

ISSUES IN INFLATION TARGETING

by

Frederic S. Mishkin

Graduate School of Business,
Columbia University
and
National Bureau of Economic Research

Uris Hall 619
Columbia University
New York, New York 10027
Phone: 212-854-3488, Fax: 212-316-9219
E-mail: fsm3@columbia.edu

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The 1990s have seen the adoption of a new approach to the conduct of monetary policy, inflation targeting, by a growing list of countries. Canada was one of the first, formally embarking on inflation targeting in February 1991. Inflation targeting has so far been very successful in the countries that have adopted it, producing low and stable inflation without lowering output growth (and arguably helping raising economic growth). Despite its successes, there are continuing debates about the best way to implement inflation targeting. This paper will try to contribute to these debates, many of which are the focus of papers in this conference, by discussing five outstanding questions about the operational design of inflation targeting regimes: 1) Which is better, a price level or an inflation target? 2) What should be the numerical value for the inflation target in the long run? 3) What should be the horizon for the inflation target? 4) Should the target be a point target or have a range? 5) 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 highly relevant to central banks in emerging market countries that are increasingly adopting inflation targeting.

I.

Price Level Versus Inflation Target?

Currently, all countries who have adopted inflation targeting have chosen to target inflation rather than the price level. However, 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 is the subject of active research and debate.

I will put in my two cents on this issue and briefly outline how outline the usual the arguments pro and con for the two targets, but also add some arguments that have not received as much attention in the literature.

Advantages of a Price-Level Target Over an Inflation Target

There are two key advantages of a price-level target relative to an inflation target. The first is that a price-level target can reduce the uncertainty about where the price level will be over long horizons. With an inflation target, misses of the inflation target 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 nonstationary, 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 therefore lead to a decrease in economic efficiency.

Although, McCallum (1999) has argued that the amount of long-run 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 exactly this issue, when we think about saving for our children's college expenses. Knowing that a central bank that is doing its job well will keep inflation under control still leaves us quite uncomfortable about how much we will need to have to provide adequately for college tuition say fifteen years in the future.

The second possible advantage of a price-level target is that in some models (e.g., Svensson, 1999, Woodford, 1999, Ditmar and Gavin, 1999, 2000, and Vestin, 2000) it produces less output variance than an inflation target. However, the results that favor 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 (this volume) and the discussant, Jean Boivin, in this conference, I will not dwell on it here, but will say the case is not yet convincing that a price-level target will outperform an inflation target in terms of output variability.

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 the previous subsection, 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 worries me, the fact that a price-level target may lead to more frequent episodes of deflation which can engender financial instability.

In my work on financial crises (Mishkin, 1978, 1991, 1997), a key factor that is

¹This 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).

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 amount of collateral a lender can grab 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 happened 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, tends to make me more skeptical about theoretical results which indicate that price-level targets are able to reduce output variability. Indeed, price-level targets which lead to more episodes of deflation may be more dangerous than their proponents have realized.

Another problem with price-level targets that 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 in Japan recently. 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 a fallacy for the reasons outlined in Meltzer (1995) and in 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 focus on so-called Taylor rules, in which the central bank sets the short-term interest rates at a level which depends on both output and inflation gaps. The Taylor (1999) volume is an excellent example of this type of research. However, once the interest rate hits a floor of zero, all of the research on optimal monetary policy rules represented by work of the type in the Taylor (1999) 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 quite uncomfortable. Therefore, an important disadvantage of a price-level target is therefore that it makes it more likely that deflationary environments will occur in which central bankers will be more at sea

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

without the usual knowledge to guide them, making it harder for them to get monetary policy exactly right.

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 measured with error rather than the *price level* and this was the approach taken by the Boskin Commission.³ This implies that the measurement error of the in the price level is I(1) that a price-level target results in growing uncertainty about the true price level as the forecast horizon grows. Thus many of the arguments that a price-level target results in lower long-run uncertainty about the true price level may be overstated.

Bottom Line: An Inflation Target is Better

The disadvantages I have outlined above, particularly the dangers of more frequent deflationary episodes under a price-level target, make me far more comfortable with an inflation target rather than 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 because central bankers have similar concerns about the dangers of deflation.

However, the arguments I have made here for preferring 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, 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

³See Boskin et al.(1996), Moulton (1996), and Shapirio and Wilcox (1996), for example.

the Bank of Canada shows that an inflation target with a small amount of error correction can substantially reduce the uncertainty about the price level in the long run, but still generate very few episodes of deflation.⁴ 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 was adopted is how it could be explained to the public. As is emphasized in my work on inflation targeting,⁵ critical to the success of inflation targeting is that it provides a vehicle for more effective communication with the public. The public will clearly not understand the technical jargon of error correction models. However, I believe that an error correction feature of an inflation targeting regime could be fairly easily communicated by not only announcing an intermediate-term inflation target, but also 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% over the business cycle.⁶

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

⁴See King (1999) and Black, Macklem and Rose (1998).

⁵Bernanke and Mishkin (1997), Mishkin (1999a), and Bernanke, Laubach, Mishkin and Posen (1999).

⁶However, the use of the range of 2 to 3% does reduce some of the clarity of the Australian inflation target and for reasons discussed below, use of a point target of 2.5% would be preferable.

A key question for any central bank using an inflation targeting strategy is what the long-run target for inflation should be. Currently, the Bank of Canada has a midpoint of its inflation target range of 2%, but as the Bank has stressed, the 2% midpoint is not necessarily the appropriate long-run target. Indeed, there continues to be an active debate in Canada on where the long-run target should be set.

In order to decide on the appropriate long-run inflation target, we need to answer the deeper question of what does price stability mean? 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 of price stability is a reasonable one and operationally, any inflation number between 0 and 3% 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%, 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%), 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 increase the natural rate of unemployment. They argue that downward rigidity of nominal wages, 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 rate of inflation might prevent real wages from adjusting

downward in response to declining labor demand in certain industries or regions, thereby leading to increased unemployment and hindering the re-allocation of labor from declining sectors to expanding sectors.

The evidence for the Akerlof-Dickens-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, Fares and Lemieux (this volume). Also as pointed out by Goshen and Schweitzer (1996, 1999), inflation not only can put "grease" in the labor markets and allow downward shifts in real wages in response to a decline in demand along the lines of Akerlof, Dickens and Perry (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, Dickens, Perry (1996) argument to be 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 it makes it more likely that the economy will experience episodes of deflation. I have argued above that deflation can be highly dangerous because it promotes financial instability and in addition can make monetary policy decisions harder if as a result short-term interest rates hit a floor of zero. 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% above true inflation. With measurement error in Canada on estimated to be 0.5% in Canada (Crawford, Fillion and Lafleche, 1998), this suggests a reasonable long-run

target of 1.5%, not too far below the current 2% midpoint of the target range.

Another reason why central banks would be better off with a long-run inflation goal above zero, is that it is crucial that they not be perceived as being overly 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, in which the central bank puts no weight on output fluctuations in making its decisions about monetary policy, it is likely to lose the support of the public. Too low an inflation target, say 0 or even 1%, 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%.

As I have argued elsewhere, Mishkin (1999b), it is unstable for a central bank in a democracy to have a very different loss function than the public. This has been recognized by the Bank of Canada, whose officials continually stress that the Bank of Canada is concerned about output fluctuations. Indeed, Bank of Canada 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 there are negative shocks to the economy. With inflation targeting, the central bank 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.

Bottom Line: 2% Looks Pretty Reasonable

The arguments above suggest that a long-run inflation target of around 2% makes a lot of sense and this is the number that is advocated in our book on inflation targeting,

Bernanke et al (1999). A 2% number 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 CPI inflation in Canada are below the 1% 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%. However, in my view, the main gain from price stability is that it leads to predictability of inflation and so the benefits of lowering the midpoint from 2% to 1.5% 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 midpoint for its inflation target of 2% looks pretty reasonable and for the foreseeable future is probably better left unchanged.

III.

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 on the order of 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: too 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 order to try to get inflation to 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.⁷

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 inflation was likely to fall, indicating that monetary policy had not been overly expansionary. Fortunately, this view was accepted outside the Bank and the governor, Don Brash, whose performance was 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 have a faster impact on inflation than interest rates. Thus trying to achieve annual inflation targets required heavier reliance on manipulating exchange rates which led to its having large swings. By trying to hit the short-horizon target, the Reserve Bank also may have induced greater output fluctuations. For example, the Reserve Bank pursued overly tight monetary policy at the end of 1996 with the overnight cash rate going to 10% 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 their discussions of monetary policy.⁸ Furthermore, the Policy Target Agreement between the central bank

⁷As 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.

⁸See Sherwin (1999) and Drew and Orr (1999).

and the government has recently been amended to be more flexible in order to support the longer policy horizon.⁹

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 for periods two years ahead. This automatically implies 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 might need to be accommodated in order to keep output fluctuations from getting excessive. 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 needs to 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 of 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 the lags in the effects of monetary policy. However, once inflation fell to around the 2% level, the inflation target range for each year has remained unchanged at 1 to 3%.

⁹See Reserve Bank of New Zealand (2000).

Thus the reality that monetary policy has to target on horizons longer than one year is no longer clear cut. Hence, even though the multi-year target may not be changing, there is a need to explain to the public that the target set today is in actuality for a target 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 for monetary policy to be appropriately preemptive.

IV.

Point Target or Range?

Inflation targeters have made different choices on whether 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 is that it provides more explicit flexibility to the targeting regime and also conveys to the public the important message that there is uncertainty in the inflation process and so the central bank's ability to control inflation will necessarily be imperfect.

However, the use of a range has several drawbacks. 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 about its ability to hit the inflation target. Unfortunately, estimates of the irreducible uncertainty around an inflation target are on the order of five percentage points,¹⁰ although over time, success with inflation targeting might decrease

¹⁰See for example, Haldane and Salmon (1995) and Stevens and Debelle (1995).

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 the central bank's 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 target 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 even though 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%. 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 at the time 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 indication that it was an attempt to improve the functioning of the system. Only the continued communication by the Reserve Bank with the public that this was not the case has prevented this undesirable outcome 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 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 lead to

losses of credibility. Indeed this has been true, but it is important to recognize that we in industrialized countries may have been extremely lucky in recent years, with supply shocks generally being favorable and demand shocks coming at auspicious times which helped keep inflation near the target levels. Counting on always being lucky is a mistake and may come back to haunt inflation targeting countries with narrow ranges in the future.

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%. Furthermore, target misses are potentially more damaging to credibility in emerging market countries because the esteem which government institutions are held in these countries is far weaker 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 which 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 been 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 for tightening of

monetary policy by the Bank of England.

The problem with too much focus on the edges of the range is that it 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 policymakers that would justify such asymmetric reactions to inflation rates just inside and outside the bands.

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 the ability of the central bank 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 the control of inflation, rather than leaving those uncertainties to be inferred from the target range. Eventually the Bank of England 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 1 percentage point away from the inflation target. This requirement is subtly different than a range because it

puts the appropriate focus on the point target rather than 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 amount of flexibility for monetary policy.

V.

Role of the Exchange Rate?

There is no question that central banks' care about the 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 gets far away from par with the U.S. dollar. An appreciation of the Canadian dollar can make Canadian business uncompetitive with those in the U.S., while a depreciation of the currency makes Canadians feel poorer relative to their southern neighbors. 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, the Canadian public may see this as a failure of their economy vis a vis the U.S. 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 at times 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 currency depreciates, this increases the debt burden of domestic firms increases. Since assets are typically denominated in domestic currency and so do not increase in value, there is a resulting decline in net worth. This deterioration in balance sheets then increases adverse selection and moral hazard problems, which leads 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 Asian in 1997 pushed these countries into full-fledged financial crises which had 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. Even though 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 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 was mentioned earlier, 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, this usually leads to higher inflation in the future, 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. The correct interest rate response is then a decline in interest

rates, not a rise as the MCI suggests.

With the negative terms of trade shock in 1997, the adoption of the MCI in 1997 led to exactly the wrong monetary policy response to 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% by June of 1998. Because the depreciation was due to a substantial, negative terms of trade shock which 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 1999.¹¹ The Reserve Bank of New Zealand did eventually realize 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 with using an MCI as an indicator of monetary policy and abandoned it in 1999. Now the Reserve Bank 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 which 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

¹¹The 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).

face of the financial turmoil if it allowed the exchange rate to depreciate after what had taken place in financial markets after 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% at an annual rate for the interbank 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 central bank did reverse 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 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 conducted with the Asian region and that it should not fight the depreciation of the Australian dollar that would inevitably result.¹² Thus in contrast to New Zealand, it immediately lowered the overnight cash rate by 50 basis points to 5% and kept it near at this level until the end of

¹²See McFarlane (1999) and Stevens (1999).

1998, when it was lowered again by another 25 basis 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 in order 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 favorable. 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%: inflation remained under control, actually falling during this period to end up slightly under the target range of 2 to 3%.

Bottom Line: Keep Your Eye on the Inflation (Not the Exchange Rate) Ball

The analysis above and the recent experiences of countries like New Zealand, Chile 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 to its decisions on setting monetary

policy instruments. A depreciation of the exchange rate due to portfolio shocks like terms of trade shocks requires a tightening of monetary policy in order to keep 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 it should respond to changes in other asset prices, like those in the stock market.¹³ 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 asset prices.

Does the 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 earlier, 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 practiced by most central banks, even those engaged in inflation targeting: the policy is

¹³The issue of how an inflation-targeting central bank should respond to asset price fluctuations is indeed a complex one and there are many subtleties that I do not want to go into here because it is well beyond the scope of this paper.

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 this 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 and this has been 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 type of shocks which occur changes over time, then the MCI may prove to be a faulty guide. Indeed, Freedman (2000) 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, it has been real shocks that dominate. Thus the weights in the MCI may not be appropriate. Furthermore, central banks have plenty of information which can help them sort out what type of shocks are hitting the exchange rate. Evaluating what the effect of an exchange rate change will be 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.

The bottom line is then that the MCI is a poor concept that would best be abandoned. However, it is true 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 is for a central bank in a small, open economy to discuss directly the importance of particular exchange rate movements to the inflation process, and then outline the appropriate response to achieve the inflation target goal.

VI.

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 promoting high economic growth. Indeed, Canada has been a shining example of how inflation targeting can be successfully pursued, and the Bank of Canada comes out as one of the heroes of the story in my book with Bernanke, Laubach and Posen (Bernanke et al, 1999). However, 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. Hopefully, my discussion of several of the unresolved issues in inflation targeting will contribute in a small way to this goal.

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