkin and Schmidt-Hebbel (2005) compare performance in the same group of emerging market economies with a number of alternative control groups. One control group includes 13 non-IT industrial countries, deliberately established to provide a best (non-IT) benchmark.\(^17\) A second control group adds the pre-IT experience of subsequent IT countries to make the comparison more realistic. The authors also seek to adjust for the endogeneity of the adoption of IT using a parsimonious instrumental variable technique.

---

\(^{16}\) In this analysis, the emerging market IT countries comprise: Brazil, Chile, Colombia, Czech Republic, Hungary, Israel, Korea, Mexico, Peru, Philippines, Poland, South Africa, and Thailand. The control group of non-IT emerging market countries comprise the 22 non-IT members of the JP Morgan EMBI index (Algeria, Argentina, Bulgaria, P.R. China (mainland), Croatia, Dominican Republic, Ecuador, Egypt, El Salvador, Indonesia, Lebanon, Malaysia, Morocco, Nigeria, Pakistan, Russia, Serbia, Tunisia, Turkey, Ukraine, Uruguay, and Venezuela) plus 7 similarly classified countries (Botswana, Costa Rica, Ghana, Guatemala, India, Jordan, and Tanzania.)

\(^{17}\) Described as a “selective set of countries that are at the international frontier macroeconomic management and performance: Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, Portugal, and United States.”
• Vega and Winkelried (2005) compare the performance of all inflation targeters, including both industrial and non-industrial countries, with a group of 86 non-IT countries. To match IT country performances to relevant comparators, the authors use a “propensity score matching” approach that seeks to identify relevant comparators for each IT country comparing their pre-IT performance on a range of macroeconomic criteria with corresponding performance of countries that did not adopt IT.

28. **A second important issue is how to control for external factors.** In this regard, the analyses are fairly consistent in approach: (a) using similar starting dates for adoption of IT by the various IT countries; and (b) using the average date of IT adoption by the relevant group as a breakpoint for comparing performances of non-IT countries.\(^{18}\) This helps to largely eliminate the benign global economic environment as an influence on the relative performance of the different policy frameworks.

29. **The results of all three analyses suggest that, when otherwise similar countries are compared over the same time periods, countries adopting IT have tended to out-perform non-IT countries.** The results from the IMF (2005) analysis presented in Table 4 are indicative. 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. Interestingly, this is very close to the figures obtained by Mishkin and Schmidt-Hebbel (2005) and by Vega and Winkelried.\(^{19}\) Inflation targeting was also associated with a reduction in the variability of inflation (as measured by 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

\(^{18}\) The end-1999 date is not arbitrary: both the average and median number of quarters of experience with inflation targeting among emerging markets corresponds to the beginning of 2000.

\(^{19}\) The most comparable result from the Mishkin and Schmidt-Hebbel analysis is from the use of IV with the Control 1 group of countries, basically to maximize allowance for the fact that the emerging market countries adopting IT have generally been far from the frontier of macroeconomic management. In this case, the authors obtain the same estimated reduction in inflation due to adoption of IT: 4.8 percent. In the Vega and Winkelried analysis, the relevant comparisons are for Developing countries adopting full-fledged IT. In this case their estimates of the benefit of adoption of IT in terms of inflation reduction fall in the range of 3.3 to 5.4 percentage points.
lower for the inflation targeters, and the difference from the comparison group of non-inflation targeters is statistically significant at the 5 percent level.\(^{20}\)

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

Source: Batini and others (2005).

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.

30. The IMF results appear to be robust to various changes in the comparisons. 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. None of the key results 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.  

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.  

![Figure 6. Comparisons of Macroeconomic Performance Under Alternative Policy Regimes 1/ 2/](image)

**Figure 6. Comparisons of Macroeconomic Performance Under Alternative Policy Regimes 1/ 2/**

**Inflation and Growth**

- Non-IT Emerging markets
- Emerging market IT
- Industrial IT

**Volatility of Inflation and Growth**

- Non-IT Emerging markets
- Emerging market IT
- Industrial IT

Source: Author’s calculations

1/ Data periods compared: For Emerging Market ITers, split is according to year of adoption of IT; for non-targeters and Industrial IT countries, breakpoint is 2000.

2/ Figures shown are for median country values of median annual growth and inflation, to minimize outlier distortions.

31. **The differences in macroeconomic performances of emerging market inflation targeters and non-targeters are shown in Figure 6.** These show that emerging market inflation targeters, on average, achieved a reduction in the median inflation rate from over 10 percent prior to adopting IT to around 4 percent subsequently, while non-IT countries had a smaller decline in the median inflation rate to around 7 percent. Both groups of countries were able to achieve this at the same time as increased median growth. Industrial country inflation targeters, in contrast, experienced little change, on average, in either inflation or growth between the 1990s and the mid-2000s. Both emerging market inflation targeters and non-targeters also achieved major reductions in inflation and output volatility, with

---

21The 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.
non-targeters experiencing a bigger reduction in inflation volatility than inflation targeters, but emerging market inflation targeters still had lower output and inflation volatility than non-targeters. Industrial countries also saw some further reductions in inflation and output volatility.

C. Resilience of Inflation Targeting

32. In addition to the issue of whether inflation targeting may improve average macroeconomic performance, there is also a question of whether it is a more robust policy framework. 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. Shocks of similar magnitude have destabilized these countries in the past, suggesting at least that the framework has contributed to the economies’ resilience to shocks.

33. Formal analysis of the data supports the view that inflation targeting is associated with lower financial market volatility. Using the same difference in differences framework described above, Batini and others (2005) compare the volatility of nominal exchange rates, foreign exchange reserves, and real interest rates between inflation targeting emerging markets and non-inflation targeters. 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. 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.

---

22 It should be noted that measure of inflation volatility is different from the rolling 12-month average of standard deviations of 12-month inflation rates used in IMF (2005). The measure used here is based on median country values of the standard deviation of deviations of of annual figures from a 3-year centered moving average of inflation. The 3-year moving average is used to minimize the problem of non-stationary data. e

23 See Bevilaqua and Loyo (2004) for a discussion of how Brazil’s fledgling inflation targeting regime was stress-tested in the first few years after its introduction.

24 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.
Table 5. Crisis Resilience Under Different Regimes  
(changes in variables, measured in percentage points)

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

Sources: Batini and others (2005).
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.

V. CHALLENGES IN ADOPTING INFLATION TARGETING IN EMERGING MARKET AND DEVELOPING COUNTRIES

34. In this section, challenges involved in adopting inflation targeting in non-industrial countries are considered. One issue is whether adoption of inflation targeting requires that a fairly demanding set of preconditions be met. The second issue is how inflation targeting frameworks might be adapted to the particular circumstances and needs of emerging market and developing countries.

A. Requirements for Inflation Targeting

35. Facts on the ground appear to be contributing to a re-assessment of the suitability of inflation targeting for emerging market and developing economies. A longstanding view has been that inflation targeting is more demanding in terms of institutional and technical requirements than alternative frameworks, making it unsuitable for many emerging market and developing economies.25 As more countries have adopted inflation targeting, however, a more neutral view has gained ground. Carare and others (2002), for example, suggest that the “…list of initial conditions is not meant to constitute strict

25 See Eichengreen and others (1999), or Masson, Savastano and Sharma (1997) who conclude that the “fairly stringent technical and institutional prerequisities 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…” Others who stress the relevance of “preconditions” include Agénor (2002), IMF (2001), and Khan (2003).
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.”

36. **There is general agreement that it is important to strengthen a range of “technical” conditions to support efficient and effective implementation of inflation targeting.** These conditions include: (a) institutional arrangements, including legislation or public commitments, providing clear prioritization and specification of the policy target, and giving the central bank with necessary autonomy to pursue the objective; (b) analytical capabilities and data availability to conduct a forward-looking assessment of inflation pressures and the appropriate policy response; (c) an economic structure that promotes transmission from the policy instruments to inflation outcomes; and (d) a sound financial system conducive to effective policy transmission, and avoidance of conflicts between the policy objective and maintenance of financial stability.

37. **What has been at issue is (a) whether establishing these conditions is more important for inflation targeting than for other policy frameworks; and (b) whether establishing these conditions should be seen as a pre-requisite for inflation targeting.** On the first issue, a basic point to make is that supportive institutional arrangements, technical capacity, effective policy transmission, and a financial system can be regarded as necessary for the success of virtually any systematic monetary policy framework. Without putting these conditions in place in some degree, any policy regime will be vulnerable to either collapse or very poor performance in achieving the policy objectives. Clearly, some elements may be particularly important for inflation targeting. For example, given the information intensive nature of inflation targeting, good macroeconomic data is more important than, say, for an exchange rate peg. However, some conditions may be more critical for other monetary policy frameworks. For example, the credibility and sustainability of an exchange rate peg may be particularly vulnerable to weaknesses in the financial system and fiscal unsustainability, while a monetary targeting framework may be particularly vulnerable to fiscal dominance or changes in economic structure affecting money velocity. If it is recognized that no one policy regime is uniquely vulnerable or robust to weaknesses in the various criteria for success, then it is not possible to identify any particular policy framework as a “default” regime in any generalized sense. Each case needs to be considered on its own merits.

38. **On the second issue, it is evident that good initial conditions cannot hurt, but are not essential pre-requisites to successful adoption of inflation targeting.** Based on a survey of central banks, together with a range of quantitative measures, Batini and Laxton

---

26 Other relatively neutral views on the importance of “preconditions” can be found in Debelle (2001), Amato and Gerlach (2001), and Jonas and Mishkin (2005).
(2005) found that all countries introducing inflation targeting fell well short of having ideal conditions in place at the outset. The survey also shows, however, that countries have typically strengthened their frameworks following adoption of inflation targeting. The authors also do not find evidence to support the view that having strong initial conditions were a pre-requisite to improved economic performance in emerging market economies adopting inflation targeting relative to alternative frameworks. The 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. Moreover, the evidence presented earlier that inflation targeting performance improves significantly in the first few years of inflation targeting strongly suggests that there is a significant element of on-the-job learning (which may not be possible to achieve before actually adopting inflation targeting). However, the evidence does cast doubt on how important it is to put all the elements in place at the outset, and which elements might be considered as more fundamental to successful initiation of inflation targeting.

39. 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. Sherwin (2000) observes that 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.

40. Of course, there are countries or circumstances where inflation targeting may not be suitable 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. In such cases, resource limitations may more or

---

27 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).

28 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.

29 See Laurens and others (2005).
less rule out inflation targeting as a feasible possibility. Even in some larger countries, developing the necessary technical skills may be an important obstacle, notably if the educational system is not geared to providing appropriate training in economics.

- In 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. 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

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. Non-industrial country inflation targeters face a number of challenges.

30 This section is based on Batini and others (2005)
31 See, e.g. Apel and others (1999).
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 and international investor sentiment. 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.

42. **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.

43. **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.

44. **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.

---

32 See also Fraga, Goldfajn, and Minella (2003).
targeting low, stable, inflation. In this context, an innovation being used in Brazil, in which 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.

45. **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. 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.

46. **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

---

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

34 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).

35 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.
exchange rate band and then abandonment of the band altogether. Indeed, the dating of when such countries have effectively started inflation targeting is usually based on when they abandoned or greatly widened their exchange rate bands.

47. 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. 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. 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.

48. 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.

49. 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

---

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

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

38 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.”
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 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.

50. **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. 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.

---

39 This is especially likely if adoption of inflation targeting is part of a larger package of economic reforms.
References


