

## A Brief History of the Conceptual and Practical Development of IT

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### A. Introduction

In early 1990, the Reserve Bank of New Zealand formally introduced a new framework for the conduct of monetary policy -- inflation targeting (or, as some would prefer to call it, inflation forecast targeting). In the 16 years since that event, 23 other countries (including Turkey) have chosen to use IT as the basis for their monetary policy. Of the 24 countries choosing to use IT, 10 were industrialized countries and 14 were emerging market countries. While two countries that used IT (Finland and Spain) later went on to join the EMU, so far no country has abandoned the framework because of inability to achieve the desired objectives of policy. Thus, the IT approach has lasted longer than the monetary aggregates targeting framework and seems to be less vulnerable to shocks than the target exchange rate arrangements that preceded it in a number of countries.

In my presentation today, I would like to give an overview of the conceptual basis for IT and of the practical elements that developed over time in the use of IT. My perspective arises from my involvement in the introduction of, and subsequent developments in, inflation targeting at the Bank of Canada, the second central bank to introduce IT (in early 1991). Over the period from 1990 to about 1997, the focus of my interest was almost entirely on the IT experience in industrialized countries. Over the last decade or so, my interests broadened to include the analysis of IT in developing countries and emerging economies (with both groups henceforward subsumed under the rubric of emerging economies), and the practical issues and special difficulties involved in conducting a monetary policy based on IT in such countries.

One of the interesting aspects of the entire IT experience is that the analysis was developed initially in central banks and only subsequently did it become a topic for academic research. Fortunately, since the mid-1990s there has been an enormous growth in academic research and literature on the subject of IT, and the interaction between academia and central bank researchers has been of great benefit to both groups.

The structure of the presentation will be as follows. Following a discussion of some background considerations with respect to anchors for monetary policy, I will examine some of the history and issues surrounding the use of IT in industrialized economies. I will then analyze certain issues that have been raised as particular problems for emerging economies that wish to adopt IT as the basic framework for their monetary policy, and

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assess the experience thus far of IT in emerging economies. I will conclude by briefly discussing some of the unresolved issues regarding IT that are currently being debated in academic and central bank circles.

### B. Some Background Considerations

In their pursuit of low inflation or price stability as the best contribution that monetary policy can make to a well-functioning economy, central banks have typically relied upon a nominal anchor as the basis for their monetary policy.

A nominal anchor is considered useful to central banks in conducting monetary policy in a number of dimensions. It helps clarify both internally and externally the (intermediate or final) objective of the central bank in carrying out policy. Thus, in the internal deliberations of the central bank, it helps to focus attention on the central objective, and to avoid situations in which the members of the monetary policy decision-making body have different objectives at which they are aiming. In addition, a publicly announced policy anchor helps the central bank communicate both its policy goals and the reasons for changes in its policy instrument. Finally, a credible nominal anchor helps focus expectations of the public (particularly expectations of future inflation) on the policy goal, and thereby facilitates its achievement.

Historically, the most common nominal anchor involved linking the value of the domestic currency to gold (under the gold standard) or to a major currency, such as the pound sterling or the US dollar (under the gold-exchange standard). While some form of fixed exchange rate was the principal nominal anchor in the first two to three decades of the postwar period, the collapse of Bretton Woods and the sharp increase in worldwide inflation in the first half of the 1970s led to a search in industrialized countries for an alternative nominal anchor. Many countries tried to anchor their monetary policy by targeting a monetary aggregate, in the expectation that controlling the rate of growth of money would enable them to bring down the rate of inflation. In the event, money targeting proved unsuccessful for a number of reasons, the most important being a lack of stability in the demand for money function. This instability was largely the result of a combination of deregulation (in some countries) and a wave of financial innovation by banks and other financial entities that resulted in significant changes in the way that the public held their financial assets, including the various measures of money.

By the mid-1980s, it was clear that monetary targeting had failed as a nominal anchor for central bank policy. In some countries that had earlier adopted a floating exchange rate, the inability to use either of the traditional nominal anchors (fixed exchange rate and monetary aggregate targets) left a vacuum, which was typically filled by a qualitative commitment to low inflation on the part of the central bank. For those countries that had a history of high inflation, such an arrangement was insufficient to convince the general public that the central bank was truly committed to taking the actions necessary to bring down the rate of inflation and to maintain it at a low level. In those countries (initially New Zealand and Canada), the explicit commitment to a quantitative path for future inflation was seen as a mechanism that would help the central bank achieve the objective of achieving and maintaining a lower rate of inflation.

In the first half of the 1990s, a number of other countries (for example, United Kingdom, Sweden and Finland) that had been using a fixed exchange rate as their policy anchor and as a way of achieving the same low rates of inflation as the country to which they had tied their currency (Germany in the case of European countries) found themselves forced by market pressures to abandon the fixed exchange rate. In some cases (e.g., the United Kingdom) they had had an earlier unsuccessful experience with monetary targeting. In the event, since they could no longer use a fixed exchange rate as the anchor of policy and since their monetary aggregates were insufficiently stable to serve as the basis of policy, they chose to introduce inflation targeting as the central element of their policy.

Later in the decade, the new approach to policy spread to emerging economies. While there is some debate in the literature as to the starting point of IT in some of these countries, in practice none of them gave clear priority to inflation targeting over their exchange rate objective until the second half of the 1990s. Although, as we shall see, there was some question as to whether emerging economies typically could meet the so-called preconditions for the introduction of inflation targeting, the success of the initial IT emerging market economies (along with the absence of viable alternative policy frameworks) was an important factor in leading other emerging market economies to move to this policy framework.

### C. The IT Experience in Industrialized Countries

At the beginning of inflation targeting in industrialized countries, there was considerable skepticism about whether the new framework would be able to achieve the decline in inflation rate that was desired by the countries that had adopted it. For example, in meetings of Bank of Canada representatives with the financial community following the announcement of inflation targeting in Canada, a number of private sector participants questioned whether the Bank would be able to achieve the initial 3 percent target, given that Canada had experienced an average inflation rate of 7 percent over the preceding 20 years. And other observers wondered whether direct targeting of inflation (as opposed to indirect targeting through monetary aggregates or the exchange rate) was an appropriate approach to policy. In part, the skepticism reflected a concern that a failure to achieve the targeted rate of inflation (whether because of unexpected shocks or because of policy errors) would have a serious negative impact on the credibility of the targeting central bank and would make it more difficult for it to achieve its desired inflation objective. In the event, it has turned out that the combination of the overall success of IT central banks in achieving and maintaining a lower rate of inflation, and increased transparency on their part in explaining their actions, have led over time to much higher central bank credibility as well as a willingness of the financial community and the public to accept central banks' explanations regarding misses in their targets. But this increase in credibility took some time to develop for the original IT central banks, and it was only as they were able to achieve their targeted inflation rate more consistently over time that the public began to anchor its expectations on the announced target inflation rate.

How did the IT industrial country central banks envision the operation of the new framework? From the outset, these central banks practised what later came to be known

as flexible inflation targeting. That is, in structuring their arrangements, they clearly took into account two objectives -- first, to achieve the targeted rate of inflation, and, second, to do so in a way that would not result in excessive fluctuations in output and unemployment. This was reflected in the fact that they aimed at achieving their inflation objective over a medium-term horizon and took the position that any miss in achieving one target would be rectified only gradually over time (Bank of Canada, 1991).<sup>2</sup>

Effectively, the IT central banks were acting as if they had a loss function that contained two arguments -- the variability of the rate of inflation around its target and the variability of output around capacity. Such a loss function was central to the framework proposed by Lars Svensson in the mid-1990s in his early articles on inflation targeting. But, as I noted earlier, the initial IT central banks did not have the benefit of any academic research at the time that they instituted the new policy framework. Thus, by economic intuition they arrived at the kinds of arrangements that were consistent with the theoretical modeling that arrived a few years later. Indeed, when I read Svensson's first article on the subject of inflation targeting (Svensson, 1997), my reaction was that the Bank of Canada had in fact been minimizing this kind of loss function without thinking of it in those terms. I would note that the plethora of academic research on inflation targeting since the mid-1990s has been very helpful to central banks as they changed and improved their IT arrangements in light of their experience and of new ways of thinking about the issues.

While IT central banks were flexible targeters from the outset, they often talked and wrote as if they were "inflation nutters", to use Mervyn King's phrase. It was only considerably later that their mode of operation became clearer to the public and, perhaps in some cases, to themselves. In part, the reason for using a more hardline rhetoric than perhaps was appropriate related to the importance to central banks of developing credibility in the early years of IT. This implied both a bias on the downside in aiming for the targeted rate of inflation during the disinflationary period, and a tendency to talk as if inflation was the only objective of policy. Over time, as the targets were achieved and as credibility did increase, central bank communications became more nuanced and there was increased clarity about central banks' thinking about such matters. In retrospect, it might have been better for central banks to have been more explicit from the outset about the way that they viewed the role of output variability, but perhaps it was not possible to bring down the rate of inflation to low levels after a long history of relatively high rates of inflation without focusing almost exclusively upon this goal in their rhetoric. As a result of this emphasis on the inflation goal and insufficient discussion of output variability, at least part of the public was concerned that the central bank was focusing excessively on the achievement of its inflation goal and giving insufficient attention for the implications of its policy on output and unemployment, i.e., that the central bank was

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<sup>2</sup> In its first few years of inflation targeting, the Reserve Bank of New Zealand took a more aggressive approach to achieving its inflation target and put less weight on output volatility than did some of the other IT central banks and than it itself did in later years. The way that this showed up in practice was a relatively short policy horizon and very aggressive actions when inflation neared the upper limit of the target range.

behaving as an "inflation nutter". Over time, as it became clear that central banks were "flexible inflation targeters", these concerns dissipated.

It was clear from the beginning of inflation targeting that the interest rate response (and the resulting exchange rate response) to demand shocks in an IT environment would move both output and inflation in the desired direction. Thus, for example, a temporary positive demand shock would tend to increase output above potential and subsequently raise inflation above its target rate. The interest rate increase in response to such a shock would bring demand back to potential and inflation back to target. And, similarly, a negative demand shock that would result in lower output and inflation would lead to a decline in interest rates, which would tend to offset the direct effects of the shock. The close link between excess demand and future inflation, and the need to take offsetting interest rate actions in response to demand shocks, were apparent from the very beginning of the IT experience.

Supply shocks raised a much more difficult issue. Since they might well come in the form of an increase in inflation and a decline in output, it appeared that IT would have the same difficulty in coping with such shocks as did other policy frameworks. While raising interest rates would act in the direction of bringing inflation back to target following an unfavorable supply shock, it would weaken demand further. On the other hand, reducing interest rates would help underpin aggregate demand but would lead to further upward pressure on inflation. In fact, over time, as IT central banks achieved their inflation targets and as their credibility improved, they were able to cope with supply shocks much more easily than had earlier been anticipated. Even in the face of supply shocks, medium-term expectations remained anchored at the target, and consequently there was less or no need to raise interest rates in the face of a temporary supply shock. In some IT countries, the central bank facilitated the ability of the public to see through such supply shocks by emphasizing the role of a core rate of inflation as a guide to policy, and in this way clarified that price shocks that did not feed into expectations of future inflation would be treated differently from those that did.

Note the importance of communications in this process. For example, in response to longer-lasting supply shocks, such as a change in VAT, the central bank was able to talk about first-round and second round effects, the former being the direct effects on prices of the VAT increase and the latter being the potential indirect effects as the first-round effects fed into expectations and possibly into a price-wage-price spiral. By announcing in advance that it would accommodate the first-round effects but not second-round and subsequent effects, the central bank made it clear that while it would allow the one-time tax-induced rise in the CPI, it was not abandoning its commitment to its inflation target and would respond aggressively to feed-through effects. If credible, such an announcement made it more likely that the public's inflation expectations would continue to be anchored on the target and that little or no interest rate increase would be necessary. Indeed, the public's understanding of the central bank's approach to such issues may have been crucial in the ability of the economy to absorb the sharp rise in fuel prices in the recent period without unduly affecting the expected rate of inflation, and in this way

facilitated the central bank's ability to deal with such a shock without significant interest rate increases.

IT central banks have responded symmetrically to movements of inflation above and below the target rate. In circumstances where inflation has fallen below its target rate, IT has allowed the central bank to ease policy without raising fears that it is abandoning its commitment to low inflation or price stability. There are, however, two situations in which an asymmetric response may be appropriate. First, at a time of disinflation when the central bank is striving to buttress its credibility, it may decide upon a more aggressive response to shocks that would increase the rate of inflation than to those that would reduce it. Second, when the central bank has achieved its longer-term target of, say, 2 percent inflation, it may respond to a negative demand shock that would tend to push inflation below the target more aggressively than to a positive demand shock that would push inflation above the target. The reason for such asymmetry in response is the concern that the negative shock might lead to a situation in which the central bank's ability to respond effectively is constrained by the zero lower bound for nominal interest rates, and to a deflationary environment, which can be very costly to the performance of the economy.

The link between IT and central bank transparency developed more quickly in some countries than in others. Thus, the Reserve Bank of New Zealand issued its first Monetary Policy Statement in April 1990, while the Bank of Canada did not introduce its Monetary Policy Report until May 1995, four years after the introduction of IT (although it did have articles in its quarterly Review discussing the inflation outcome before that). The Bank of England released its first Inflation Report in February 1993. It focused on the Bank's views on the prospects for inflation over the coming two years and the implications of those views for the appropriate stance for monetary policy (initially implicitly and later on explicitly). The Bank of England's situation was different from that of other IT countries because it was the Chancellor of the Exchequer and not the Bank that set the policy interest rate between 1992 and 1997. Hence the principal role of the Bank of England at that time was to give the Chancellor and the public an independent assessment of the likely future path of inflation. The Bank clearly felt that the weight of its views would be considerably enhanced if it made public both the information and the analysis on which its views were based.

Over time, it became clear that transparency about the various facets of the central bank's operations under IT would improve the functioning of the framework and contribute to the accountability of the central bank. Thus, IT central banks became more and more open about many aspects of their operations -- (i) the objectives of the Bank (including the contribution of their procedures to stabilizing output growth); (ii) their views of how the transmission mechanism operated in their country (including publication of the models that the staff used in preparing forecasts for inflation and other key macroeconomic variables); (iii) their explanation of recent economic developments (including their explanation for recent changes in the policy interest rate) and their outlook for the economy; (iv) and, in some cases, a quantitative or qualitative projection for the policy interest rate over the policy horizon. While the Inflation Report or

Monetary Policy Report was and is the primary vehicle for communicating the views of the central bank, other mechanisms are also used as a way of explaining developments and transmitting "messages" to the financial markets and the public. These include press conferences following release of the Report, testimony in Parliament, speeches, and press releases following interest rate decisions of the Monetary Policy Committee. In some countries, central bank press releases have gone from a simple announcement of the interest rate decision, to a more detailed explanation of the reasons for a change in the policy interest rate, to an explanation of the circumstances surrounding the decision whether or not there was a change in the policy interest rate.

The role of transparency and communications has become ever more central to the operations of IT central banks (and indeed of all central banks). The more that the public and participants in financial market understand the logic of the framework within which the central bank is making policy and the central bank's views of the current and unfolding economic situation, the more likely it is that their own behavior will facilitate the achievement of the central bank's goals. This can happen in a variety of ways. First, generating a constituency among the public that supports the objective of low inflation will increase the likelihood that the policy will be pursued even under difficult circumstances, and development of such support requires a broad understanding of the reasons for the objectives of policy and the way that policy is being conducted. Thus, in its communications it always behooves the central bank and its spokespersons to focus on the costs of inflation and to explain the benefits of achieving and maintaining a low and predictable rate of inflation. Second, especially as the central bank achieves its inflation goals over time, expectations become anchored to the target and temporary shocks (both demand and supply) will have less effect on inflation expectations and inflation, and hence will require less of an interest rate response by the central bank. Third, while the central bank adjusts only a very short-term interest rate, in many cases the overnight rate, spending behavior is influenced by a variety of rates, ranging from the short-term to long-term. To the extent that the financial markets' expectations of future central bank changes in the policy rate are based on their understanding the modus operandi of the central bank and its views of current and prospective economic developments, good communications will result in financial markets adjusting these market rates in advance of central bank actions and hence doing much of the necessary work in stabilizing the economic situation and helping achieve the target rate of inflation.

One communications element that clearly would have been beneficial at the time that inflation targeting was adopted would have been to strongly emphasize the contribution of low and predictable rates of inflation in bringing about a well-functioning economy. Although this was well understood within central banking circles, it was perhaps not communicated clearly to the public at the time. Indeed, given the historical linkage between disinflation and excess capacity, it is not surprising that the public and some members of the economics profession were not convinced that low inflation was compatible with an economy operating at capacity until experience showed otherwise.

A communications issue that IT central banks continue to struggle with is how best to communicate the uncertainty surrounding the base case or central forecast. There is a

tendency on the part of financial markets and the media to overemphasize the base case forecast, and to underemphasize the fact that the forecast is best treated as a probability distribution, with the outcome a function of future shocks. Some central banks have used fan charts as a way of focusing attention on the probabilistic nature of their forecasts. Others have presented alternative scenarios as a way of showing the sensitivity of the forecast to various assumptions about exogenous variables (such as oil prices). Still others have discussed verbally the kinds of risks that the central bank believes are most likely to affect the economic outcome and to lead to results different from the base case forecast, without being quantitatively precise about their likelihood.

Most industrialized countries that adopted IT either began after the disinflationary process was completed or had only a short distance to go before reaching the long-term or equilibrium target rate of inflation. Almost all of these countries are now aiming at a 2 percent or 2 ½ percent rate of inflation, with or without a band around the target. While 2 percent can be characterized as a very low rate of inflation, it is probably not true price stability since the bias in the CPI measure seems to be between ½ percent and 1 percent. The logic for not going to true price stability (say 1 percent inflation after taking account of bias) relates to the uncertainty of the size of the benefits of the gain from further reducing the inflation target as opposed to the costs of so doing. In the literature, in addition to the transitory costs of further disinflation, longer-term costs are specified as coming from wage and price rigidities (Akerlof et al, 1996), the problem of a zero lower bound on nominal interest rates, and the potential high cost of deflation. While it is difficult to evaluate the weight that should be put on these potential costs, and in my own view the second and third are more important than the first, the absence of persuasive quantitative evidence as to the benefits of a further reduction in the inflation target and the potential costs of going further have made central banks and governments cautious about reducing inflation targets to 1 percent, at least at this stage of the economic analysis of these issues.

Has inflation targeting been a successful initiative for those central banks in industrialized countries that have adopted it? On the surface, it certainly seems to have been very successful.<sup>3</sup> IT countries moved from relatively high inflation to doing as well as, or better than, other industrialized economies, and they did it in a relatively short time span. The volatility of inflation outcomes fell significantly after the introduction of IT compared to the earlier period. In addition, the persistence of inflation in response to shocks effectively disappeared during the IT period. Output variability declined appreciably, and the IT countries have been able to avoid the deep recessions that were so harmful to their economies in the previous two decades. Medium-term and longer-term inflation expectations converged to the target over time, resulting in lower nominal interest rates. In addition, the risk premiums that were needed to compensate investors for inflation uncertainty declined or vanished. Moreover, labor contracts and financial

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<sup>3</sup> There have recently been a number of articles that attempt to assess the success of IT using econometric techniques. The results have been mixed, with some finding considerable success for IT countries, and others finding that, in a number of dimensions, non-IT countries have done just as well as IT countries. See, for example, Roger and Stone (2005), Mishkin and Schmidt-Hebbel (2005), and Batini and Laxton (2005).



contracts lengthened as concerns about future inflation dissipated. According to the staff of a number of central banks with inflation targets, the quality of monetary policy discussions within the central bank has been significantly improved. As well, the quality of commentary in the media and by financial analysts has improved as the framework in which IT central banks were making policy, and their actions within that framework, were increasingly understood by outside observers. Of course, the increased transparency of IT central banks contributed importantly to this improved commentary. One area in which there does not appear to have been significant improvement in economic performance compared to the pre-IT period is in the sacrifice ratio of the disinflating IT industrialized countries.

In spite of these positive developments in IT countries, there has been some debate in the literature as to the contribution of IT itself to the success of their performance. The questioning has taken two forms. One argues that the framework has not really been tested as yet, since the period during which IT has been in force has not seen the kinds of unfavorable shocks that were prevalent in the 1970s (Stock and Watson, 2003). According to this line of argument, the principal reason for the favorable outcomes in inflation and output has been the absence of unfavorable shocks. In fact, the second half of the 1990s and the first half of the current decade have not been nearly as tranquil as suggested by the critics. Economies had to cope with the Southeast Asian crisis, the Russian debt default, the boom and collapse of the information technology sector, the sharp decline in the stock market, the uncertainty generated by 9/11, the spread of SARS, the wars in Afghanistan and Iraq, the buffeting of investor confidence by the financial scandals in Enron and several other corporations, and most recently the sharp run-up of oil and natural gas prices. Despite these shocks, the industrial economies have continued to perform reasonably well, with the maintenance of low rates of inflation and fairly stable output growth. The case can be made that IT and the transparency that has accompanied it have facilitated the ability of central banks to cope with the many shocks over the period in a way that was less disruptive to the performance of the economy than might otherwise have been the case.

A much-cited article by Ball and Sheridan (2003) develops a second line of attack on the contribution of IT to the success in reducing inflation in those countries that adopted it. The argument that they put forward was that the relatively high inflation rate in such countries would have disappeared even without IT, since their empirical work indicated that there was reversion to the mean in countries with temporarily high inflation. In other words, countries like New Zealand and England with relatively high inflation rates would have returned to the more typical lower inflation rates in industrialized countries over time even if they had not adopted IT. To this argument there have been counter-arguments. Hyvonen (2004) demonstrated that while the empirical work done by Ball and Sheridan showed reversion to the mean in rates of inflation in the 1990s, such inflation convergence did not occur consistently over earlier time periods. Indeed, there is no evidence of convergence having occurred between the 1960s and the 1970s, and there was noticeably weaker convergence between the 1970s and the 1980s than between the 1980s and the 1990s. Thus, the statement that countries with high inflation typically return to the mean inflation of all countries does not hold generally. It seems evident that

the reason that certain countries adopted inflation targeting in the early 1990s was precisely that their inflation experience was worse than the average and that the other monetary frameworks that they had used to try to get the rate of inflation down to more normal levels had not succeeded.

A chapter in a recent IMF World Economic Outlook (2005) argued that while it may be difficult to find persuasive empirical evidence that the performance of IT industrial countries improved more than that of non-IT industrial countries, the experience of emerging markets offers a richer set of data for assessing the effects of inflation targeting in part because of the wider variability of their situation. Using the same econometric approach as Ball and Sheridan, they conclude that IT emerging economies show more convergence to low inflation and to less variable inflation than do non-IT emerging economies.<sup>4</sup>

Is IT necessary for countries to achieve low inflation? Of course not. We have examples of Germany, United States, and Japan, none of whom needed IT to achieve and maintain a low rate of inflation. However, recent evidence suggests that even in such countries, inflation targeting could be helpful in improving performance. In the case of Japan, a symmetric inflation target that treated downside misses from the target as being as much of a problem as upside misses might have been helpful in bringing about a more rapid interest rate response to deflationary tendencies, once they began to be apparent. And a recent study by Gürkaynak et al (2005) showed that domestic macroeconomic data surprises and monetary policy announcements had more effect on the compensation for expected inflation and inflation risks at long horizons in the United States than they did in Canada and Chile, both IT countries. This would suggest that inflation expectations are less affected by transitory shocks in countries that have an explicit commitment to a specific target rate of inflation than in countries in which there is only a qualitative commitment to low inflation.

#### D. Inflation Targeting in Developing and Emerging Economies

While a number of emerging economies had begun to use inflation targeting in the first half of the 1990s, it was initially only one part of their policy framework, with some variant of exchange rate targeting typically being equally or more important. It was only in the latter part of the 1990s and the first half of the current decade that IT became the central element in monetary policy arrangements of emerging economies. The earliest literature on IT in developing countries, which began to focus attention on differences between such countries and industrialized countries, also began to appear in the latter part of the 1990s.

A number of IMF publications, including Masson, Savastano, and Sharma (1997), Schaechter, Stone, and Zelmer (2000), Carare, Schaechter, Stone, and Zelmer (2002), and Stone (2003), focused on the difficulties that would face developing countries adopting IT. And they introduced the notion of the preconditions that needed to be satisfied before

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<sup>4</sup> See also Vega and Winkelried (2005) who use a somewhat different methodology than Ball and Sheridan to conclude that “the adoption of IT ... delivers the theoretically promised outcomes: low mean inflation (around a fixed target or within a target range) and low inflation volatility”.

the introduction of inflation targeting. As the concepts of preconditions and conditions have played a not insignificant role in the thinking about IT in developing economies, I would like to spend some time discussing both the earlier views on each of these issues, as well as the current thinking that has developed in part because of the experience of developing countries with IT. It is now believed that while there are two or three true preconditions, many of the apparent requirements suggested in the earlier literature are not really preconditions for the introduction of IT. Indeed, the direction of causation may well be from the introduction of IT to the satisfaction of such conditions rather than the reverse. Following the discussion of preconditions, I will turn briefly to an assessment of the experience of emerging economies under inflation targeting.

Let me begin by listing some of the conditions that were noted in the earlier literature<sup>5</sup> -- (i) priority of inflation targeting over other goals; (ii) absence of fiscal dominance; (iii) central bank independence (as well as a considerable degree of control by the central bank over the policy instrument); (iv) reasonable methodology for forecasting; and (v) sound financial institutions and markets and resilience to changes in exchange rates and interest rates.

#### D.1 Priority of inflation targeting over other goals

Modern central banks have one instrument, the policy interest rate, and hence can have only one objective. Under IT, that objective is the rate of inflation. More precisely, the target of policy is the rate of inflation at the end of the policy horizon, where the latter is defined as the period by which the central bank expects inflation to return to its target following the combination of a shock and the appropriate monetary policy response. For industrial countries, the policy horizon is typically six to eight quarters. For emerging economies, it may be a shorter time period because of differences in their transmission mechanism.

While the rate of inflation is the primary objective of policy, this does not mean that the central bank is indifferent to developments in other economic variables. Most importantly, the choice of policy horizon is made on the basis of the country's preference for inflation stability relative to output stability. A shorter policy horizon would imply a commitment to achieve the target inflation rate fairly quickly following shocks, with the possibility of enhanced credibility, but greater variability of output and financial variables. A somewhat longer horizon would result in less volatility in output and financial market variables, but inflation would be away from its target for a longer period of time following a shock. In both cases, however, the actions taken by the central bank must aim at bringing the rate of inflation back to its target over the specified time period.

Moreover, targeting the rate of inflation does not mean ignoring movements in the exchange rate. The exchange rate plays an important role in the transmission mechanism for monetary policy, being one of the two main channels through which central bank actions affect aggregate demand and subsequently inflation. Consequently, in deciding upon the policy actions needed in given economic circumstances, the central bank must

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<sup>5</sup> Various authors have grouped the various conditions in different ways. See IMF (2005) for a somewhat different way of discussing the conditions.

take into account developments in the foreign exchange market, since they influence inflation both directly through their effects on traded goods prices, and indirectly through their effect on aggregate demand. In addition, when the exchange rate moves for reasons other than central bank policy actions, the central bank must come to a view as to the likely cause of the exchange rate movement before deciding upon the appropriate policy response. In particular, the crucial question is whether the exchange rate movement is a result of expected "real" developments that would impact upon aggregate demand and inflation, or "financial" developments, such as increased market confidence resulting from an improvement in the political situation of the country.

A number of emerging economies have chosen to have targets for both inflation and the exchange rate, especially in the initial period after the adoption of IT<sup>6</sup>. This has a number of disadvantages. It can leave the public and the financial markets unclear as to which target will dominate when the two are in conflict. And the central bank will be unable to communicate nearly as clearly the way in which policy will be conducted as it could in a full-fledged IT environment with a single target. As a result, the central bank will lose many of the benefits that arise from anchoring the public's inflation expectations to the inflation target. In a number of cases, for example Chile and Israel, countries that began with both an inflation target and an exchange rate target gradually reduced the importance of the exchange rate target, eventually abandoning it altogether. In sum, attempting to run a system with more than one target tends to have many disadvantages and relatively few advantages.

#### D.2 Absence of fiscal dominance

Another so-called precondition, and one that is also a true precondition in my view, is the absence of fiscal dominance. If the central bank is required to finance the government deficit by lending directly to the government or by purchasing all new issues of government bonds that the public is unwilling to purchase, it will not also be able to target the pre-announced rate of inflation. If the central bank tries to use its single policy instrument to aim at two targets, one involving financing the government deficit and the other being the achievement of an inflation target, it will simply not be able to succeed in achieving both targets with the one instrument. Put more bluntly, if the central bank has to finance the government deficit, it will not have control over the size of its own balance sheet. Hence, it will not be able to exert a sufficient degree of influence over the policy interest rate to set in motion the effects on the transmission mechanism needed to respond to an overly high or overly low rate of inflation.<sup>7</sup> Some emerging economies have dealt

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<sup>6</sup> To overcome the problem of one instrument and two targets in such circumstances, the central bank will either have a trade-off between the two targets, and not try to achieve either target with any precision, or will use sterilized intervention in the foreign exchange market as a second instrument. There is considerable doubt in the literature as to the effectiveness of sterilized intervention when countries have open capital markets.

<sup>7</sup> Central banks could achieve more than one goal if they had recourse to more than one instrument. For example, suppose the central bank had the power to raise primary reserve requirements on the liabilities of commercial banks and that it backed the increase in its own liabilities by purchasing new government debt. Or, alternatively, suppose that the central bank could impose secondary reserve requirements on commercial banks, which they could satisfy only by holding government debt. Then the central bank could use the interest rate instrument to influence aggregate demand and the rate of inflation, and adjust reserve

with this potential problem by making direct financing of government deficits by the central bank illegal.

Another use of the term fiscal dominance, which has been applied by some commentators to the situation in Turkey and Brazil, relates not to the requirement that the central bank finance the government deficit, but rather to the linkage between the interest rate actions that the central bank needs to engage in to achieve its inflation target and the markets' perceptions of the ability of the government to pay its obligations (Blanchard, 2004 and Favero and Giavazzi, 2004). Suppose that there is a positive demand shock with potential inflationary consequences that requires an interest rate increase by the central bank. Given the short-term nature of public debt in many emerging economies, this could lead to increased concern in financial markets about debt sustainability and, hence, to an increase in the risk premium on that country's debt. This in turn could lead to a depreciation of the currency (rather than the appreciation normally associated with a rise in the policy interest rate), which would tend to put upward pressure on inflation, both directly and indirectly. Thus, the response by the central bank to an inflationary shock could in theory lead to an economic outcome that reinforced inflationary pressures, rather than the reverse. It is not clear how important this problem is at present in emerging economies. But it would appear that the introduction of IT should be helpful in breaking the linkages sketched out above, since the effect of a depreciation on inflation is likely to be much attenuated in an IT framework. Of course, statements by the government reaffirming its commitment to a sustainable fiscal policy would also be helpful in breaking the potential links between the interest rate movement and the risk premium.

Some commentators have gone further than the above view that absence of fiscal dominance is essential for inflation targeting and have argued that a country should have sound fiscal policy before it adopts inflation targeting, in part because a weak fiscal position would leave concerns in financial markets about the possibility of future monetization. Interestingly, in a number of industrialized countries, including Canada, the adoption of inflation targeting preceded the improvement of the government fiscal position. There is nonetheless no question that a weak fiscal position makes the job of an IT central bank harder. For example, in the first half of the 1990s, the high real interest rates in Canada relative to those in the United States, and the difficulty that the Bank of Canada faced in getting interest rates as low as it desired without setting off significant downward pressure on the Canadian dollar in the foreign exchange market, can be attributed in considerable measure to the absence of fiscal credibility. The situation would be worse in countries that have a history of very high inflation and/or hyperinflation, and that also have less well developed capital markets for financing government deficits, where the fear of monetization would be much greater than in industrialized countries such as Canada. Nonetheless, fiscal weakness is a problem in all monetary policy frameworks and there is no reason to believe that it would cause more difficulty under IT than under other frameworks.

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requirements to satisfy the goal of financing government deficits. However, such arrangements could lead to highly variable reserve requirements and cause a serious deterioration in the efficiency of commercial banks.

D.3 Central bank independence (as well as a considerable degree of control by the central bank over the policy instrument)

Another precondition that is often noted in the literature is the need for central bank independence. It is generally agreed that this involves instrument independence, the freedom to set the policy interest rate needed to achieve desired goal of policy without government interference, rather than goal independence, the freedom to choose the objective of policy. Indeed, goal independence for the central bank, i.e., the freedom to set the actual quantitative target for inflation, is not required and may not even be desirable.

In passing, I would note the importance of the government of an emerging economy being involved in decision-making regarding the quantitative target of policy and, equally important, being publicly committed to its achievement. Otherwise, there could be continuing uncertainty on the part of economic participants, including investors, as to whether the government really supports the framework and the goal of monetary policy. The best way of committing the government to such a policy would be for it to change the legislation governing the central bank so that low inflation or price stability is established as the primary goal of monetary policy. The experience of industrialized countries shows that inflation targeting can work with the government setting the target itself, or, better in my view, with the target jointly set by the government and the central bank.

Given the importance of instrument independence for the central bank, many IT countries have passed legislation giving the central bank the power to set interest rates. This is particularly important in emerging economies, since in many cases their history is one of the government controlling monetary policy. Direct government control over monetary policy actions has typically resulted in poor monetary policy outcomes, with a strong tendency to inflation and the use of monetary policy for political goals. By tying their own hands through legislation, governments are able to increase the likelihood of competent monetary policy, to reassure financial markets that policy is likely to be much less inflationary than in the past, and to allow the central bank to build up its credibility, with attendant benefits.<sup>8</sup>

In addition to formal instrument independence, the central bank must have the ability to control or strongly influence a policy interest rate that affects the market interest rates that feed into aggregate demand. This means that mechanisms must exist or be established that enable the central bank to initiate a series of developments that flow from its actions all the way to aggregate demand and inflation. In technical terms, the central bank stands at the beginning of the transmission mechanism of monetary policy, and its actions result in changes in a series of economic variables that form the linkages from its

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<sup>8</sup> The arrangements governing monetary policy in the United Kingdom during the period between 1992 and 1997 did not satisfy this perceived need for instrument independence for the central bank. However, the immediate favorable response of financial market expectations to the granting of instrument independence to the Bank of England in 1997 indicates the benefits of such a move. Moreover, to the extent that government conduct of monetary policy in emerging economies has resulted in poor outcomes, the benefits from granting instrument independence to central banks in such economies would be even greater than in industrialized countries.

actions to the rate of inflation. Typically, in countries with a reasonable degree of financial development, the central bank's actions first influence money markets and then spread to interest rates further out on the maturity spectrum as well as to the exchange rate. In countries without developed financial markets, some mechanism has to be developed by which the central banks actions affect the interest rates charged by banks on loans and mortgages as well as the interest rates paid by banks on deposits.

#### D.4 Reasonable methodology for forecasting

Some commentators have argued that it is important that the central bank have a reasonable methodology, including a model, for producing inflation forecasts. This has sometimes been interpreted as a requirement for the central bank to have a clear understanding of the transmission mechanism for the country. Since, in many cases, emerging economies have just undergone or are undergoing major changes in their economic framework, the ability of the central bank to have a good empirical model of the transmission mechanism is very limited. Indeed, the understanding of the transmission mechanism in industrialized countries (where central banks and academics have been studying this issue for decades) is still imperfect, in part because of the inherently complex nature of the transmission mechanism, in part because of changes over time as the economic and financial systems of the country evolve.

While a sophisticated methodology for producing forecasts can be developed and improved over time, it is not essential at the outset of IT. What is essential for an IT country is a reasonable framework for forecasting the future rate of inflation. The model underlying this framework can initially be rather simple, becoming more complex and realistic gradually over time. The framework should employ whatever formal empirical relationships have proved useful in the past, whatever variables and indicators containing information on the future rate of inflation are available, survey evidence, and the judgment of the staff and the members of the monetary policy committee of the central bank. That is, it should not be based solely on an econometric model, but rather should incorporate the judgment of specialists and whatever else is available that can contribute to the quality of the forecast.

In the context of this discussion of models, I would note the importance of building into the reaction function embedded in the model the appropriate response of the central bank to pressures on inflation. That is, the central bank should raise or lower the nominal policy interest rate more than one-to-one in response to a change in the forecast rate of inflation relative to the target rate. If the interest rate response were less than one-to-one, a positive inflation shock would result in a decline in the real rate of interest, which would intensify the inflationary pressures in the economy rather than counteracting them. Similarly, in the case of a negative inflation shock, an insufficient decline in the nominal rate of interest would result in an increase in the real rate of interest, which would accentuate the disinflationary or deflationary pressures.<sup>9</sup>

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<sup>9</sup> See Taylor (1993) for a discussion of this issue, which has come to be known as the Taylor principle. While the original article focused on the necessity for real interest rates to move in the appropriate direction in the context of Taylor rules, the principle has a much broader application.

#### D.5 Sound financial institutions and markets and resilience to changes in exchange rates and interest rates

It is sometimes argued that a precondition for inflation targeting is that the economy needs to be resilient to changes in exchange rates and interest rates. This involves a number of elements. Perhaps the most important one is that financial institutions be sound and well regulated and supervised. Otherwise, it is argued, the central bank will feel constrained in its ability to raise interest rates by the fear that such actions will result in the failure of financial institutions. A similar concern relates to the possibility that a sharp depreciation in the external value of the currency would affect the balance sheets of the financial institutions or their customers negatively and would lead to their failures.

While it is always better that monetary policy be conducted in an environment of sound financial institutions and markets, it is not clear that IT imposes a significantly higher bar in this respect than other frameworks for monetary policy. Although using the exchange rate as a nominal anchor seems to be less demanding in this respect, the periodic sharp devaluations in an adjustable peg system (following episodes of capital flight, for example) can have a very deleterious effect on the balance sheet of financial institutions and even result in their failures. This is particularly likely in the context of a system that gives unwarranted comfort to participants as to the permanence of the exchange rate fixity and therefore results in their not protecting themselves against exchange rate changes. One of the advantages of having a floating exchange rate is that it leads economic participants to recognize that there is two-way risk in exchange markets, and that it is therefore much more likely to lead to the development and use of hedging facilities than a fixed exchange rate regime.

I would now like to examine more closely the argument that emerging economies are more sensitive to exchange rate movements than are industrialized economies, since this is an important element in the concern of some emerging economies about the adoption of inflation targets.

Why are exchange rate movements perceived to be more of a problem for emerging economies than for industrialized economies? First, the pass-through from exchange rate movements to price movements is greater in emerging economies than in industrialized economies. In part, this is due to the history of high rates of inflation in many emerging economies and the associated high level of indexing, including in some cases indexing directly to the exchange rate. Thus, central banks in some countries (e.g., Mexico) were loath to adopt full-fledged IT because of their concern that they would not be able to achieve a pre-announced inflation target in the face of an exchange rate depreciation, and would lose credibility as a result.

One response to this concern is to note that in countries that have achieved lower rates of inflation, the pass-through seems to have declined (Baqueiro et al, 2003). Of course, this does not happen overnight but gradually over time. Thus, the importance of this problem should diminish as a result of the commitment to, and achievement of, a lower rate of inflation.



The second concern with exchange rate movements derives from the mismatch in many countries between assets and liabilities denominated in foreign currency, and the consequent vulnerability of these countries to an exchange rate depreciation. In some countries, the banks themselves have a net foreign-currency liability position. In others, the banks have a balanced position, but their customers have more foreign-currency liabilities than foreign-currency assets. A sharp depreciation could cause the domestic currency value of corporate liabilities denominated in foreign currencies to increase significantly and, hence, lead corporations to default on their bank loans. Thus, in circumstances of balance sheet mismatch, the banks are vulnerable to a sharp depreciation directly or indirectly.

This situation, which is linked to the absence of long-term domestic currency financial instruments because of a history of high rates of inflation, has been termed "original sin" (Eichengreen and Hausmann, 1999). But, as the experience of Chile and some other countries indicates, with low inflation and encouragement by the authorities of the development of local currency bond markets, so-called "original sin" can be overcome. However, this does take time. And, in the meantime, emerging market countries are concerned that an exchange rate depreciation could have deleterious effects on the economy.

The third concern relates to the desire of these countries to protect their export (and import-competing) industries. If exchange rates move excessively and in ways not consistent with economic fundamentals, it can have deleterious effects on the traded goods sector, as companies come under pressure from an appreciation of the currency, or become overly profitable and expand inappropriately in response to a temporary depreciation. In the absence of hedging facilities, producers are unable to protect themselves against exchange rate movements. And these countries are concerned that exchange rates will move excessively because of the illiquidity of their financial markets.

All this has led to a "fear of floating" (Calvo and Reinhart, 2002) in which ostensible floaters intervene very heavily in practice, especially on the up side. However, if an inflation targeting country tries to tie down its exchange rate too rigidly, the attempt to prevent the currency from moving in response to shocks can be inconsistent with its commitment to the inflation target as well as making it more difficult for the real exchange rate to move to its new equilibrium.

A number of commentators (e.g., Goldstein, 2002) have suggested that middle income emerging market economies adopt inflation targets but remain more sensitive to exchange rate movements than their industrialized counterparts. What this seems to involve is a commitment to the primacy of the inflation target, no alternative target in the form of an exchange rate band or crawling peg, a readiness to intervene in exchange markets to smooth exchange rate movements (because of the thinness of the markets in emerging economies) but not to prevent movements to a new equilibrium exchange rate in response to real shocks, and a willingness to use the interest rate instrument to influence exchange rates on the margin in much the same way as intervention is used,

i.e., to smooth exchange rate movements in response to portfolio shocks but not in response to real shocks that require an adjustment to a new equilibrium exchange rate.

This approach combines the fundamental role of inflation targeting with a strong commitment to improving the financial system and a secondary role for exchange rate smoothing. It may prove attractive to some emerging economies considering adopting IT. What is essential in conducting policy in this way is to ensure that the actions of the central bank are clearly in line with the primacy of the inflation target and that any policy actions to smooth exchange rates are seen to be secondary to the goal of achieving the pre-announced rate of inflation. This ordering of priorities will require self-discipline on the part of the authorities. Otherwise, there will be a risk of not achieving the announced target rate of inflation, as well as serious communications problems regarding the thrust of policy, and many of the benefits of inflation targeting will be lost.

#### D.6 Summary of preconditions

In sum, while there are some true preconditions that have to be met before inflation targeting is adopted in emerging economies (priority of the inflation target, absence of fiscal dominance, instrument independence for the central bank and some degree of control over the policy interest rate), most of the other so-called preconditions and elements that are proposed as ways of improving the process can be introduced subsequent to the adoption of inflation targeting. The latter include construction of formal models for forecasting inflation, sophisticated empirical research on the transmission mechanism, issuing inflation reports or monetary policy reports, structural changes to reduce indexation, and strengthening the financial system by improving the regulation and supervision of financial institutions and encouraging the development of long-term domestic currency bond markets. In my view, even if the economic and institutional environment in emerging economies is not absolutely ideal at the outset, the benefits from adopting inflation targeting and then improving the environment would be substantial. And this was certainly the experience in the industrialized economies and in the emerging economies that have adopted IT.

#### D.7 Recent empirical studies on the experience with IT in emerging economies

There have been a number of recent empirical studies on the experience with IT in emerging economies. Given the shortness of the period for which there are data on the performance of IT emerging economies, the results of such studies have to be tentative. Interestingly, they have come to somewhat different conclusions as to the efficacy of IT in emerging economies. These differences relate in some cases to the countries that the authors of the studies have chosen as their control group, i.e., the non-IT countries that have been used as a point of comparison.

Roger and Stone (2005) group countries into industrial and emerging market countries, and into those with stable inflation targets and those pursuing disinflation. They do not use a control group, but rather analyze "the inflation experience of IT countries to develop stylized facts of their inflation performance and implications for design of targeting frameworks". They summarize the institutional frameworks, with a particular focus on how these frameworks have evolved over time, compare inflation performance

with inflation targets, and study episodes of the largest misses of inflation targets. While the evidence shows that inflation outcomes often deviate from targets by significant margins and for lengthy periods, especially for countries in the process of disinflation, no country has dropped inflation targeting in response to misses. The largest misses seem to reflect the direct and indirect impact of exchange rate shocks. The authors conclude that the "resilience of inflation targeting appears to reflect the flexibility of the framework in handling shocks, high standards of transparency and accountability, as well as the lack of alternative monetary regimes". In particular, they note that accountability and transparency have allowed central banks to explain why they have missed the target in a way that does not seriously undermine policy credibility. They also find that IT emerging economies take longer to disinflate than their industrial counterparts, but have as good inflation performance under stable inflation targeting as IT industrial countries.

Batini and Laxton (2005) and the summary of their work in IMF (2005) analyze the effects of IT in emerging economies on the basis of a new and detailed survey of 31 central banks. They also compare the experience of 13 emerging economy ITers to that of the other 22 emerging economies that are in the JP Morgan EMBI Index plus seven additional emerging economies. Thus, the non-IT control group consists of emerging economies that appear to be reasonably similar to the IT emerging economies. The authors' principal conclusions are as follows. "IT is associated with a significant 4.8 percentage point reduction in average inflation, and a reduction in its standard deviation of 3.6 percentage points relative to other strategies. The standard deviation of output is also slightly lower for the ITers, and the difference from the comparison group of non-ITers is statistically significant at the 5 percent level. Thus, there is no evidence that ITers meet their inflation objectives at the expense of real output stabilization".

Mishkin and Schmidt-Hebbel (2005) compare the experience of both industrialized and emerging economy ITers with their own experience prior to adopting IT and with that of a control group of 13 industrial countries without IT<sup>10</sup>. They recognize that the choice of the control group is stringent because the macroeconomic and monetary performance of the countries in the control group is among the best in the world, "raising the odds against finding evidence of better performance among IT countries". Nonetheless, they conclude that their evidence is supportive of inflation targeting. "IT seems to help countries achieve lower inflation in the long run, have smaller response to oil price and exchange rate shocks, strengthen monetary policy independence, improve monetary policy efficiency, and obtain inflation outcomes closer to target levels". They also find that some of these benefits are greater after countries have completed their desired disinflation and are able to make their inflation targets stationary. However, their evidence does not suggest that countries that have adopted IT have had a better monetary policy performance than the control group. But, as the authors are well aware, their choice of high-performing non-IT countries, most of whom are now in the EMU, would make it very difficult for any other group of countries, IT or non-IT, to perform appreciably better. And, it is important to note, many IT countries have chosen to adopt IT precisely

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<sup>10</sup> Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, Portugal, and the United States. Of the thirteen countries in the control group, nine joined the EMU in 1999 and one (Greece) joined later.

because of their relatively poor performance in the past. The fact that they have converged reasonably quickly to the performance of other countries is itself a strong recommendation for IT. As the authors put it, "inflation targeting does seem to help countries converge toward the performance of the control group".

I will conclude this section with a few impressionistic comments on the performance of emerging economy ITers. First, to come back to the point just made, I have been very impressed by the convergence of the performance under IT of emerging economies whose past experience had been relatively poor toward the performance of best-practice central banks. Second, the adoption of IT in emerging economies has helped prevent exchange rate movements from feeding into equivalent movements of inflation, even when past history has been one of very close linkages between the exchange rate and inflation. The example of Brazil in 1999 and 2000 is instructive to this regard. Third, transparency and communications play an extremely important role in helping IT central banks in emerging economies develop and maintain credibility. This credibility contributes importantly to their ability to cope with misses in inflation outcomes relative to target, if their explanation for the miss is cogent.<sup>11</sup> Fourth, more recent adopters of IT in emerging economies have been able to build on the increased credibility of the earlier adopters. Thus, the skepticism that greeted the adoption of IT in the early years is no longer in evidence. And the anchoring of the public's inflation expectations to the target, while still requiring the central bank to show its commitment to the new regime by taking the necessary actions to achieve the target, seems to occur more rapidly than had earlier been the case. Fifth, in some emerging economies, IT has preceded and may even have helped cause improvements in financial markets and in the regulation and supervision of financial institutions. Sixth, given the success of the many emerging economies adopting IT, I expect that the IT framework will continue to spread in emerging economies over the coming years.

#### E. Some unresolved issues in IT

I would like to conclude this presentation by listing a number of issues in IT that are unresolved and require further research and analysis. First, while industrialized countries seem to have settled for the present on an inflation target of 2 percent or 2½ percent, the question of whether further reductions in the target to 1 percent or 1½ percent would make sense remains open. As noted earlier, this would involve an empirical cost-benefit analysis between the benefits of a further reduction in target inflation and the potential costs of so doing, both transitional and long-lasting. Second, while some emerging economies have chosen target inflation rates very close to those of industrialized countries, others have chosen somewhat higher target rates. This might reflect a larger upward bias in the price index measure (because of data collection problems or difficulties in adjusting for quality changes) or more uncertainty about the flexibility of the economy in the context of a more rapid pace of structural change. If emerging economies aim at having traded goods inflation similar to that in industrialized countries in the long run, their target for CPI inflation would have to be higher than that in industrialized countries because of higher relative productivity growth in the traded

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<sup>11</sup> For example, if the miss is related to an unpredictable shock and is not the result of the central bank being slow to take policy actions when they are clearly required.

goods sector and the Balassa-Samuelson effect. In any case, the question of the appropriate (or optimal) rate of inflation for emerging economies is an area that would merit more research. Third is the role of asset prices in the conduct of monetary policy under IT. A number of observers have argued that central banks should pay more attention and respond more to movements in asset prices than would be indicated by the standard analysis of IT, in which asset price movements enter into the decision-making process solely through their effects on aggregate demand and inflation. A fourth and not unrelated issue is the way in which financial stability problems can influence central bank behavior in an IT environment. The BIS, in particular, has emphasized the importance of taking account of financial stability issues in conducting monetary policy under IT. Fifth, the possible effect of changes in economic structure on the optimal length of the policy horizon (i.e., the timeframe to get inflation back to target following a shock and the interest rates response to it) deserves further attention in central banking circles. Sixth, there has been considerable amount of interesting analysis of the potential benefits of a price level target relative to an inflation target. While no country as yet has seriously considered a price level target, it may well be one of the important issues in future debates on monetary policy under IT.

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