Inflation Targeting 7

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The inflation-targeting framework is an operational regime intended to enhance the performance of monetary policy. Price stability is the primary goal of monetary policy, and the central bank has discretion for determining how monetary goals are attained and is accountable for achieving those goals. The inflation-targeting framework was initially adopted to resolve conflicts among competing monetary policy objectives. Many countries adopted the framework to address problems experienced with previous monetary regimes, such as those that used exchange rate pegs or monetary aggregates as the intermediate target. In a few countries, inflation targeting was used where earlier inflation-stabilization efforts consisting of heterodox programs[1] and crawling exchange rate bands had conflicted with efforts to maintain the official exchange rate regime and to control inflation. The inflation-targeting framework avoids these conflicts by serving as a clear statement that inflation fighting is the primary goal of monetary policy. The central bank is given the freedom to conduct monetary policy independently of the influence of political cycles, thus making it accountable for its success in achieving monetary goals.

This chapter begins with a general overview of issues associated with designing monetary policy rules. It then assesses the rationale for and the theory of inflation targeting, including some prerequisites for adopting an inflation-targeting framework and the operational steps involved in implementing inflation targeting. The chapter also examines how the accountability and transparency of the central bank are critical to successful inflation-targeting frameworks. It also considers how the framework, which has been applied largely by advanced economies, may be applied in developing economies, as well as how using inflation targeting in IMF programs would be meaningful for developing and transition economies. Finally, the chapter examines three countries—Israel, New Zealand, and the United Kingdom—that

[1]Inflation-stabilization programs that used an exchange rate anchor and fiscal consolidation concurrently with wage and price controls.

have recently and successfully adopted an inflation-targeting framework to lower the rate of inflation.

Monetary Policy Rules

The discussion of monetary policy rules has often been characterized as a debate over "rules versus discretion." A rule represents the period-by-period implementation of a preselected formula that is generally considered to reflect monetary conditions. In contrast, discretion connotes the period-by-period reoptimization of policy actions by the monetary authority. By this definition,[2] inflation targeting is a rule: in each period, a formula is reevaluated and policy adjusted to achieve the targeted inflation rates. Although most monetary policy rules pursue low inflation as their ultimate objective, an inflation-targeting framework is distinguished by the fact that the forecast of the future inflation rate is also the intermediate target.

However, this characterization of inflation targeting as a monetary policy rule is not universally accepted. Some discussion in the literature holds to the view that a rule implies a fixed rate of money growth or a fixed exchange rate. Another view, held by Bernanke and Mishkin (1997), holds that classifying the inflation-targeting framework as a rule is incorrect when viewed in the context of how it is implemented by central banks. This view argues that inflation targeting should instead be considered a policy of "constrained discretion." The first argument is a technical one, suggesting that inflation targeting is not a policy rule because it does not provide simple and mechanical operational instructions to the central bank. The inflation-targeting framework entails using structural and judgmental modeling in conjunction with other relevant economic variables in formulating policy and does not represent a rigid rule. The second argument is that the inflation-targeting framework contains a significant amount of policy discretion, particularly for dealing with economic developments in the short run. In this view, that the inflation-targeting framework both enhances communication between policymakers and the public and introduces greater accountability for monetary policy further bolsters the advantages of using the approach.

In setting monetary policy, the monetary authority must establish a framework that defines the goals, targets, instruments, and macroeconomic model of policy. The goals (or ultimate targets) are the para-

[2]The definitions are taken from McCallum (1997).

mount objectives of the monetary authority (and the government) and include such variables as high long-run per capita growth, a low unemployment rate, and price stability. Intermediate targets are operational variables through which the central bank aims to achieve these goals more precisely. The choice of the intermediate target is widely debated among economists, but potential variables include the exchange rate, a particular inflation rate, the rate of growth in money or credit, and nominal income. Instruments of monetary control are variables that the central bank actually regulates in order to reach the targets: for example, open market operations, the discount rate, and reserve requirements. The operating target on which the instrument acts is usually either a monetary base–type or short-term instrument. Central banks have almost unanimously opted for some type of short-term interest rate in the inflation-targeting framework.[3]

The decision to announce a monetary target or an inflation target in the context of policy rules implies a choice by policymakers in the form of a trade-off between controllability and visibility. Cukierman (1995) notes that the primary advantage of a central bank policy to announce a monetary target is that the rate of growth in the monetary base is "fully controllable" by the central bank. Unfortunately, movements in the monetary base affect the inflation rate with long and uncertain lags. Furthermore, although some economic agents may monitor movements in the base and are aware of its influence on prices, most pay little attention to announcements about the monetary base, and thus it has little impact on their inflationary expectations. The motive for making a policy target announcement is distinctly to influence inflationary expectations, yet the segment of the population affected by such an announcement may be rather small. Thus the impact of an announcement of a monetary target on inflationary expectations may be slight. Conversely, an inflation target is more visible to the general public, since most people easily recognize the significance of the inflation rate. The disadvantage is that the inflation rate is not completely controllable by the central bank. In addition, the central bank may miss the inflation target, not through some fault of its own

[3]Freedman (1994) discusses the Bank of Canada's move from a short-term interest rate as the operational target of monetary policy to a monetary conditions index (MCI). The MCI, a combination of the short-term interest rate and the exchange rate, measures the extent to which monetary conditions have been loosened or tightened from some given date. The MCI was developed to incorporate the influence of both variables in the transmission mechanism of monetary policy.

but because of some exogenous factor beyond its control. As a result, the public may discount the significance of an inflation target more readily.

Thus the question is, Which nominal variable should be targeted to obtain the maximum impact on inflationary expectations? Cukierman found that the relative benefit of a base target increases with its visibility to the public.[4] However, the advantage of an inflation target increases under several scenarios: (1) when the reputation of the central bank is credible; (2) when policy has greater control over the inflation rate; and (3) when inflation is high, the reputation of the central bank and its ability to control inflation are weak, and the gains from surprise inflation are great. In the last case, a base target is likely to be less visible during periods of high inflation, which favors adopting an inflation target. Another situation favoring the use of inflation targeting is when money demand is unstable, and hence difficult to estimate—this has been a major reason why many central banks have moved to an inflation-targeting framework. Similarly, the adoption of exchange rate targets was useful at the outset of many inflation stabilization programs, but the targets were often abandoned because of the central banks' desire for greater autonomy over monetary policy, as well as problems stemming from speculative attacks on the currency. In any event, experience has shown that when the central bank educates the public about the link between money and inflation, monetary policy has a greater impact on inflationary expectations.

Conceptual Issues Underlying Inflation Targeting

The inflation-targeting framework is premised on the view that the primary goal of monetary policy should be to achieve a low and stable inflation rate. This view yields the framework's two basic characteristics: an explicit quantitative target for inflation, and the absence of an explicit intermediate target for monetary policy. The argument underlying an inflation-targeting policy is based on the following propositions:

- that an increase in the money supply is neutral with regard to output and employment in the medium and the long run and has permanent effects only on the price level;
- that money is not neutral in the short run but has a significant transitory impact on real variables;

[4]Cukierman (1995) provides more technical discussion of these results.

- that inflation is costly in terms of both resource allocation and long-run growth (this proposition stems from the view that the most appropriate monetary policy for ensuring the overall economic health and growth of the economy is one that provides a stable, low-inflation environment; an inflation-targeting framework can help to stabilize output because, given the Phillips curve, output variations result in inflation variations—thus, controlling the latter necessitates preventing the former); and
- that the ability of the central bank to control inflation on a period-by-period basis is frustrated by the uncertain impact of monetary policy and the delay with which monetary policy influences inflation.

Some proponents have argued that the inflationary bias of a discretionary monetary policy regime also justifies using an inflation target. That is, the (often politically motivated) temptation to exploit monetary policy for short-run employment gains usually results in a higher-than-optimal rate of inflation. According to Fischer (1994), two primary explanations for an inflationary bias endure under close scrutiny. The first, and more obvious, is seigniorage revenue. One can take this a step further and expand the inflation tax component of seigniorage to include the government's proceeds from nonindexation of tax brackets and from the devaluation of nominal government debt (under conditions of unanticipated inflation). Then the inflation tax provides an even stronger argument for the presence of an inflationary bias. The second explanation is dynamic inconsistency, defined as the inconsistency between optimal policies that the authorities would announce if they enjoyed public credibility, and policies that the authorities would carry out once the public had acted on those expectations (Fischer, 1994, p. 287).

An example of dynamic inconsistency would be the following: Suppose the government announces a policy to fight inflation. If the private sector reacts by incorporating a lower expected rate of inflation into its wage and price contracts, the government will be tempted to increase output by inducing a surprise bout of inflation. An inflation-targeting framework avoids this discretionary bias by clearly establishing that inflation is the primary objective of monetary policy and by providing prespecified and forward-looking guidelines from which to make preemptive corrections to changes in inflationary conditions. Similarly, one of the arguments for an independent central bank is to remove the ability to impose an inflation tax from the powers of the fis-

cal authorities. Thus, under all of these circumstances, an inflation-targeting framework may be the best way to achieve and maintain a low rate of inflation.

Most countries that adopt inflation targeting have had a poor record of controlling inflation. Canada and New Zealand, for example, experienced relatively high inflation before they targeted inflation. Countries with poor track records often adopt inflation targets to enhance the credibility of monetary policy and to help establish an inflation-fighting track record by increasing the accountability of the central bank for achieving its targets. Another motivation for adopting inflation targeting stems from problems with money demand. For example, the changing characteristics of the financial system in the United Kingdom created instability in the demand for money, complicating decisions about which money supply growth rate should be targeted. In contrast, countries that have been viewed as credible inflation fighters, such as Germany, Japan, and the United States, have maintained relatively low levels of inflation over long periods without resorting to an explicit inflation-targeting framework.

Consequently, inflation targets serve several roles. First, they give the market an anchor or coordinating device to formulate inflationary expectations in setting wages and prices. Second, they serve as a transparent guide to the operational conduct of monetary policy. (Because inflation is the main objective of monetary policy, the public can respond to changes in macroeconomic variables with the foreknowledge that changes in other variables will be of secondary priority.) Third, they provide a measure against which the central bank can be held accountable.

Requirements for Implementing Inflation Targeting

From an analysis of advanced economies that have implemented inflation targets, Masson, Savastano, and Sharma (1997) have identified two conditions crucial to the inflation-targeting framework. First, a central bank should be able to conduct monetary policy with a fair degree of independence. Independence in achieving policy goals allows central banks to formulate monetary policy separately from other financial policies. In this vein, significant symptoms of fiscal dominance should not prevail—that is, fiscal requirements should not seriously constrain the conduct of domestic monetary policy. This element is crucial, because fiscal dominance can inhibit the effectiveness of monetary policy in attaining an inflation target if monetary policy becomes sub-

ordinated to the need to monetize the deficit. In general terms, low fiscal dominance implies that:

- direct borrowing by the public sector from the central bank will be low or nonexistent;
- the country will have a broad revenue base;
- the government will not depend systematically on revenue from seigniorage;
- domestic markets will be deep enough to absorb placements of public debt; and
- the accumulation of public debt will not lead to explosive or unpleasant dynamics (Sargent and Wallace, 1985).

Second, the authorities should be committed to targeting the inflation rate to the exclusion of other variables such as wages and the nominal exchange rate. Semifixed exchange rate regimes such as crawling pegs or target zones can coexist with an inflation target so long as there is a clear understanding that the inflation target takes precedence in case of conflict.

If these two conditions are satisfied, an inflation-targeting regime can be implemented—if, in addition to using an explicit quantitative target and ensuring that the inflation target is the overriding objective of monetary policy, a country has both a methodology for constructing inflation forecasts that captures a variety of variables and indicators for future inflation, and a forward-looking operating approach by which policy instruments are set according to an evaluation of inflationary pressures and in which the inflation forecasts are the main intermediate target. These requirements presume not only that the central bank has the technical capacity to model inflation forecasts, but also that it has insight into the relationships between macroeconomic variables and the time frame within which monetary policy stimuli influence inflation.

Operational Steps in the Inflation-Targeting Framework

Implementing an inflation-targeting framework consists of three steps. First, the central bank forecasts the future path of inflation. Second, it compares the forecast with the targeted inflation rate. Third, it calculates the difference between these two rates to determine how the monetary policy instrument should be adjusted. As noted by Masson, Savastano, and Sharma (1997), it is the specification of policy instruments based on a systematic evaluation of forecast inflation, rather than on past or current inflation, that distinguishes the inflation-

targeting framework. This aspect of inflation targeting deals with one of the basic problems of monetary policy: the imperfect control that central banks have over the current rate of inflation. Thus the measure of the expected rate of inflation j periods into the future, conditional on information available at time t, ${}_t\pi^e_{t+j}$, constitutes *the main intermediate target* of monetary policy under inflation targeting.

Operationally, the authorities will try to maintain the difference between expected inflation and targeted inflation—that is, between ${}_t\pi^e_{t+j}$ and π^*_{t+j}—within a set target band. An example of a simple schematic feedback (or, more exactly, feed-forward) rule[5] is

$$\Delta i_t = \gamma({}_t\pi^e_{t+j} - \pi^*_{t+j}),$$

where i_t represents the policy instrument used by the central bank, and the information set underlying the estimation of future inflation includes not only structural variables but also discretionary variables, such as market surveys of inflationary expectations and the judgment of central bank staff.

Note that, in this representation, the sign of γ will depend on which instrument is chosen: if i_t is a price-related variable, such as the repurchase rate, then $\gamma > 0$; if i_t is a monetary aggregate, then $\gamma < 0$. If at any point the discrepancy between ${}_t\pi^e_{t+j}$ and π^*_{t+j} is zero or negative, the authorities will have a signal that the inflation target is attainable under the prevailing path and that a policy change is unnecessary. Conversely, if the difference is a positive number, and thus expected inflation exceeds the target, the discrepancy indicates that the inflation target is not likely to be achieved in the next period. Consequently, under ordinary circumstances, the central bank will adjust the policy stance and change the policy instrument until it eliminates the discrepancy between the updated inflation forecast and the inflation target.

Nevertheless, this simple adjustment mechanism comes with a caveat: some countries seriously heed the lower limit of the band and do not want to reduce inflation too rapidly. For example in 1991, the German Bundesbank faced rising inflation, but instead of sharply tightening monetary policy, it reduced inflation gradually (Fischer, 1994). Similarly, the Bank of Canada has stated explicitly that if inflation moves away from its target (for example, in response to a shock), it will seek to return inflation to the center of the band over a six- to eight-quarter horizon (Freedman, 1996). Discussions in the literature have recognized the issues pertaining to the speed of disinflation and

[5]Haldane (1996) provides this representation and terminology.

its consequences for short-run output. In particular, agents' flawed expectations about inflation adjustment are considered a key reason for making disinflation costly. In this case, reducing the output costs of disinflation implies targeting a reasonable inflation rate so that agents are able to adjust their expectations accordingly. Conversely, if the path of disinflation is too moderate, the central bank may be perceived as "soft," and its inflation policy will be less credible, and disinflation more costly. Thus, the central bank must weigh its alternatives in determining the speed of adjustment toward the inflation target.

Main Issues in Inflation Targeting

Interaction Between the Inflation Target and Other Policy Goals

Because the primary objective of monetary policy under inflation targeting is to achieve the desired inflation rate, other goals are pursued insofar as they fit within the framework of the inflation target.[6] For example, a fixed exchange rate regime is not consistent with an inflation target, because changes in the money supply to support a fixed exchange rate may adversely influence the path of inflation. Conversely, low and stable rates of inflation should largely enhance financial sector stability. Similarly, it has been argued that achieving full employment may best be supported with a monetary policy that achieves a low-inflation environment. Given the long-run benefits of full employment, the cost may be a short-run trade-off between price and output stability, as discussed earlier. For example, an adverse supply shock would require that monetary policy be tightened so that the inflation target can be maintained, at the cost of a further reduction in output. Consequently, inflation-targeting frameworks sometimes specify caveats for accommodating certain types of shocks, such as changes in indirect taxes, the terms of trade, or price shocks stemming from natural disasters.

It should also be recognized that fiscal and monetary policies often conflict. A large public debt stock foments the expectation of future inflation, thus making it more difficult to control current inflation. Similarly, when the government's fiscal policy involves a large tax cut, the central bank may find it necessary to maintain a tight monetary policy for a longer period of time than it would in the absence of such a cut.

[6]This section draws on Debelle (1997).

Assigning the Target

The process of assigning the target—the target level, the policies and methods for attaining the target, and so forth—is often related to the degree of central bank independence. Debelle and Fischer (1994) have argued that the trade-off should be between *goal dependence* for the central bank (the inflation goal is assigned by the government or by charter) and *instrument independence* (the central bank is free to conduct monetary policy as it wishes in pursuing the inflation goal). The argument in favor of central bank independence is supported by Fischer (1994) on the basis of evidence from a sample of industrial countries that a significant negative relationship exists between the rate of inflation and the degree of central bank independence.[7] He then extends this analysis, showing that the two variables most closely related to inflation performance are, first, the existence of a statutory requirement that the monetary authority pursue monetary stability (goal dependence), and second, and more significant, the central bank's ability to use its instruments unchecked (instrument independence), as represented by measures of the monetary authority's right not to finance the deficit and to determine the discount rate.

Nevertheless, government intervention in setting the target is necessary because it strengthens the government's commitment to a low-inflation environment. Without the endorsement of the government, unilateral announcement of an inflation target by the central bank may lack credibility and reduce the effectiveness of the strategy. In practice, however, the division of responsibilities between the monetary authority and the government has generally differed across countries (Table 7.1).

Defining the Inflation Target

The time horizon for the inflation-targeting framework often depends on the country's inflation rate at the outset of the program. In practice, where the initial inflation rate has differed from the desired rate, the implementation period has traditionally taken about two years. However, if the inflation rate is already low, the target has been adopted immediately and for an indefinite period. In addition, the level of the target, which reflects the authorities' concept of price sta-

[7]The measure of central bank independence is based on an index of different legal provisions, which include the process for appointments, the relationship with the government, the constitution, monetary financing of the budget deficit, and monetary instruments.

Table 7.1. Summary of Inflation Targeting Frameworks

	New Zealand	Canada	United Kingdom	Sweden	Finland	Australia	Spain
Date first instituted	March 1990	February 1991	October 1992	January 1993	February 1993	Aprox. April 1993	Summer 1994
Current target	0–3%	1–3%	1–4%	2%	2%	2–3%	Less than 3%
Time frame	5 years (to 1998)	Through end-1998	By spring 1997; 2.5% or less thereafter	1996 onwards	1996 onwards	On average over the cycle	By late 1997; less than 2% thereafter
Inflation measure	Underlying CPI	CPI	Retail price index excl. mortgage interest payments (RPIX)	CPI	Underlying CPI	Underlying CPI	CPI
Factors excluded from CPI	Interest cost component, indirect taxes, government charges, and significant changes in terms of trade	None; underlying inflation rate used operationally	Mortgage interest payments	None	Mortgage interest payments, indirect taxes, government subsidies, housing, and prices	Mortgage interest payments, indirect taxes, and other volatile items	None
Target announcement	Defined in policy target agreement (PTA) between the minister of finance and the governor of the central bank	Joint agreement between the minister of finance and the governor of the central bank	Chancellor of the Exchequer	Bank of Sweden (Riksbank)	Bank of Finland	Reserve Bank of Australia	Bank of Spain
Inflation report	Quarterly since March 1990	Half-yearly since May 1995	Quarterly since February 1993	Quarterly since October 1993	No	No	Semiannual
Inflation forecasts published?	Yes	No	Yes	No	No	No	No

Source: Debelle (1997).
Note: The New Zealand inflation target bandwidth was widened from 0–2 percent in December 1996; the central bank has since defined the price index it targets, only excluding credit services from the headline index.

bility, must be determined. Although a zero rate of inflation would seem to be the definition of true price stability, inflation rate targets in practice have usually centered around 2 percent annually. A zero inflation target has been avoided for several reasons. First, measurement rigidities (changes in the definition of the consumption bundle, quality biases, and so forth) are associated with calculating the price index. Second, because of downward rigidity in prices and wages, a small positive rate of inflation allows for some room in relative price adjustments. Third, since nominal rates are bounded from below by zero, an inflation rate of zero would mean that the central bank is no longer able to drive real interest rates into the negative range, which may be necessary to move the economy out of a recession. Fourth, choosing a target in the range of 2 to 3 percent avoids the costly recessionary effects generated by a further reduction in inflation to zero.

Choosing the Price Index

In practice, the price index used in inflation targeting has usually been the consumer price index (CPI) rather than the GDP deflator. In general, the CPI is the index most familiar to the public; however, while the public is familiar with the "headline," or published CPI, the inflation target in the program usually focuses on the underlying (or core) rate of inflation. Core inflation reflects the basic change in the overall price level, abstracting from unusual, one-time increases precipitated by such events as increases in administered prices or discrete devaluations of the currency. For example, core inflation excludes the first-round impact of certain shocks (which are accommodated by monetary policy) but does not exclude the second round of effects that are channeled to prices and wages (Debelle, 1997). Within the inflation-targeting framework, the primary difference between the headline CPI and the core inflation rate is that the latter excludes the impact of mortgage payments. Consequently, the central bank's efforts to tighten monetary policy and increase interest rates in an effort to achieve the inflation target will not be channeled to the core inflation rate through higher mortgage lending rates. Additional components omitted from the headline CPI are certain supply shocks and changes in indirect taxes.

Choosing the Width of the Target Band

Countries adopting inflation targeting have opted for either a range (or band) for the inflation target (as in Canada, New Zealand, Sweden,

and the United Kingdom), a point target for the inflation rate (as in Australia and Finland), or a ceiling for inflation (as in Spain).

Bands are chosen for various reasons: the need to maintain some flexibility in responding to shocks, imperfect ability to control the money supply, differing views about the feasible level of variation in inflation; and the strength with which the authorities want their commitment to reducing inflation to be viewed by the public. With respect to the public's perception, two types of bands can be considered. First, a tight or "hard-edged" band can be adopted, which places emphasis on the short-run accountability of the central bank in achieving the inflation target but at the risk of occasionally violating the band. Second, a wide or "soft-edged" band can be adopted, giving the central bank greater short-run flexibility (and thus accountability) in a medium-term outlook, but at the risk of being interpreted as soft on inflation. Thus, when credibility is a desired goal of the central bank, the public may interpret a tight band as a stronger commitment to reducing inflation.

Accountability

A central bank should be held accountable in two respects: it should be accountable for achieving the inflation target, and it should be accountable for its policies and actions. Although an inflation target for achieving the first measure of accountability defines a clear and easily identifiable benchmark against which to measure the performance of the central bank, it may be difficult to determine whether any deviation from the target was due to policymakers' error or to exogenous shocks outside the control of the central bank. Consequently, if the goal is to increase the effectiveness of the inflation program, the central bank should stress the transparency of its actions. This, in turn, leads to the second concept of accountability.

Policy changes and the reasons for these changes should be announced to the public. The more informed the public, the more readily it can adapt its inflationary expectations to changes in the economic environment, and so assist in shortening the lag with which monetary policy takes effect. Measures to increase accountability and transparency have taken a variety of forms, including regular testimony by central bank officials before parliament on achieving the monetary policy goals, and the publication of annual and quarterly reports explaining the methodologies, assumptions, and guidelines for the central bank's inflation-targeting framework. New Zealand laid the ground-

work for many of the basic standards, including accountability requirements, that other countries have since used to design their inflation-targeting frameworks (see Table 7.1).

Applicability of Inflation Targeting to Developing Economies

The countries that have adopted an inflation-targeting framework have largely been advanced economies. The question therefore arises about aspects of the inflation-targeting framework that are consistent with its use by developing economies. As noted earlier, an independent monetary policy has two primary requirements: a low degree of fiscal dominance (and, closely related, a high degree of central bank independence), and a commitment to the inflation rate as the primary objective of monetary policy. Masson, Savastano, and Sharma (1997) found two extreme cases in which an inflation-targeting framework can be easily ruled out as an option. One consists of countries that display high and chronic inflation, and that consequently often display accommodative monetary policy. The other consists of economies that peg the nominal exchange rate to a major trading partner or are members of a currency union. However, the majority of developing economies are more difficult to evaluate.

In general, Masson, Savastano, and Sharma found that developing economies tend to experience three problems in adopting inflation targeting. The first is fiscal dominance, as reflected in a reliance on seigniorage. A variety of factors precipitate recourse to seigniorage for revenue, including poor tax collection and administration, concentrated and variable revenue sources, and an uneven income distribution. More important, such economies often resort to seigniorage during fiscal crises, rather than issuing debt or reducing expenditure. Research has shown an inverse relationship between the degree of central bank independence and reliance on seigniorage (Cukierman, 1992). The second problem is shallow capital markets, often stemming from a country's inability to access international capital markets or from small domestic financial markets, both of which constrain the government's ability to issue debt to finance budgetary needs. The third is a fragile banking system, often because of a history of financial repression.

Developing economies may also suffer from more technical problems that make it difficult to implement an inflation target. One is the absence of a robust analytical framework for forecasting inflation and

analyzing the impact of monetary policy. The difficulty of obtaining accurate inflation forecasts is exacerbated by the lack of stable macroeconomic relationships and insufficient knowledge of the links between the instruments available to the central bank and the targets of monetary policy. In addition, the inflation target to be chosen and the speed with which it should be achieved are controversial issues in many developing countries. Even choosing the price index to be used is complicated by the fact that supply shocks are often a significant factor in influencing inflation, and by the fact that administered prices comprise a significant portion of price indices.

Using Inflation Targeting in IMF Programs

In general, the idea of using inflation targeting in IMF programs would be meaningful for developing and transition economies.[8] Consequently, the criteria given above for assessing whether inflation targeting is applicable to developing economies would apply here. It is also assumed that the country applying for IMF resources is capable of instituting an inflation-targeting framework. Furthermore, it is understood that this framework will be in line with the IMF's policy of minimal interference in a country's preferences and, assuming that balance of payments need is still the criterion for use of IMF resources, that the country has an actual or potential balance of payments need.

With these points in mind, Savastano (1997) suggests that four issues be considered when incorporating an inflation-targeting framework into an IMF program. First, the IMF's approach to monetary policy, based on the monetary approach to the balance of payments, would have to be revised. As Savastano notes, the approach to monetary policy in a typical IMF financial arrangements resembles a monetary regime based on relatively simple rules, with no systematic feedback from other variables and allowing a considerable degree of discretion. Thus, it differs markedly from inflation targeting, with its ultimate targeting, continuous feedback to instruments, and policy mode of "constrained discretion" (Savastano, 1997, page 4). Consequently, introducing inflation targeting into a financial program would require abandoning the assumption of stability of money demand and the use

[8]The choice of using inflation targets versus traditional IMF practices might depend on the economic situation of the country. For example, a country with high inflation and other significant macroeconomic problems should follow the current IMF approach, since forecasting inflation during stabilization may be quite difficult. However, after stabilization is achieved, adopting inflation targets should be recommended.

of net domestic assets as the primary intermediate target for monetary policy. Rather, an estimate of the inflation-determination process for that country would be used to introduce a forward-looking procedure that would rely on a broader array of variables.

Second, choosing performance criteria is complicated by the difficulty of finding variables that are both controlled by the authorities and linked explicitly to the inflation target. Using the actual rate of inflation can be ruled out, since it is not controllable. The principle of controllability has been at the heart of the IMF's choice of performance criteria and explains why measures of domestic credit are used rather than broader monetary aggregates or the rate of inflation. In an inflation-targeting framework, the monetary performance criteria would be linked to the program's inflation target. Thus, the IMF's current financial programs might differ from a financial program embodying inflation targeting.

For example, in a traditional monetary program with little feedback from other variables, a performance criterion applied to net domestic assets would be set consistent with the inflation rate assumed for the program period, as well as with decisions about velocity, reserve targets, and other goals within the program—all of which are usually set for a one-year period. Under an inflation-targeting framework, the expected inflation rate and its relation to the original target would have to be reassessed periodically, thus requiring continuous revision of the feedback rule. Consequently, because performance criteria must be integrated explicitly with the inflation target, the time path for net domestic assets would have to be adjusted several times during the course of the program. That is, the ability to monitor performance criteria—in this case, net domestic assets—would now have to be contingent on a periodic reevaluation of the difference between inflation forecasts and the inflation target of the program.

Third, the manner in which programs are formulated must be modified. IMF staff and the national authorities must agree not only on the inflation target, but also on the model and other information variables used to produce inflation forecasts. In addition, they must ensure that the inflation target and estimates of relevant baseline variables are compatible with the other program goals.

Fourth, the IMF would also need to adopt new procedures for monitoring IMF arrangements. First, since performance criteria would now have to be linked to the inflation target, they could potentially include the staff's forecast of the inflation rate, the difference between the forecasts and the inflation target, or the path of some information

variable, which is updated in line with the inflation forecast. Second, the practice of setting prespecified test dates would no longer be applicable, because the policy instruments would have to be changed frequently and at uncertain times so that the inflation forecasts could be kept in line with the target. Third, it would similarly be difficult to link the test dates—and thus the phasing of disbursements—with the periodic updates of the inflation forecasts. Synchronizing the test dates of the program with the revisions of the inflation forecast would require greater flexibility in the timing of the test dates and would likely increase their number. Fourth, the direction of program reviews would have to change from an evaluation of past performance, which has been the traditional approach, to a more forward-looking assessment of whether the monetary policy stance is consistent with the inflation target. Fifth, so long as measures have been adopted to update the current monetary policy stance to conform with expected inflation, and flexibility has been built into the timing of disbursements, interruptions in a country's access to IMF resources would be less likely.

Case Studies

New Zealand, 1989

New Zealand introduced inflation targeting to support its disinflationary process, which, given the country's poor record of fighting inflation in the previous 30 years, had little credibility. Because the overriding objective of monetary policy under an inflation target is to reduce inflation, New Zealand adopted this approach to improve the credibility of the central bank's monetary policy.

In New Zealand, the inflation target is assigned under a joint agreement between the minister of finance and the governor of the Reserve Bank of New Zealand (RBNZ). The RBNZ Act requires that the minister and the governor sign a Policy Target Agreement (PTA) that defines the framework for attaining price stability. The agreement lasts for the term of the governor; the principal performance criterion of the governor's employment contract is achieving the target.

The inflation-targeting framework defined by New Zealand set the foundation for inflation programs adopted later by other countries. Starting from an annual rate of inflation of around 7 percent in 1989, the initial PTA announcement in early 1990 specified an inflation rate of 0 to 2 percent by 1992. The disinflationary path in New Zealand was

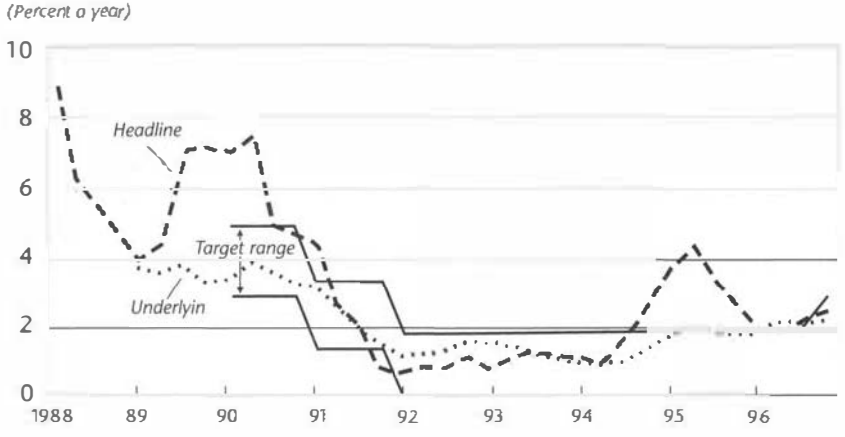
thus relatively gradual: it allowed about 18 months for achieving the initial target and called for step reductions in inflation at 12-month intervals thereafter. By 1992 the inflation rate had dropped within the targeted range. After inflation reached the desired level, inflation targets were set for five-year periods (corresponding to the length of the governor's employment contract), and inflation was to remain within the band during the period. The inflation rate initially chosen was based on the CPI, measured in terms of the underlying, or core, rate of inflation. This core rate excluded specific supply shocks: changes in mortgage interest rates, price changes caused by natural disasters, changes in indirect taxes and other government-set prices, and the first-round impact of major changes in import and export prices. However, the RBNZ has since adjusted the inflation rate it targets, focusing on a broader definition of the price index that more accurately captures core inflation. The new price index is calculated by excluding only credit services from the headline index. The width of the band started at 2 percentage points (and was later widened to 3), with emphasis on targeting the center of the band.

Several mechanisms helped ensure strict accountability: regular testimony before parliament; six-month reports that discussed performance in the previous six months and the strategy for the next six months; quarterly reports on inflation progress; and, most important (and unlike the practice of many other countries), publication of the central banks' inflation forecasting and monetary framework in semiannual monetary policy statements and economic forecasts. These forecasts specify the possible risks foreseen by the RBNZ and its expected response.

New Zealand provides perhaps one of the best examples of transparency in the extreme. Because both the methodology and projections for inflation and other macroeconomic variables are published, most remedial adjustments are enacted not by the central bank but by the markets. Market forces are critical to inducing exchange rates and interest rates (both forward-looking) to adjust upon release of the RBNZ's inflation forecast, so that monetary conditions move to the level necessary to meet inflation objectives. Consequently, until March 1995 the RBNZ had to effect only two explicit monetary policy adjustments in the five years that inflation targeting had been in place. Financial markets made the remaining interest rate adjustments.

In conjunction with a policy of fiscal restraint, annual inflation fell from 7 percent to less than 2 percent and remained within the band

Figure 7.1. New Zealand: Inflation Targets and Actual Inflation



Source: Debelle (1997).

from 1992 to 1995 (Figure 7.1). Despite breaches of the band in June 1995 and March 1996, the response of the financial markets to these violations was minimal. The markets also had little reaction to the RBNZ's widening of the band in late 1996, when it raised the ceiling to 3 percent. This indicated that the credibility of the RBNZ had improved considerably over the past, when inflationary expectations had been generally above the upper edge of the target bands and had lagged behind the decline in actual inflation. This slow improvement could have been due, in part, to the large public debt position, which made long-term sustainability questionable despite the concurrent fiscal consolidation.

Israel, 1991

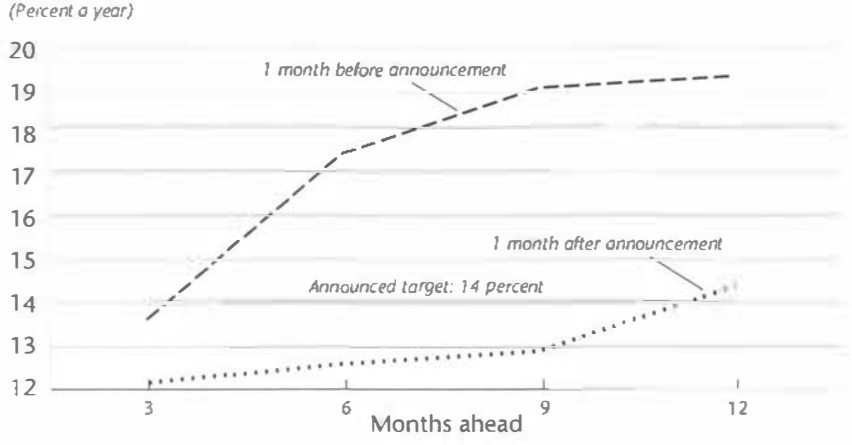
Compared with other countries that have adopted inflation targeting, Israel was atypical in two respects: it was the only country in which triple-digit inflation was a recent memory (the mid-1980s), and considerable uncertainty surrounded the exact character of the inflation target. In December 1991, the Israeli authorities decided to switch from the nominal anchor of a fixed exchange rate regime to a crawling exchange rate band. In the new regime the rate of crawl was set equal to the difference between the authorities' inflation target and

a forecast of the average inflation rate of Israel's primary trading par ners. It was in this manner that the idea of an "inflation target" was first introduced—not as an inflation target in its own right, but as a determinant of the upward slope of the band. The roles of the central bank and the treasury in ensuring the success of the target were not clearly announced; consequently, the extent to which the authorities were committed to the inflation target was not clearly understood. Furthermore, it was never clear whether the inflation target was a policy target that would be pursued actively by the authorities, or what the priority of the inflation target was in relation to other policy objectives. Only over time did the inflation target take precedence over the exchange rate target. In fact, it was not until 1995 that the inflation target received a semicommitment by the government, when (in conjunction with the central bank) it "took note" of the inflation target range of 8 to 11 percent (Bufman, Leiderman, and Sokoler, 1995).

Following an annual inflation rate of about 19 percent in 1991, the inflation target announced for 1992 was 14 to 15 percent, slightly below the inflation rate prevailing during the late 1980s. The inflation target in Israel is announced one year at a time, in the fall of the preceding year, leaving only a 16-month window to attain the target. Consequently, the long lags with which monetary policy takes effect imply that interest rates may have to change considerably so that the target can be met if confronted with small changes in the expected inflation rate. Unlike many other inflation-targeting countries, Israel chose the actual CPI, rather than underlying or core inflation, as the target rate. One reason was that approximately 40 percent of the CPI consisted of a group of items whose prices fluctuate considerably. Although such items are often excluded from the CPI when core inflation is determined, omitting these prices would have damaged the credibility of the target. Similarly, administered prices, which are also frequently excluded from the CPI, embrace a significant portion of goods in the CPI, and their exemption was thus unrealistic. Finally, indexation conventions and CPI-indexed contracts are widespread in Israel, including financial assets and wage contracts, and this argued against using the core inflation rate as the target.

The methodology used in Israel to forecast inflation also differs in several ways from that used in other countries. Although the Bank of Israel employs an annual model to forecast medium-term inflation, the model depends heavily on the implied inflationary expectations that stem from the difference in yields of 12-month indexed and nonin-

Figure 7.2. Israel: Inflation Expectations Before and After December 1991 Announcements



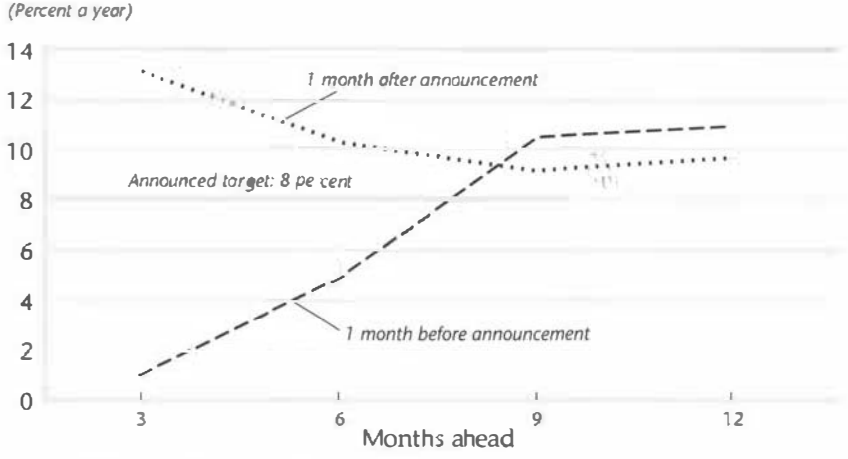
Source: Bufman, Leiderman, and Sokoler (1995).

dexed bonds.[9] Furthermore, unlike the forward-looking models of many other countries, regression analysis has shown that approximately 60 percent of the Bank of Israel's expectations measure is based on past rather than future inflation (IMF, 1998). In practice, however, the weight given to historical inflation tends to be even higher, because inflation in the past year also enters as a separate variable that is used as an indicator of the current inflation situation. Consequently, rather than adjusting instruments in anticipation of future changes in inflation, policy has tended to accommodate the preceding changes in inflation.

Bufman, Leiderman, and Sokoler (1995) also examined the credibility of the inflation target by using market-based inflation expectations derived from the difference in the yields of indexed and nonindexed bonds. One month prior to the 1991 announcement of the target, inflationary expectations were about 14 percent for a 3-month horizon and about 19 percent for 6 to 12 months (Figure 7.2). However, approximately one month after the announcement, inflationary expectations

[9]Basing monetary policy on market-based inflationary expectations has received considerable criticism, because the difference between indexed versus nonindexed bonds must be a function of the market's expected changes in monetary policy, especially since the private sector knows that the central bank uses this information. Thus, the stance of monetary policy contains a circularity that does not target the market's inflation expectations but is instead affected by the market's perceived changes in monetary policy.

Figure 7.3. Israel: Inflation Expectations Before and After July 1993 Announcements



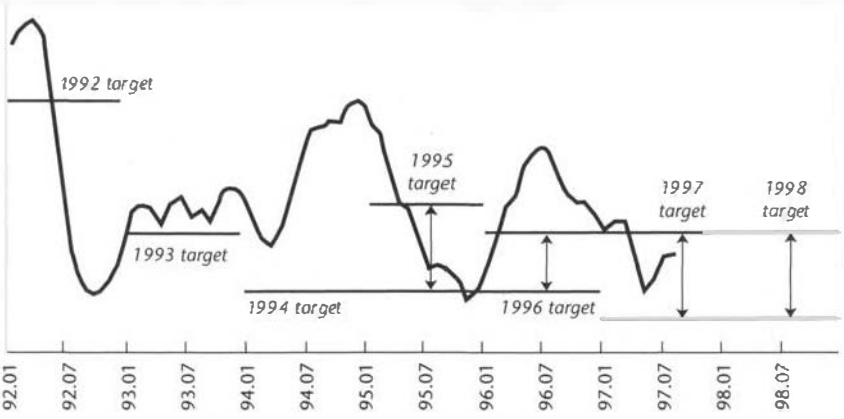
Source: Bufman, Leiderman, and Sokoler (1995).

had fallen to about 12 percent for a 3-month horizon and to 13 to 14 percent for 6 to 12 months into the future. When the market's inflationary expectations dropped below the target in 1992, the implication was that the central bank had achieved a considerable degree of credibility. However, by mid-1993, the setting of an inflation target of 8 percent for 1994 revealed a loss of credibility. Figure 7.3 indicates that one month after the target was announced, the market's inflationary expectations were not converging to the target but exceeding it at a level of 10 to 11 percent. In fact, inflation in 1994 was considerably higher than targeted, ranging between 11 and 15 percent during the course of the year (Figure 7.4).

When a country has both an inflation target and a crawling exchange rate band, the two can sometimes lead to conflicting objectives. For example, if the central bank has increased domestic interest rates in order to dampen inflationary pressures at home, the higher interest rates may induce capital inflows as foreigners are attracted to the higher domestic yields. This effect, in turn, exerts pressure for the currency to appreciate, while the inflow of funds tends to reduce domestic interest rates and fuel inflation. Consequently, the authorities face trade-offs. They can ease their commitment to the exchange rate anchor by widening the band around the central parity rate, thus permitting larger fluc-

Figure 7.4. Israel: Targeted and Actual Inflation

(Percent a year)



Source: Israeli authorities.

tuations in the exchange rate and introducing greater foreign exchange risk. Doing so would reduce the incentives for short-term capital inflows and the resulting inflationary pressures. Alternatively, the authorities can maintain the exchange rate commitment and deal with the prospect of the new, higher inflation. This they can do either by relaxing their commitment to the inflation target and allowing the capital inflows to feed inflationary tendencies in the economy or by sterilizing the capital inflows through open market operations, which would merely serve to maintain the higher domestic interest rates and to perpetuate the foreign inflows. In this situation, inflation is controlled, but sterilization also imposes costs.

In recent years, foreign capital inflows to Israel have increasingly exerted pressure for currency appreciation. To stabilize the exchange rate in the presence of capital inflows, the authorities would have had to expand money growth significantly, introducing added inflationary concerns. Consequently, Israel increasingly focused on the inflation target, and in June 1995 it officially widened the exchange rate band to 7 percent around the central parity rate. By 1997, inflation levels had dropped to within the 7 to 10 percent target range. This case should be noted because, apart from Spain, Israel has been the only country to adopt an inflation-targeting framework concurrently with an important commitment to the exchange rate.

United Kingdom, 1992

In 1986 the United Kingdom discontinued using monetary targeting because of concerns about changes in the velocity of money caused by financial innovations, which had altered the public's money demand and had made it difficult for the central bank to choose a monetary growth rate that was consistent with the desired inflation rate. Thus, in 1987 the pound sterling began to track the deutsche mark and was formally linked to it in 1990. However, there was growing skepticism in the markets that the United Kingdom could follow a policy that would maintain parity with the mark under the increasingly restrictive German monetary policy. In 1992 the pound sterling was forced out of the European exchange rate mechanism (ERM), and in October of that year the United Kingdom adopted inflation targeting after determining that no appropriate intermediate targets for other variables could be relied on to steer monetary policy in the correct direction in all circumstances (Bowen, 1995).

The decision to adopt inflation targeting was announced by the chancellor of the exchequer to the Treasury and the Civil Service Committee of the House of Commons, stating that monetary policy would be targeted at controlling inflation. However, unlike in New Zealand, the central bank was not operationally independent at the time the inflation-targeting framework was adopted; rather, the government made decisions about monetary policy and was fully responsible for decisions about the interest rate.

The U.K. policy framework called for adopting an explicit inflation target under a flexible exchange rate regime and consisted of the following elements:

- the targeted measure of underlying inflation was defined as the retail price index, excluding mortgage interest payments (called the RPIX);
- from an annual inflation rate of around 4.2 percent at the time inflation targeting was adopted, the RPIX was to remain within a 1 to 4 percent range (with a target of 2.5 percent) and decline to the lower half of the range by April 1997;
- monetary policy focused on a range of indicators for evaluating whether the inflation forecast was in line with the inflation target—these included monetary aggregates (M0 and M4), housing and equity prices, yield-curve measures, the exchange rate, the fiscal policy stance, and movements in prices, output, and employment; and

- the intermediate variable for monetary policy was the entire probability distribution of future inflation outcomes.

In an effort to make monetary policy more transparent, the authorities made public a series of documents to provide information on monetary policy formulation. Beginning in late 1992 these documents included the U.K. Treasury's *Monthly Monetary Report*, describing developments in policy indicators that formed the framework for the monthly meeting between the chancellor and the governor of the Bank of England; the Bank of England's *Quarterly Inflation Report*; the thrice-yearly publication of forecasts and assessments in the *Treasury Panel of Independent Forecasters*; and explanatory press releases accompanying each change in interest rates.

In May 1997 the authorities eliminated the primary drawback under the old arrangement—namely, the absence of central bank independence—by granting instrument independence to the Bank of England, thus altering the requirements for accountability. The new rules made the Bank of England responsible for implementing an inflation-targeting framework, with the following stipulations:

- that the Bank of England, without prejudice to this objective, support the policy of the government, including its objective for growth and employment (IMF, 1997);
- that the inflation target itself be set by the government in the annual budget;
- that exchange rate policy remain in the hands of the government (which still maintained a flexible regime);
- that, under extreme circumstances, the government retain the right to override the monetary policy decisions of the Bank of England;
- that monetary policy decisions be made in monthly meetings of a Monetary Policy Committee chaired by the governor of the Bank of England and comprising five senior Bank of England staff and four outsiders;
- that the minutes of the monthly monetary policy meetings now represent the views of the Monetary Policy Committee and that they report any internal conflicts of opinion; and
- that the Bank of England's *Quarterly Inflation Report*, not the chancellor, now presents the views of the committee.

In addition, to enhance the accountability of the central bank, a 1 percentage point deviation of the inflation rate from its target would require that the governor write an open letter to the chancellor to explain the deviation and the actions to be taken to correct it.

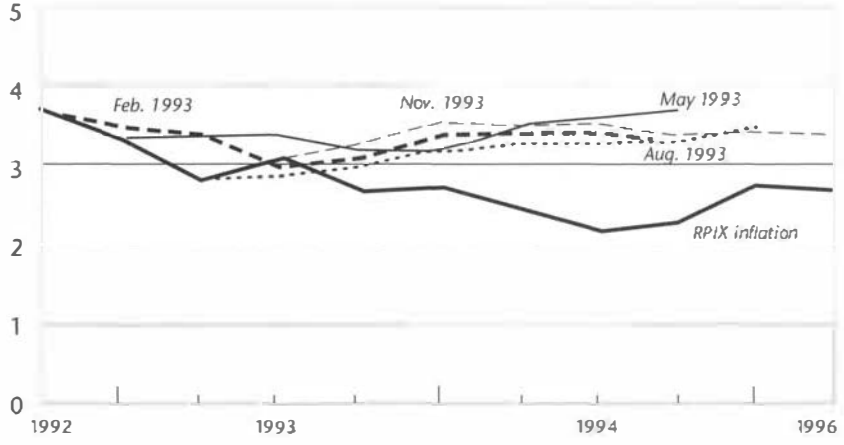
The analytical framework of the Bank of England calls for producing both a short-run (three-month) projection of inflation and a medium-term projection covering up to two years. The short-run projection serves both to fix a baseline for the medium-term inflation projection and to provide a benchmark against which to evaluate new information over the quarter. The short-run inflation forecast is less structured than the medium-term projection and encompasses information on inflationary inertia, seasonality, and "off-model" information, such as changes in taxes or prices. The medium-term projection uses a structural model of approximately 20 equations (although the Bank of England has increasingly been drawing on a wider set of models). The Bank of England's model captures not only structural variables but also a price-expectations term that is basically a portmanteau statistic for off-model variables, which include inflationary expectations inferred from the yield curve,[10] surveys of inflationary expectations, money and credit aggregates, and, in particular, the judgment of policymakers. More important, in order to produce a probability distribution of inflation forecasts, the Bank of England has adopted a strategy that first identifies the risks to the variables in the model; ranks the risks to the model's variables according to severity and asymmetry; produces an accepted skewness and variance adjustment for each variable that enters the reduced-form equation for inflation; and then translates the weights of each of the variables into a probability distribution for inflation. Accordingly, the Bank of England's methodology allows both the authorities' priors and off-model variables to enter into policy decisions.

Under its inflation-targeting framework, the United Kingdom reduced inflation to the 1 to 4 percent range by 1993, and to the 2.5 percent target by the April 1997 deadline. Yet the accuracy of the Bank of England's forecasting ability improved only over time. A comparison of actual inflation with the Bank of England's forecasts made at various times in the year revealed that its 1993–94 forecasts were significantly more pessimistic than the actual path of inflation (Figures 7.5 and 7.6). However, by 1995 the Bank of England's inflation forecasts had improved considerably and tracked actual inflation much more consistently (Figure 7.7). In addition, the implied inflation term structure had declined from the period shortly after the United Kingdom exited

[10]The same criticism that applied to Israel's indexed versus nonindexed yields would also apply here.

Figure 7.5. United Kingdom: Inflation Projections Made in 1993 and Actual Inflation

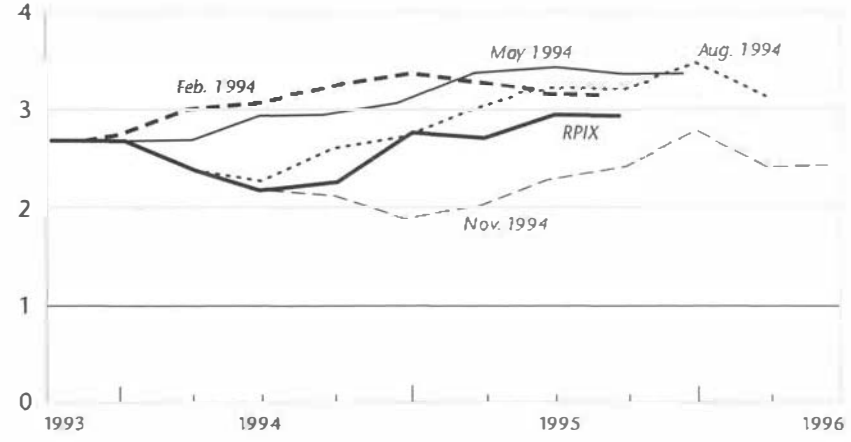
(Percent a year)



Source: Haldane (1996).
Note: Retail price index excluding mortgage interest payments (RPIX) is the officially targeted measure of underlying inflation.

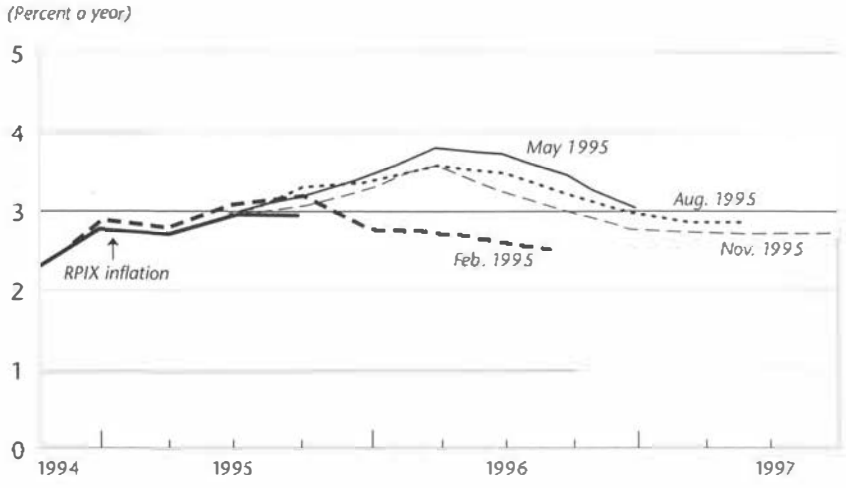
Figure 7.6. United Kingdom: Inflation Projections Made in 1994 and Actual Inflation

(Percent a year)



Source: Haldane (1996).
Note: RPIX is the officially targeted measure of underlying inflation.

Figure 7.7. United Kingdom: Inflation Projections Made in 1995 and Actual Inflation



Source: Haldane (1996).
Note: RPIX is the officially targeted measure of underlying inflation.

the ERM (September 12, 1992) to a lower level as of April 16, 1996 (Figure 7.8).[11]

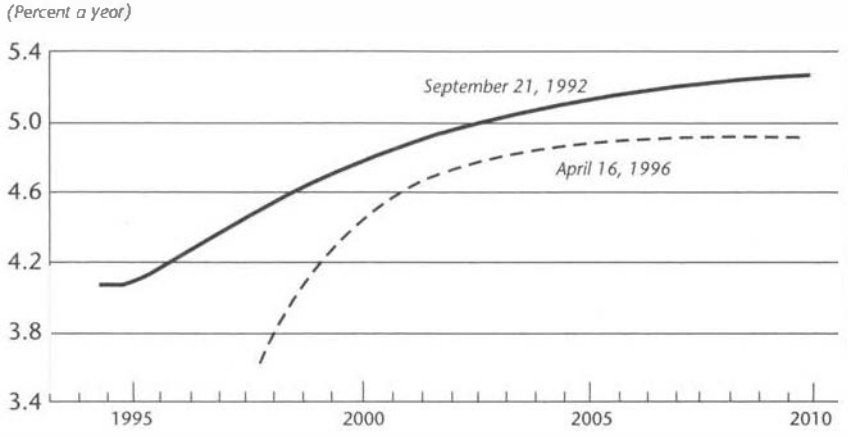
Nevertheless, the market data reveal that, with inferred inflationary expectations (as of April 1996) remaining at more than 4.5 percent 10 years hence, the level of expectations is still too high to be consistent with an official inflation target of 2.5 percent (Figure 7.8). However, there are signs that the Bank of England's credibility has been improving over time, as indicated by a decline in the differential between index-linked and non-index-linked bond yields to 3.5 percent by September 1997, although this is still above the official target (Figure 7.9).

Summary of Experience Under Inflation Targeting

This chapter has provided a brief overview of developments in inflation-targeting policies and programs. Thus far, there has been less than a decade's worth of experience with inflation targeting, with New Zealand having the longest history. Nevertheless, the inflation perfor-

[11]This structure is inferred from the United Kingdom's index-linked bond market.

Figure 7.8. United Kingdom: Implied Forward Inflation Rates



Source: Haldane (1996).

mance of inflation-targeting countries has been largely positive. Haldane (1996) shows that, for the 1980–95 period, mean inflation performance among inflation-targeting countries improved significantly

Figure 7.9. United Kingdom: Market Indicators of Monetary Credibility

Sources: United Kingdom, Office for National Statistics; and IMF Research Department. (Figure adapted from IMF, 1997.)
[1]Difference in yields on 7.75 percent treasury loans (2012–15) and 2.5 percent treasury index-linked bonds (2015).

Table 7.2. Summary of Inflation Targeting Statistics

	Preperiod[1]				Postperiod[2]			
	Inflation		Output		Inflation		Output	
	μ	σ	μ	σ	μ	σ	μ	σ
Inflation-targeting countries	8.1	1.9	2.1	0.6	2.7	1.0	2.3	1.0
Non-inflation-targeting countries	4.3	2.1	2.5	0.7	2.8	0.8	2.1	1.4

Source: Haldane (1996).

Note: The symbol μ represents the mean of the series, and σ represents the variance.

[1]For inflation-targeting countries, the period covers 1980, first quarter, to the introduction of the target; the period for non-inflation-targeting countries covers the 1980s.

[2]For inflation-targeting countries, the period covers from the introduction of the target to 1995, fourth quarter; for non-inflation-targeting countries, it covers 1990 (first quarter)–1995 (fourth quarter).

Table 7.3. Sacrifice Ratios

	Sacrifice Ratio
Australia	0.12
Canada	1.69
Finland	3.95
France	1.21
Germany	4.29
Italy	1.04
Japan	4.63
New Zealand	0.60
Spain	0.89
Sweden	4.41
Switzerland	n.a.
United Kingdom	3.29
United States	0.67

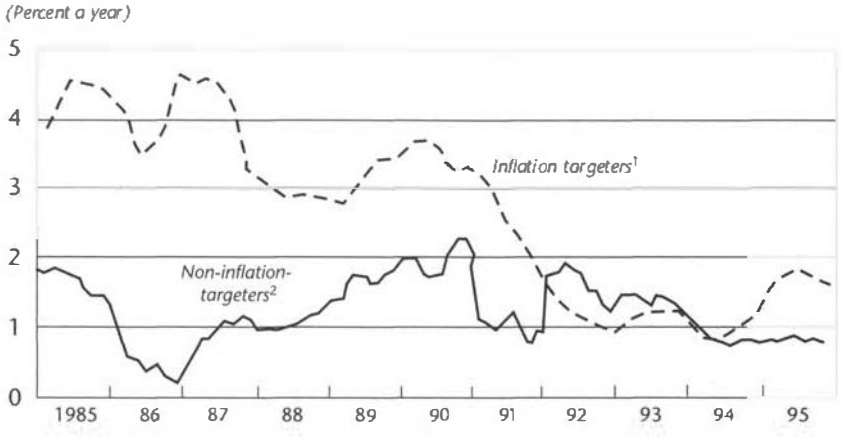
Source: Haldane (1996).

during the relevant period (2.7 percent) compared with their pre-inflation-targeting experience (8.1 percent, Table 7.2).[12] The output cost of disinflation under an inflation-targeting framework provides an important gauge of the trade-offs that policymakers can expect to face.

Some discussions in the popular press have claimed that inflation targeting improves the output-inflation trade-off. However, estimates of the sacrifice ratio (Table 7.3) deviate widely, from 0.12 percent

[12]The inflation-targeting countries included in the study are Australia, Canada, Finland, New Zealand, Spain, Sweden, and the United Kingdom. The non-inflation-targeting countries include France, Germany, Japan, Switzerland, and the United States.

Figure 7.10. Inflation in Inflation-Targeting and Non-Inflation-Targeting Countries



Source: Haldane (1996).
[1]Australia, Canada, Finland, New Zealand, Spain, and Sweden.
[2]France, Germany, Japan, and Switzerland.

in Australia (an inflation-targeting country) to 4.63 percent in Japan (a non-inflation-targeting country) and are, on average, slightly lower for inflation-targeting countries (2.37 for non-inflation-targeting countries compared with 2.14 for inflation-targeting countries).[13] The implication is that the costs of lowering inflation in inflation-targeting countries have not been significantly more painful than in non-inflation-targeting countries. Conversely, critics have argued that inflation targeting was initiated during a period in which worldwide inflation was exhibiting an overall downward trend (Figure 7.10). The question, then, is whether the inflation-targeting framework itself was responsible for the decline in inflation in these countries, or whether it was the downward pull from abroad. Finally, critics charge that inflation targeting has not yet been tested under extreme economic conditions, such as severe recessions or financial crises, but only under moderately inflationary conditions.

[13]The sacrifice ratio is measured (see Table 7.3) as the ratio of cumulative loss of output in the 1990–95 period to the difference in the average inflation rate between the 1980–89 and 1990–95 periods. Haldane estimated that trend growth was 2.5 percent for all countries surveyed. In Table 7.3, Italy has replaced Switzerland as an inflation-targeting country.

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