

Issues in Inflation Targeting

*Frederic S. Mishkin**

Introduction

The 1990s have seen a growing number of countries adopt a new approach to the conduct of monetary policy: inflation targeting. Canada was one of the first, formally embarking on this approach in February 1991. It has been very successful in the countries that have adopted it, producing low and stable inflation without lowering output growth (and arguably, helping to increase economic growth). Despite its successes, debates continue over the best way to implement inflation targeting. This paper will attempt to contribute to these debates—many of which are the focus of other papers in this conference—by discussing five outstanding questions about the operational design of inflation-targeting regimes:

- Which is better, a price-level target or an inflation target?
- What should be the numerical value for the inflation target in the long run?
- What should be the horizon for the inflation target?
- Should the target be a point target or have a range?
- What role should the exchange rate play in an inflation target?

Answers to these questions are not only relevant to the Bank of Canada and other inflation-targeting central banks in industrialized countries, but are also pertinent to central banks in emerging-market countries that are increasingly adopting this approach.

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1 Price Level or Inflation Target?

At present, all countries that have adopted inflation targeting have chosen to target inflation rather than the price level. Nevertheless, which of these two targets would result in better economic performance is still an open question. Indeed, it is the subject of several of the papers in this conference and the focus of active research and debate. I will offer my two cents worth on this issue, and briefly outline the arguments for and against the two targets. I will also add some arguments that have not received as much attention in the literature.

1.1 Advantages of a price-level target over an inflation target

A price-level target has two key advantages relative to an inflation target. First, a price-level target can reduce uncertainty about where the price level will be over long horizons. Inflation-target misses are not reversed by the central bank. The result is that inflation will be a stationary stochastic process, that is, integrated of order zero, $I(0)$, while the price level will be non-stationary, an $I(1)$ process. The result is that the uncertainty of where the price level will be in the future grows with the forecast horizon. This uncertainty can make long-run planning difficult and may lead to a decrease in economic efficiency.

Although McCallum (1999) has argued that the amount of uncertainty about the future price level that would arise from successful adherence to an inflation target may not be all that large, it still complicates the planning process and may lead to more mistakes in investment decisions. Many of us face precisely this issue when we think about saving for our children's college expenses. Knowing that a central bank is doing its job well and will keep inflation under control still leaves us uncomfortable about how much we will need to adequately provide for college tuition, say in fifteen years from now.

The second possible advantage of a price-level target is that in some models (e.g., Svensson 1999; Woodford 1999; Dittmar, Gavin, and Kydland 1999; Dittmar and Gavin 2000; and Vestin 2000) it produces less output variance than an inflation target. However, the results that favour a price-level target are very model-specific and depend on key assumptions about the price-setting process and the degree to which it is forward-looking. Because this issue will be discussed extensively in the paper by Barnett and Engineer and by the discussant, Jean Boivin, I will not dwell on it here, but will say that the case is not yet convincing that a price-level target will outperform an inflation target in terms of output variability.

1.2 Disadvantages of a price-level target relative to an inflation target

The traditional view, forcefully articulated by Fischer (1994), argues that a price-level target produces more output variability than an inflation target, because unanticipated shocks to the price level are not treated as bygones, and must be offset.¹ A price-level target requires that overshoots or undershoots of the target must be reversed, and this could impart significantly more volatility to monetary policy and, with sticky prices, to the real economy in the short run.

Although the models mentioned in section 1.1, particularly those with forward-looking price setting, do not find that this feature of a price-level target increases output variability, they do not focus on one particular problem with a price-level target that concerns me, the fact that a price-level target may lead to more frequent episodes of deflation, which in turn, can engender financial instability.

As described in my work on financial crises (Mishkin 1978, 1991, 1997), a key factor that is found to promote financial instability in industrialized countries is deflation. Because debt contracts in industrialized countries frequently have long maturities, a deflation leads to an increase in the real indebtedness of firms and households, which leads to a decline in net worth and a deterioration in their balance sheets. Irving Fisher (1933) aptly named this phenomenon “debt deflation” and saw it as a major factor promoting the economic downturn during the Great Depression. With less net worth, adverse selection and moral-hazard problems increase for lenders, and so they cut back on lending. The decline in net worth leads to a decline in the value of collateral a lender can secure if the borrower’s investments turn sour, and the reduction in collateral therefore increases the consequences of adverse selection, because, in the case of a default, losses from loans are likely to be more severe. In addition, the decline in net worth increases moral-hazard incentives for borrowers to take on excessive risk, because they now have less to lose if their investments go sour.

This reasoning indicates that deflation can promote financial instability in industrialized countries through the debt-deflation mechanism, a recent example of which is what has occurred in Japan in the last decade (Mishkin 1998). My concerns about the ability of deflation to promote financial instability, with potentially large costs to the economy, tend to make me more skeptical about theoretical results that indicate that price-

1. This view is supported by simulations of econometric macro models with backward-looking expectations, which typically find that a price-level target leads to greater variability of output and inflation than an inflation target (e.g., see Haldane and Salmon 1995).

level targets are able to reduce output variability. Indeed, price-level targets that lead to more episodes of deflation may be more dangerous than their proponents have realized.

Another problem with price-level targets, which is not often mentioned in the literature, is that they may make it more difficult to conduct monetary policy. With more frequent periods of deflation resulting from a price-level target, it will become more common that short-term interest rates will hit a floor of zero during deflations, as occurred during the Great Depression and recently in Japan. One argument that some economists make is that when the interest rate hits a floor of zero, monetary policy becomes ineffective.² I believe this argument is false for the reasons outlined in Meltzer (1995) and Mishkin (1996a). Monetary policy works through many other asset prices besides those of short-term debt securities, and so even when short-term interest rates hit the floor of zero, monetary policy can still be effective, and indeed was so during the Great Depression. (See Romer 1992.)

Nonetheless, monetary policy becomes more difficult during deflationary episodes when interest rates hit a floor of zero, because the usual guides to the conduct of monetary policy are no longer relevant. In recent years, much of the research on how central banks should optimally conduct monetary policy focuses on so-called Taylor rules, in which the central bank sets the short-term interest rates at a level that depends on both output and inflation gaps. The Taylor (1999) volume is an excellent example of this type of research. Once the interest rate hits a floor of zero, however, all of the research on optimal monetary policy rules represented by work of the type in the Taylor volume is no longer useful, because manipulating short-term interest rates is no longer an effective tool of monetary policy. In such a deflationary environment, central banks do have the ability to lift the economy out of recession by pursuing expansionary policy and creating more liquidity, but it becomes much less clear how far they need to go. This rightfully makes central bankers uncomfortable. Therefore, a significant disadvantage of a price-level target is that deflationary environments will more likely occur in which central bankers will be without the usual knowledge to guide them, making the determination of monetary policy even more difficult.

Another problem for a price-level target that has received little attention in the literature is the presence of measurement error in inflation. Most research on measurement error takes the view that it is *inflation* that is

2. Summers (1991) is one prominent example, and officials of the Bank of Japan have recently used this argument to indicate that expansionary monetary policy is likely to be ineffective in promoting Japanese recovery.

measured with error, rather than the *price level*, and this was the approach taken by the Boskin Commission. (See Boskin et al. 1996, Moulton 1996, and Shapiro and Wilcox 1996.) This implies that the measurement error of the price level is $I(1)$, and that a price-level target results in growing uncertainty about the true price level as the forecast horizon grows. Thus, many of the arguments suggesting that a price-level target results in lower long-run uncertainty about the true price level may be overstated.

1.3 Bottom line: An inflation target is better

The disadvantages I have outlined, particularly the dangers of more frequent deflationary episodes under a price-level target, make me far more comfortable with an inflation target than with a price-level target. Indeed, one of the reasons that no central bank has decided to target the price level in recent years may be that central bankers have similar concerns about the dangers of deflation.

However, the arguments I have made here in favour of an inflation target over a price-level target, do not rule out hybrid policies, which combine features of an inflation and a price-level target, but may not provide the best of both worlds. An inflation target could be announced with a commitment to some error correction in which target misses will be offset to some extent in the future. Research at the Bank of England and the Bank of Canada shows that an inflation target with a small amount of error correction can substantially reduce uncertainty about the price level in the long run but still generate very few episodes of deflation. (See King 1999 and Black, Macklem, and Rose 1998.) Evaluating these hybrid policies should be a major focus of future research.

One issue that would have to be addressed if such a hybrid policy were adopted is how it could be explained to the public. As emphasized in my work on inflation targeting (Bernanke and Mishkin 1997; Mishkin 1999a; and Bernanke, Laubach, Mishkin, and Posen 1999), and critical to its success, inflation targeting provides a vehicle for more effective communication with the public, who will clearly not understand the technical jargon of error-correction models. However, I believe that an error-correction feature in an inflation-targeting regime could be fairly easily communicated by not only announcing an intermediate-term inflation target, but by indicating that there is a target for the average inflation rate over a longer

period, say five years. Indeed, this is very close to what the Australians have been doing by announcing that they have an inflation target of 2 to 3 per cent over the business cycle.³

2 What Numerical Value Should the Inflation Target Have in the Long Run?

A key question for any central bank using an inflation-targeting strategy is what the long-run target for inflation should be. The Bank of Canada has a midpoint of its inflation-target range of 2 per cent, but has stressed that this midpoint is not necessarily the appropriate long-run target. Indeed, an active debate continues in Canada regarding where the target should be set.

To decide on the appropriate long-run inflation target, we need to determine what price stability means. Alan Greenspan has provided a widely cited definition of price stability as a rate of inflation that is sufficiently low that households and businesses do not have to take it into account in making everyday decisions. This definition is a reasonable one, and operationally, any inflation number between 0 and 3 per cent seems to meet this criterion. Some economists, Martin Feldstein (1997) and William Poole (1999) being prominent examples, argue for a long-run inflation goal of 0 per cent, which has the psychological appeal of the “magic number” of zero. Indeed, one concern is that an inflation goal greater than zero might lead to a decline in central bank credibility and instability in inflation expectations, which could lead to an upward creep in inflation. However, evidence in our book on inflation targeting, Bernanke et al. (1999), suggests that maintaining a target for inflation above zero, but not too far above (less than 3 per cent), for an extended period, does not lead to instability in the public’s inflation expectations or to a decline in central bank credibility.

One prominent argument against setting the long-run inflation target at zero, raised by Akerlof, Dickens, and Perry (1996), is that setting inflation at too low a level produces inefficiency and will result in an increase in the natural unemployment rate. They contend that downward nominal-wage rigidity, which they argue is consistent with the evidence, indicates that reductions of real wages can occur only through inflation. The implication is that a very low inflation rate might prevent real wages from adjusting downwards in response to declining labour demand in certain industries or regions, thereby leading to increased unemployment and hindering the re-allocation of labour from declining to expanding sectors.

3. However, the use of the range of 2 to 3 per cent does reduce some of the clarity of the Australian inflation target, and for reasons to be discussed, a point target of 2.5 per cent would be preferable.

The evidence for the Akerlof, Dickens, and Perry mechanism through which low inflation raises the natural rate of unemployment is not at all clear-cut and indeed is the subject of another paper in this conference (Farès and Lemieux). Also, as pointed out by Groshen and Schweitzer (1996, 1999), inflation can not only put “grease” in the labour markets and allow downward shifts in real wages in response to a decline in demand along the lines of Akerlof et al. (1996), but can also put in “sand” by increasing the noise in relative real wages. This noise reduces the information content of nominal wages and hence the efficiency of the process by which workers are allocated across occupations and industries. Thus, I do not find the Akerlof et al. argument a persuasive one for setting the long-run goal for inflation above zero.

A more persuasive argument against an inflation goal of zero is that with such a goal the economy would probably experience episodes of deflation. I have argued that deflation can be highly dangerous, because it promotes financial instability and can make monetary policy decisions more difficult if short-term interest rates hit a floor of zero as a result. The implication is that undershooting a zero inflation target (i.e., a deflation) is potentially more costly than overshooting a zero target by the same amount. The logic of this argument suggests that setting an inflation target a little above zero is worthwhile, because it provides some insurance against episodes of deflation. Indeed, in Bernanke et al. (1999), we have argued for a long-run inflation goal of 1 per cent above true inflation. With measurement error in Canada estimated to be 0.5 per cent (Crawford, Fillion, and Laflèche 1998), this suggests a reasonable long-run target of 1.5 per cent, not too far below the current 2 per cent midpoint of the target range.

Another reason why central banks would be better off with a long-run inflation goal above zero, is that they should not be perceived as being obsessed with controlling inflation at the expense of output stability. If a central bank is perceived as an “inflation nutter,” in Mervyn King’s (1996) terminology, that puts no weight on output fluctuations in making its decisions about monetary policy, it is likely to lose the public’s support. Too low an inflation target, say 0 or even 1 per cent, may signal to the public that the central bank does not care sufficiently about the public’s concerns. Indeed, it is not clear that there is public support for lowering the midpoint of the inflation target in Canada to below its current 2 per cent.

As I have argued elsewhere (Mishkin 1999b), it is unstable for a central bank in a democracy to have a loss function very different from that of the public’s. This has been recognized by the Bank of Canada, whose officials continually stress that the Bank is concerned about output fluctuations. Indeed, Bank officials have pointed out that one beauty of inflation targeting, which emphasizes the floor of the target range as much as the

ceiling, is that it can actually help stabilize output when negative shocks to the economy occur. With inflation targeting, central banks can be more aggressive in offsetting these negative shocks with expansionary monetary policy, because they are less concerned that expansionary policy will lead to a rise in inflation expectations.

2.1 Bottom line: Two per cent looks pretty reasonable

These arguments suggest that a long-run inflation target of around 2 per cent makes a lot of sense, and this is the number advocated in our book on inflation targeting (Bernanke et al. 1999). A 2 per cent target provides insurance against deflation with its possible very high costs, and also seems to be a number that the public is quite comfortable with, providing the necessary support for the central bank to keep inflation under control. Because estimates of the measurement bias in consumer price index (CPI) inflation in Canada are below the 1 per cent number arrived at by the Boskin Commission (Boskin et al. 1996), there is an argument for lowering the midpoint of the Canadian target to 1.5 per cent. However, in my view, the main gain from price stability is that it leads to inflation predictability, so the benefits of lowering the midpoint from 2 to 1.5 per cent are likely to be quite small. On the other hand, there could be a substantial cost if lowering the inflation target led to an erosion of support for the Bank of Canada's pursuit of price stability. The bottom line is that Canada's choice of a 2 per cent midpoint for its inflation target looks pretty reasonable and, for the foreseeable future, is probably better left unchanged.

3 What Horizon for the Target?

Monetary policy affects the economy, and particularly inflation, with long lags. In industrialized countries, lags from monetary policy to inflation are typically estimated to be about two years. Shorter time horizons, such as one year, which have been common in inflation-targeting regimes, can be highly problematic. The first problem with too short a horizon is that it can lead to a controllability problem: frequent misses of the inflation target, even when monetary policy is being conducted optimally. The second problem is that it can lead to instrument instability, in which policy instruments are moved around too much in an attempt to have inflation hit its targets over the shorter horizon. A third problem is that too short a horizon implies that not

enough weight is put on output fluctuations in the central bank's loss function.⁴

The experience with inflation targeting in New Zealand, documented in Bernanke et al. (1999), illustrates these problems. In 1995, the Reserve Bank of New Zealand overshot its one-year-horizon inflation target range, making the Governor subject to dismissal under the central banking law. It was recognized in the Reserve Bank that the overshoot was likely to be short-lived and that inflation was likely to fall, indicating that monetary policy had not been overly expansionary. Fortunately, this view was accepted outside of the Bank, and the Governor, Don Brash, whose performance had been excellent, retained his job. Attempting to hit the annual target did, however, have the unfortunate consequence of producing excessive swings in the monetary policy instruments, especially the exchange rate. In a small, open economy, like New Zealand, exchange rate movements affect inflation more quickly than interest rates. Thus, trying to achieve annual inflation targets required heavier reliance on manipulating exchange rates, which led to the large swings. By trying to hit the short-horizon target, the Reserve Bank also may have induced larger output fluctuations. For example, the Reserve Bank pursued an overly tight monetary policy at the end of 1996, with the overnight cash rate going to 10 per cent, because of fears that inflation would rise above the target range in 1997, and this helped lead to an undesirable decline in output. The Reserve Bank of New Zealand has recognized the problems it had with a too-short target horizon, and now emphasizes a horizon of six to eight quarters in its monetary policy discussions. (See Sherwin 1999 and Drew and Orr 1999.) Furthermore, the Policy Target Agreement between the central bank and the government has recently been amended to be more flexible in order to support the longer policy horizon. (See Reserve Bank of New Zealand 2000.)

3.1 Bottom line: The need for multi-year targets

The solution to avoiding too short a horizon for the inflation target is to set inflation targets two years ahead, automatically implying that the central bank will have multi-year inflation targets. The target for the current calendar year will have been set two years previously, while there will also be a target for the following year. With multi-year targets, the target from one year to the next could vary over time. The inflation target would vary in response to shocks to the economy, especially to supply shocks, which

4. As demonstrated by Svensson (1997), a faster target path of inflation to the long-run inflation goal implies a smaller weight on output variability in the central bank's loss function.

might need to be accommodated to prevent excessive output fluctuations. Also, putting a weight on output fluctuations in a central bank's objectives, as is sensible, requires that the approach of the inflation target to the long-run goal be gradual (Svensson 1997). This also suggests the need for multi-year targets in which the inflation target, even one for two years ahead, may differ from the long-run target if shocks to the economy have driven inflation away from the long-run goal.

The problem with too short a horizon for the inflation target has been recognized by the Bank of Canada since the inception of inflation targeting. When the inflation target was adopted in Canada in February 1991, it was set for 22 months in the future to reflect lags in the effects of monetary policy. However, once inflation fell to around the 2 per cent level, the target range for each year has remained unchanged at 1 to 3 per cent. Thus, the reality that monetary policy has to target on horizons longer than one year is no longer clear-cut. Hence, although the multi-year target may not be changing, there is a need to explain to the public that the target set today is actually for two years from now. Getting the public to recognize that an inflation target has a horizon longer than one year is crucial for generating public support when monetary policy must be appropriately pre-emptive.

4 Point Target or Range?

Inflation targeters have made different choices regarding whether or not an inflation target should be expressed as a point target or a range. Chile and the United Kingdom have chosen to focus on a point target, while most other inflation-targeting countries have chosen a range.

The advantages of a range are that it provides more explicit flexibility to the targeting regime, and also conveys to the public the important message that uncertainty exists in the inflation process, so that the central bank's ability to control inflation will necessarily be imperfect.

The use of a range has several drawbacks, however. First, it is not clear that the use of a target range is a good way for the central bank to convey the uncertainty in the inflation process and in its ability to hit the inflation target. Unfortunately, estimates of the irreducible uncertainty around an inflation target are around five percentage points (see, for example, Haldane and Salmon 1995 and Stevens and DeBelle 1995), although over time, success with inflation targeting might decrease the variability of inflation expectations and, hence, inflation. Thus, the inflation-targeting central bank has the unattractive choice of making the inflation target range very wide, which is likely to confuse the public about its intentions and reduce the credibility of policy; or of making the range so narrow that misses are inevitable.

New Zealand, the first country to adopt inflation targeting, initially chose a target range of two percentage points, and it was followed in this by many other inflation targeters. This range was probably too narrow and indeed led to serious controllability and instrument instability problems. As we have seen, the target range was breached in 1995, although the Reserve Bank was viewed as blameless, while the narrowness of the target range helped promote excessive fluctuations in the monetary policy instruments for the reasons discussed above.

One solution to these problems is to widen the target range, as New Zealand did in November 1996, increasing it to 300 basis points, with a new target range of 0 to 3 per cent. If the range is made wide enough to significantly reduce the instrument instability and controllability problems, however, the targeting regime may lose credibility. Indeed, this concern was expressed by officials of the Reserve Bank of New Zealand when the range was widened. They were concerned that the widening of the range might be perceived as a sign of a weaker commitment to inflation control, rather than an attempt to improve the system. Only the continued communication by the Reserve Bank with the public that this was not the case has prevented this from occurring. Recently, the Reserve Bank has modified its discussion of the inflation target to put greater emphasis on the midpoint of the target rather than on the upper and lower limits of the range.

One counter to my criticisms of having a target range is that misses of the range in inflation-targeting countries have been rare in recent years and so have not led to losses in credibility. While this has been true, it is important to recognize that we in industrialized countries may have been extremely lucky in recent years, with supply shocks generally being favourable and demand shocks coming at auspicious times, which helped keep inflation near target levels. Counting on always being lucky is a mistake, and may come back to haunt inflation-targeting countries with narrow ranges.

Uncertainty about the inflation process is even greater for emerging-market countries and so the likelihood of missing narrow target ranges is even greater. This is especially true if the emerging-market country is using inflation targets to help reduce inflation from levels in excess of 10 per cent. Furthermore, target misses are potentially more damaging to credibility in emerging-market countries, because the esteem in which government institutions are held in these countries is considerably less than in industrialized countries. Target ranges may thus be even more problematic for emerging-market countries than for industrialized countries. Indeed, concerns of this type may explain why Chile, the first emerging-market country that engaged in inflation targeting, decided to switch from target ranges to a midpoint target in 1994.

An additional problem with a range is that it can take on a life of its own. This has been evident in the experience with exchange-rate targeting with a band, and has also occurred in inflation-targeting regimes (see Bernanke et al. 1999). With target ranges in place, politicians, financial markets, and the public often focus on whether inflation is just outside or inside the edge of a range, rather than on the magnitude of the deviation from the midpoint. The opposite problem occurred in the United Kingdom in 1995, when inflation exceeded the target midpoint by over one percentage point but without breaching the upper band. The fact that inflation was still within the target range gave the Chancellor of the Exchequer cover to resist demands by the Bank of England for tightening of monetary policy.

Too much focus on the edges of the range can lead the central bank to concentrate too much on keeping the inflation rate just within the bands, rather than trying to hit the midpoint of the range. It is difficult to imagine a sensible objective function for policy-makers that would justify such asymmetric reactions to inflation rates just inside and outside the bands.

4.1 Bottom line: Point target has advantages over a range

The disadvantages of a target range lead me to the conclusion that a point target for inflation is likely to lead to better performance than a range. However, it is imperative that the central bank communicate with the public to make them understand the inherent uncertainty in the inflation process and in the central bank's ability to hit the target. When the Bank of England switched from a range to a point target in 1995, it used its *Inflation Report* and other channels to communicate the uncertainties in the inflation process and in the control of inflation, rather than leaving those uncertainties to be inferred from the target range. The Bank of England eventually hit on the successful communications device of its "fan chart," in which the confidence intervals around the inflation forecast are displayed with different shadings.

With the granting of the right to control the setting of the monetary policy instruments to the Bank of England in May 1997, the government required the Bank of England to report to parliament when inflation is more than one percentage point away from the target. This requirement is subtly different from a range, because it puts the appropriate focus on the point target rather than on the edges of the band.

One concern might be that a point target may overly limit the flexibility of monetary policy. However, emphasis on uncertainty in the inflation process by the central bank and the ability to vary the inflation target over time should provide the necessary flexibility for monetary policy.

5 What Role for the Exchange Rate?

There is no question that central banks care about their countries' exchange rate. Changes in the exchange rate can have a major impact on inflation, particularly in small, open economies like Canada. For example, a depreciation of the currency can lead to a rise in inflation because of the pass-through from higher import prices and greater demand for the country's exports.

In addition, the public and politicians pay a lot of attention to the exchange rate, and this puts pressure on the central bank to alter monetary policy. Canadians are not happy when the Canadian dollar strays too far from par with the U.S. dollar. An appreciation of the Canadian dollar can make Canadian businesses uncompetitive with those in the United States, while a depreciation makes Canadians feel poorer relative to their southern neighbours. There may also be an element of national pride in the value of the currency. When the Canadian dollar falls relative to the U.S. dollar, Canadians may see this as a failure of their economy vis-à-vis the United States. This problem has become evident in the European Monetary Union, where the decline of the euro has become a big political issue, and the central bank has been blamed, I think unfairly, for the euro's decline. The result has been calls for monetary policy tightening, even when inflation expectations and forecasts were not suggesting that inflation was rising above the target range.

Emerging-market countries, rightfully, have an even greater concern about exchange rate movements. Not only can a real appreciation make domestic industries less competitive, but it can lead to large current account deficits, which might make the country more vulnerable to currency crisis if capital inflows turn to outflows. Depreciations in emerging-market countries are particularly dangerous, because they can trigger a financial crisis along the lines suggested in Mishkin (1996b, 1999c). These countries have much of their debt denominated in foreign currency and when the domestic currency depreciates, the debt burden of domestic firms increases. Since assets are typically denominated in domestic currency and so do not increase in value, a decline in net worth results. This deterioration in balance sheets then increases adverse selection and moral-hazard problems, which lead to financial instability and a sharp decline in investment and economic activity. This mechanism explains why the currency crises in Mexico in 1994–95 and East Asia in 1997, pushed these countries into full-fledged financial crises, resulting in devastating effects on their economies.

The fact that exchange rate fluctuations are a major concern in so many countries raises the danger that monetary policy, even under an inflation-targeting regime, may put too much focus on limiting exchange

rate movements. The first problem with a focus on limiting exchange rate movements is that it runs the risk of transforming the exchange rate into a nominal anchor that takes precedence over the inflation target. For example, as part of its inflation-targeting regime, Israel has had an intermediate target of an exchange rate band around a crawling peg, whose rate of crawl is set in a forward-looking manner by deriving it from the inflation target for the coming year. Although the Bank of Israel downplayed the exchange rate target relative to the inflation target over time, it did slow the Bank's efforts to win support for disinflation and lowering of the inflation targets (see Bernanke et al. 1999).

The second problem arising from a focus on limiting exchange rate fluctuations is that it can induce the wrong policy response when a country is faced with real shocks, such as a terms-of-trade shock. Two graphic examples occurred in New Zealand and Chile in the late 1990s.

As mentioned, the short horizon for the inflation target in New Zealand led the Reserve Bank to focus on the exchange rate as an indicator of the monetary policy stance, because of the direct impact of exchange rate movements on inflation. By early 1997, the Reserve Bank institutionalized this focus by adopting as its primary indicator of monetary policy a monetary conditions index (MCI) similar to that developed by the Bank of Canada. The idea behind the MCI, which is a weighted average of the exchange rate and a short-term interest rate, is that both interest rates and exchange rates, on average, have offsetting impacts on inflation. When the exchange rate falls, higher inflation usually results, and so interest rates need to rise to offset the upward pressure on inflation. However, the offsetting effects of interest rates and exchange rates on inflation depend on the nature of the shocks to the exchange rates. If the exchange rate depreciation comes from portfolio considerations, then it does lead to higher inflation and needs to be offset by an interest rate rise. However, if the reason for the exchange rate depreciation is a real shock, such as a negative terms-of-trade shock, which decreases the demand for a country's exports, then the situation is entirely different. The negative terms-of-trade shock reduces aggregate demand and is thus likely to be deflationary. In this case, the correct interest rate response is a decline in interest rates, not a rise, as the MCI suggests.

With the negative terms-of-trade shock hitting New Zealand in 1997, the 1997 adoption of the MCI led to the wrong monetary policy response to the East Asian crisis. With depreciation setting in after the crisis began in July 1997 (after the devaluation of the Thai baht), the MCI began a sharp decline, indicating that the Reserve Bank needed to raise interest rates, which it did by over 200 basis points. The result was very tight monetary policy, with the overnight cash rate exceeding 9 per cent by June 1998. Because the depreciation was due to a substantial, negative terms-of-trade

shock that decreased aggregate demand, the tightening of monetary policy, not surprisingly, led to a severe recession and an undershoot of the inflation-target range, with actual deflation occurring in 1999.⁵ The Reserve Bank of New Zealand eventually realized its mistake and reversed course, sharply lowering interest rates beginning in July 1998, after the economy had entered a recession; but by then it was too late. It also recognized the problems associated with using an MCI as an indicator of monetary policy, and abandoned it in 1999. The Reserve Bank now operates monetary policy in a more conventional way, using the overnight cash rate as its policy instrument, with far less emphasis on the exchange rate in its monetary policy decisions.

Chile's inflation-targeting regime also included a focus on limiting exchange rate fluctuations, by having an exchange rate band with a crawling peg that was (loosely) tied to lagged domestic inflation. This focus on the exchange rate induced a serious policy mistake in 1998, because the central bank was afraid it might lose credibility in the face of the financial turmoil if it allowed the exchange rate to depreciate after what had taken place in financial markets following the East Asian crisis and the Russian meltdown. Thus, instead of easing monetary policy in the face of the negative terms-of-trade shock, the central bank raised interest rates (to over 30 per cent at an annual rate for the inter-bank rate by September 1998) and even narrowed its exchange rate band. In hindsight, these decisions appear to have been a mistake: the inflation target was undershot and the economy entered a recession for the first time in the 1990s. With this outcome, the central bank came under strong criticism for the first time since it had adopted its inflation-targeting regime in 1990, weakening support for the independence of the central bank and its inflation-targeting regime. During 1999, the bank reversed course, easing monetary policy by lowering interest rates and allowing the peso to decline.

The contrast of the experience of New Zealand and Chile during this period with that of Australia, another small, open economy with an inflation-targeting regime, is striking. Prior to the adoption of their inflation-targeting regime in 1994, the Reserve Bank of Australia had adopted a policy of allowing the exchange rate to fluctuate without interference, particularly if the source of the exchange rate change was a real shock, like a terms-of-trade shock. Thus, when faced with the devaluation in Thailand in July 1997, the Reserve Bank recognized that it would face a substantial negative terms-of-trade shock because of the large component of its foreign trade

5. The terms-of-trade shock, however, was not the only negative shock the New Zealand economy faced during that period. Its farm sector experienced a severe drought, which also hurt the economy. Thus, a mistake in monetary policy was not the only source of the recession. Bad luck played a role, too. See Drew and Orr (1999) and Brash (2000).

conducted with the Asian region, and that it should not fight the depreciation of the Australian dollar that would inevitably result (see Macfarlane 1999 and Stevens 1999). Thus, in contrast to New Zealand, it immediately lowered the overnight cash rate by 50 basis points to 5 per cent and kept it near this level until the end of 1998, when it was lowered again by another 25 points.

Indeed, the adoption of the inflation-targeting regime probably helped the Reserve Bank of Australia to be even more aggressive in its easing in response to the East Asian crisis and helps explain why their response was so rapid. The Reserve Bank was able to make clear that easing was exactly what inflation targeting called for to prevent an undershooting of the target, so that the easing was unlikely to have an adverse effect on inflation expectations. The outcome of the Reserve Bank's policy actions was extremely favourable. In contrast to New Zealand and Chile, real output growth remained strong throughout this period. Furthermore, there were no negative consequences for inflation, despite the substantial depreciation of the Australian dollar against the U.S. dollar by close to 20 per cent: inflation remained under control, actually falling during this period to end up slightly under the target range of 2 to 3 per cent.

5.1 Bottom line: Keep your eye on the inflation (not the exchange rate) ball

The analysis above and the recent experiences of countries like Chile, New Zealand, and Australia, strongly suggest that central banks' concerns about the exchange rate should not deter them from keeping their eyes on the inflation ball. Hitting the inflation target should be the primary issue when setting monetary policy instruments.

Does a focus on achieving the inflation goal imply that central banks should pay no attention to the exchange rate? Of course not. An important transmission mechanism for monetary policy is the exchange rate, and its level has important effects on inflation and aggregate demand, depending on the nature of the shocks, particularly in small, open economies like Canada. Therefore, the central bank needs to closely monitor exchange rate developments and factor them in when setting monetary policy instruments. A depreciation of the exchange rate resulting from portfolio shocks requires a tightening of monetary policy to prevent inflation from rising. On the other hand, a depreciation when there is a negative terms-of-trade shock requires a different response, an easing of monetary policy, as Australia did in 1997.

My view on how inflation-targeting central banks should typically respond to exchange rate fluctuations is similar to how they should respond

to changes in other asset prices, like those in the stock market.⁶ It depends. Depending on the nature of the shocks and the initial conditions, monetary policy should respond in different ways. What is key is that the central bank not be perceived as having a target for the exchange rate or for asset prices.

Does avoidance of a target for the exchange rate imply that central banks should have a benign neglect of exchange rates? This issue is particularly relevant for emerging-market countries, as is emphasized in Mishkin (2000) and Mishkin and Savastano (2000). For the reasons discussed, emerging-market countries with a lot of foreign-denominated debt may not be able to afford sharp depreciations of their currencies, which can destroy balance sheets and trigger a financial crisis. Central banks in these countries may thus have to smooth “excessive” exchange rate fluctuations but must make it clear to the public that they will not preclude the exchange rate from reaching its market-determined level over longer horizons. The stated rationale for exchange rate smoothing should be similar to that of interest rate smoothing, which is practised by most central banks, even those engaged in inflation targeting: the policy is not aimed at resisting market-determined movements in an asset price, but at mitigating potentially destabilizing effects of abrupt changes in that price.

What about the MCI? Is it a useful guideline for monetary policy? Clearly, the New Zealand experience indicates that using an MCI as a target is a very bad idea. What about using the MCI as an important piece of information to help guide monetary policy? The MCI does not stand up well on this score either, a fact increasingly recognized by the Bank of Canada, as a recent speech by Deputy Governor Freedman (2000) indicates. The MCI provides information about the stance of monetary policy for the average type of shocks hitting the exchange rate during the period over which it was constructed. If the types of shocks that occur change over time, the MCI may prove to be a faulty guide. Indeed, Freedman suggests that the weights for the Bank of Canada’s MCI were estimated over a period where portfolio shocks dominated movements in the exchange rate, while in recent years real shocks have dominated. Thus, the weights in the MCI may not be appropriate. Furthermore, central banks have plenty of information that can help them sort out what types of shocks are hitting the exchange rate. By evaluating the effect of an exchange rate change on aggregate demand and inflation on a case-by-case basis, central banks will be better able to hit the inflation target and avoid economic downturns.

6. The issue of how an inflation-targeting central bank should respond to asset-price fluctuations is indeed complex, and there are many subtleties that I do not want to explore here, because they are well beyond the scope of this paper.

The bottom line then is that the MCI is a flawed concept that would best be abandoned. It is true, however, that in a small, open economy like Canada, central bank officials must pay a lot of attention to the exchange rate and at times will need to justify their monetary policy actions to control inflation with reference to exchange rate movements. One reason for the adoption of the MCI in Canada was to be able to emphasize to the public the importance of exchange rates as part of the monetary transmission mechanism. The problems with the MCI outweigh this benefit. A better communication device for a central bank in a small, open economy is to discuss directly the importance of particular exchange rate movements to the inflation process and then outline the response needed to achieve the inflation-target goal.

Conclusions

Since inflation targeting began to be adopted by central banks in the early 1990s, it has proved to be highly successful in keeping inflation under control and in promoting high economic growth. Indeed, Canada has been a stellar example of how inflation targeting can be successfully pursued, and the Bank of Canada emerges as one of the shining lights of the story, as described in my book with Bernanke, Laubach, and Posen (Bernanke et al. 1999). But, this does not mean that inflation-targeting central banks can rest on their laurels. Inflation targeting needs to be continually refined to make it better. I hope that my discussion of several of the unresolved issues will contribute in a small way to this goal.

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