

■ Experience of inflation-targeting in 20 countries

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It is now twelve years since the Swedish inflation target was announced and a decade since it became operative.¹ When Sweden gave up the policy of a fixed exchange rate, we had very little experience of conducting monetary policy with a flexible exchange rate.² Faced with the task of formulating an inflation target, the Riksbank therefore considered the solutions chosen by countries where inflation-targeting systems with a flexible exchange rate had been introduced some years earlier: Canada, New Zealand and the United Kingdom.³ In recent years these pioneers of inflation targeting have been joined by a number of developing countries, for example Brazil, South Africa and Thailand, as well as by such East European transitional economies as Poland, the Czech Republic and Hungary. At present, around twenty central banks around the world are conducting monetary policy with a flexible exchange rate and an explicit target for inflation.⁴

In this article I discuss the monetary policy experiences of the countries that have adopted an inflation target. How has the delegation of monetary policy to an independent central bank been implemented? Which inflation targets have countries chosen? To what extent do the central banks state that they also take real economic stability into consideration? What part do inflation reports and monetary policy minutes play for communication and accountability? Have central banks fulfilled their inflation targets without generating unnecessary fluctuations in growth and employment?

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¹ Sweden's inflation target was announced in January 1993 and applied as of 1995.

² Sweden did have a flexible exchange rate and a price stability objective for monetary policy for some years in the 1930s but that was a long time ago and of little consequence for the formulation of stabilisation policy after World War II. For an account of Sweden's price-level target in the 1930s, see Berg & Jonung (1999).

³ The first country to adopt an inflation target was New Zealand, in 1990. Chile also announced an inflation target in that year but both its target and inflation were considerably higher than in the other pioneer countries.

⁴ As more and more countries adopt the combination of an inflation target and a variable exchange rate, the scientific literature in this field is growing rapidly. Moreover, time series for major macro variables since the changeover to targeting inflation are now so long that it is becoming possible to draw conclusions about the policy's effects. Thus, a good deal of experience is available as regards conducting, analysing and evaluating inflation-targeting monetary policies. Meanwhile, inflation targeting is attracting growing interest in countries such as Japan and the United States, where the discussion of the advantages of a numerical price stability target for monetary policy is starting to spread beyond academic circles.

Policy framework with five components

There is widespread agreement that monetary policy's long-term objective should be price stability. A low and stable rate of inflation provides favourable conditions for the economic decisions of households and firms. Moreover, monetary policy's long-term effects are confined to nominal variables such as inflation and the exchange rate. A central bank cannot affect either average growth or employment in the long run. In the short term, on the other hand, monetary policy clearly can have an impact on such real variables. So there is a consensus that a central bank should aim to generate price stability without this leading to unnecessary fluctuations in real economic activity. The delegation of monetary policy to an independent central bank makes it more credible that low inflation will be achieved without more marked variations in employment or growth.⁵

A central bank should aim for price stability without unnecessary real economic fluctuations.

Inflation-targeting monetary policy can be said to have an institutional framework with the following components:

- 1) The political system delegates monetary policy to an independent central bank.
- 2) The central bank objective is to achieve a publicly explicit numerical target for price stability.
- 3) The central bank aims to achieve the inflation target without generating unnecessary real economic variability.
- 4) The central bank regularly publishes reports that describe the prospects of achieving the inflation target.⁶
- 5) The political system regularly holds the central bank accountable for achieving the objective.

Between them, the components of this analytical framework function as a mechanism with a strong incentive to keep inflation down. By providing a credible anchor for inflation expectations in the longer run, the framework helps to eliminate the inflation bias described by Kydland & Prescott (1977).⁷

Instrumental-rate adjustments by the central bank affect inflation via a variety of channels in monetary policy's transmission mechanism: short- and long-term real interest rates, the exchange rate and the volume of

⁵ Following Rogoff (1985), an extensive literature has been produced in which the issue is analysed in a principal agency perspective. For a review of the relations in this theoretical framework between an optimal inflation target, the stabilisation of employment and linear inflation contracts, see Svensson (1997a). See also footnote 22.

⁶ However, not all central banks publish inflation forecasts in their inflation reports. Moreover, the monetary policy minutes of some central banks are more explicit than their inflation reports about how monetary policy is conducted to achieve the inflation target.

⁷ Orphanides & Williams (2004) show in a model how an inflation target can help to anchor inflation expectations by making it easier to estimate future inflation.

An inflation target enables the central bank to supplement the traditional transmission channel with an expectations mechanism.

credit, each with a different time lag, see Svensson (2002). When the central bank lowers (raises) the instrumental rate, these different channels tend to lead in time to higher (lower) inflation. However, inflation is also subject to exogenous shocks that have nothing to do with monetary policy, for example oil price shocks. The central bank therefore needs to explain how inflation can be brought back to target after a deviation. In their external communications, central banks that target inflation, particularly those that publish their inflation forecasts, therefore attach great importance to managing the formation of expectations. It can be said that an inflation target also enables the central bank to supplement the traditional transmission channel more explicitly with the expectations mechanism that is a feature of modern macro models.

Delegating monetary policy

Delegating monetary policy to an independent central bank promotes economic efficiency.

The delegation of monetary policy to an independent central bank is not an end in itself but a means of contributing to a more efficient economy. Central bank independence wards off pressure from the political system and interest groups; it also provides full control of monetary policy's implementation in the form of open market operations, that is, instrumental independence. Today, the central bank is instrument independent in principle in all the inflation-targeting countries.⁸ Still, the delegation may involve some form of exemption whereby the government or the parliament is entitled, usually under very exceptional circumstances, to rescind the inflation target. The law provides for such an exemption in less than one-third of the countries (see Table 1).⁹

Whichever authority announced the target, in every country its fulfilment is the responsibility of the central bank.

In inflation-targeting countries the target was usually announced by the government alone or together with the central bank (see Table 1). The announcement was made by the central bank alone in just over one country in four. Government participation in the announcement of an inflation target may have the advantage of conferring greater credibility if the introduction of the new monetary policy regime needs to be backed up by a realignment of fiscal policy and national debt administration. A drawback may be that the government can be in a position to alter the inflation target and thereby weaken its long-term credibility. Whichever authority announced the target, in every country the central bank is held

⁸ A number of industrialised countries, including Sweden, adopted an inflation target before their legislation had been amended and the central bank became instrument independent. Among emerging-market countries, on the other hand, the common procedure has been to amend the law and make the central bank independent before announcing an inflation target. In many cases this has had to do with the importance of making a break with a history of government interference in monetary policy, weak government finances and very high inflation.

⁹ In the United Kingdom the Treasury is entitled to issue instructions to the Bank of England if this were to be in the public interest on account of extreme economic circumstances.

TABLE 1. INFLATION-TARGETING COUNTRIES

	Since	Target set by:	Instrument independent	Current target (per cent) ²	Target variable
Australia	1993	Government & central bank	Yes ¹	2–3 (b)	CPI
Brazil	1999	Government	Yes	4.5 ±2.0 ³ (p)	CPI
Canada	1991	Government & central bank	Yes ¹	2 ±1 (p)	CPI
Chile	1990	Central bank	Yes	2–4 (b)	CPI
Colombia	1999	Central bank	Yes	3.5–5.5 ⁴	CPI
Czech Republic	1997	Government & central bank	Yes	2–4 ⁵ (b)	CPI
Hungary	2001	Government & central bank	Yes	4 ±1 (p)	CPI
Iceland	2001	Government	Yes	2.5 ±1.5 (p)	CPI
Israel	1991	Government	Yes	1–3 (b)	CPI
Mexico	1995	Central bank	Yes	3 ±1 (p)	CPI
New Zealand	1990	Government & central bank	Yes ¹	1–3 (b)	CPI
Norway	2001	Central bank	Yes ¹	2.5 (p)	CPI
Peru	2002	Central bank	Yes	2.5 ±1 (p)	CPI
Philippines	2002	Government & central bank	Yes	4–5 (b)	CPI
Poland	1998	Central bank	Yes	2.5 ±1 (p)	CPI
Republic of Korea	1998	Government & central bank	Yes ¹	3 ±1 (b)	UND ⁶
South Africa	2000	Government & central bank	Yes	3–6 (b)	CPIX
Sweden	1993	Central bank	Yes	2 ±1 (p)	CPI
Thailand	2000	Central bank	Yes ¹	0–3.5 (b)	UND ⁶
U.K.	1992	Government	Yes ¹	2 (p)	CPI (HICP)

¹ Normally but government can intervene.

² p = point target, b = band target.

³ For 2006.

⁴ For 2005.

⁵ Through 2005, thereafter 3% point target.

⁶ CPI excl. food and oil prices.

Sources: The central banks' web sites, Truman (2003) and Carare et al. (2003).

accountable for fulfilling it. Doing that requires, however, some decisions of a more technical nature concerning the target variable and the target's level.

CPI the normal target variable

The target variable for inflation that has been chosen by most countries, Sweden included, is the consumer price index (see Table 1). This index is an appropriate target variable for monetary policy for several reasons. Besides being a cost-of-living index that maps the development of prices for an average basket of goods and services, it is well-known and is published regularly. Stabilising the CPI facilitates consumers' decisions in a market economy.

As an operational index for monetary policy, however, the CPI does pose problems. The most common problem is that in the short run the housing item (house mortgage interest expenditure) responds to the central bank's interest adjustments in a contrary manner. An interest rate hike

The CPI entails a problem in that in the short run an interest rate adjustment has a contrary effect on the housing item.

lifts house mortgage rates and the CPI tends to rise, while a cut lowers mortgage rates and tends to lower the CPI.¹⁰ Another problem is that the CPI may be affected by other transitory effects – primarily price fluctuations for energy and food – that the central bank may want to disregard. There are various ways in which such transitory effects can be ignored in the implementation of monetary policy.

The problem of the housing item in the operational target variable is commonly avoided by using a CPI that excludes interest expenditure; this is the case in the United Kingdom and South Africa and it used to be done in New Zealand.¹¹ In some countries – Republic of Korea and Thailand, for example – the target variable is the CPI excluding food and oil prices.

An alternative approach is to be explicit in connection with monetary policy decisions about the types of transitory effects on inflation that monetary policy ought not to counter in full. In Sweden, the Riksbank has published a clarification of its view related to this issue.¹² In practice, the Riksbank has chosen as a rule to disregard interest expenditure by normally using an index of inflation (UND1X) that does not include this item.¹³ The Swedish clarification also has the advantage that it provides for statements about other types of transitory effects that monetary policy does not aim to counter. In the event of a temporary inflationary shock related to volatile energy prices, one possibility is to show a measure that excludes energy prices and on this basis explain why the central bank does not want to counter the shock. Another possibility is to extend the forecast horizon somewhat.¹⁴

Target level positive in every country

Improvements in the quality of goods and services give the CPI a positive bias.

Turning now to the level of inflation targets, it can be noted that every country has chosen a positive number. There are several reasons for not choosing 0 per cent inflation, even though this may seem most natural if price stability is taken to imply an unchanged yardstick. In practice, improvements in the quality of goods and services give the CPI a positive

¹⁰ In Sweden this problem was particularly evident when the Riksbank cut the instrumental rate in the course of 1996 by almost 5 percentage points and this contributed to CPI inflation being clearly below the targetted rate.

¹¹ In the United Kingdom the target variable used to be RPIX (retail prices excluding interest expenditure); in 2004 it was replaced by a CPI that corresponds to the HICP and likewise excludes house mortgage interest costs. Following a redefinition, the CPI in New Zealand no longer includes interest expenditure.

¹² See Sveriges Riksbank (1999) and Heikensten (1999).

¹³ UND1X is defined as the Swedish CPI excluding indirect taxes, subsidies and house mortgage interest expenditure.

¹⁴ In recent years there have been a couple of occasions when inflation has been driven up by rapidly rising prices for energy in particular but also for food. In this way, inflation moves up sharply in one year and then falls back steeply in the following year when the transitory disturbances no longer affect the 12-month change figures. So even when inflation is fairly close to the target on average, it may deviate markedly at times.

bias. In most countries this bias is judged to be at least 1 percentage point but in Sweden the CPI enquiry put it at about 0.3 of a percentage point. Another reason is that some positive inflation can facilitate relative wage adjustments if labour-market rules and standards impede nominal wage cuts. The analysis in Akerlof, Dickens & Perry (1996) suggests that the inflation target ought not to be below 2 per cent. Finally, a positive inflation target is an advantage in the event of a deep recession with a risk of deflation. If the central bank's inflation target is 0 per cent, deflation is liable to occur from time to time. As the nominal interest rate cannot be negative, it may then be difficult for the central bank to prevent a self-generating deflation spiral. This is because in such a situation the central bank is unable to bring the real interest rate down sufficiently if expectations of deflation arise when the nominal interest rate is already as low as possible. With a positive inflation target and thus a margin to zero, there is less probability of such a scenario.

Most industrialised countries have chosen inflation targets in the 1–3 per cent range, while the targets in developing countries and transitional economies tend to be higher, 3–6 per cent (see Table 1). The developing countries that started to target inflation when it was relatively high have reduced their targets successively, so the current difference between the country groups is not particularly great. One reason why the developing countries as a group should nevertheless have higher inflation targets than industrialised countries is that, according to the so-called Balassa-Samuelson effect, they have higher inflation as long as they are catching up with the industrialised countries.¹⁵

Approximately half the countries have a point target for inflation, with or without a tolerance for deviations, as a rule ± 1 percentage point. A point target has the advantage, when inflation is currently deviating from it, of indicating just what the central bank is aiming to bring inflation back to. In that way the target should help to anchor inflation expectations. A drawback with a point target, however, can be that it gives a misleading impression of precision and focuses undue attention on decimal points. In this context the tolerance interval can play an important role by indicating a normal range for inflation. If inflation moves outside this interval, as a rule the central bank needs to explain why.¹⁶ In the other half of the countries the central bank operates with a band for tolerable inflation instead of a point target. A drawback with a band is that it may

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¹⁵ GDP growth and wage increases can be fairly high during the process of growth in developing countries. Moreover, wage increases in the sheltered sector often keep pace with those in the competitive sector without being matched by the same productivity growth.

¹⁶ The use of a tolerance interval is criticised, however, by Faust & Henderson (2004), who argue that an optimal monetary policy often means that inflation should be outside the interval.

not be clear just what rate of inflation the central bank is aiming for.¹⁷ In both cases, inflation is normally targeted symmetrically, that is, the central bank is expected to react equally strongly to downward and upward deviations from the inflation target. This also helps to anchor inflation expectations.

Consideration for real economic stability

Central banks usually take real economic developments into account.

To what extent are growth and employment a consideration in monetary policy? Even though monetary policy's long-term focus is on inflation, central banks usually also take real economic developments into account, that is, they implement a flexible inflation-targeting policy, see Svensson (1998, 2002).¹⁸ Central banks are not inflation nutters, to cite a pithy coinage in King (1997).

Still, central banks differ a good deal in their explicitness about the extent to which they take fluctuations in growth or employment into account. Those who are more forthcoming about also considering the real economy in the implementation of monetary policy are the central banks in Australia, New Zealand, Norway and Sweden, while the Reserve Bank of Canada is more reticent.^{19, 20}

A major reason why all central banks that target inflation do so flexibly in practice is that in the economic models that are normally used, the difference between actual and potential growth (the output gap) is of central importance for future inflation. The instrumental rate's impact on the output gap is lagged in practice by approximately one year. The output gap in turn affects inflation with a further lag of another year.²¹ So if the central bank raises the interest rate in order to check an upswing in inflation that rising demand is expected to generate about two years ahead, this automatically helps to stabilise the real economy approximately one year ahead.

However, inflation is also exposed to other types of shock that can-

¹⁷ The difference should not be exaggerated because to maximise the probability of inflation being inside the interval in the longer run, even central banks with a band target should aim for the mid-point in the event of a deviation.

¹⁸ More specifically, "flexible" inflation targeting implies that the central bank can assign some weight to the stabilisation of target variables other than inflation, in the first place the output or the unemployment gap but also interest rates. For an instructive review, see Svensson (2002).

¹⁹ Sveriges Riksbank, for example, has stated that there may be grounds for not striving to return inflation to the targeted level immediately after a sizeable shock. Deviations can be motivated by the macroeconomic costs that would otherwise be incurred due to unnecessary fluctuations in economic activity; see Heikensten (1999) and Sveriges Riksbank (1999).

²⁰ According to Kuttner (2004), Norges Bank has shown the way among central banks in clarifying that monetary policy also attempts to stabilise the real economy. The Reserve Bank of Canada holds that the inflation target contributes to good growth, a more traditional central-bank view that Sveriges Riksbank also voiced when it announced the inflation target, see Sveriges Riksbank (1993).

²¹ This description of the transmission mechanism is a simplification because there are other channels, too. Moreover, time lags are difficult to measure and estimates vary with the methods as well as with the data. For a review, see Christiano, Eichenbaum & Evans (1999).

not be handled so straightforwardly as changes in demand. A negative supply shock – a sharp oil price rise, for example – can lead to the combination of rising inflation and a drop in output to below the potential level. Returning inflation rapidly to the targeted rate under such circumstances could entail unduly large and undesirable fluctuations in output, see Svensson (1997b, 1998) and Woodford (2004). This suggests that a central bank may want to attach some weight to output stabilisation as such, over and above what is directly related to the role of the output gap in the inflation forecast.²²

The trade-off between stabilising inflation and output, respectively, can be specified in various ways. The most attractive in theory would be to specify the central bank's objective function. Lars Svensson has recommended in a number of papers that the central bank should clarify the weight it attaches to real economic stability in relation to achieving the inflation target, see e.g. Svensson (2002). This could be done by publishing an objective function for the trade-off between the output gap and inflation. The central bank then sets the instrumental rate to minimise the deviations over time in inflation from its target and in output from its potential level. No such objective function has, in fact, been published to date by an inflation-targeting central bank. This probably has to do with the practical difficulties, particularly when monetary policy is decided by a collegial board, see Goodhart (2001) and Mishkin (2004). In the real world the economy is so complex that it could be hard to specify an appropriate objective function.²³

An alternative would be for the central bank to publish monetary policy's reaction function, that is, an equation that relates the instrumental rate to a number of variables to which this rate reacts. From a theoretical standpoint, however, this is less attractive than an objective function. Specifying a realistic reaction function for monetary policy is even more difficult, for a number of reasons. Even with a relatively stylised model of the economy, the reaction function is liable to be rather complex because in principle it should include every factor that influences aggregate demand and aggregate supply.²⁴ Moreover, a reaction function is model-dependent and instead of being tied to a particular model, central banks normally prefer to base their forecasting work on several models of differ-

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²² In Rogoff's (1985) model, lower inflation due to less weight for stabilising employment leads to a higher variability in employment. Svensson (1997a) shows that this is not necessarily the case if the central bank's objective is specified as a contract with an explicit and low inflation target, an implicit employment target and an implicit weight for stabilising employment relative to stabilising inflation.

²³ According to Faust & Henderson (2004), the objective function can be rather complex and variable over time even in a fairly simple model of the economy.

²⁴ See e.g. Svensson (2003b).

ent types as well as on sector experts and subjective assessments.²⁵ No inflation-targeting central bank has published a monetary policy reaction function.

A third alternative is for the central bank to clarify what is a reasonable way of returning inflation to the target.

A third and more practical alternative is for the central bank to clarify what is a reasonable way of returning inflation to the targeted rate without generating unnecessary fluctuations in real economic activity. While the *control horizon* indicates how far ahead monetary policy is *capable* of affecting inflation, the *targeting horizon* indicates the time by which it is *desirable* that inflation is back on target. The *control horizon* is often said to be approximately one to two years because this is the interval in which an interest rate adjustment is considered to have most effect on prices in general.²⁶

Five inflation-targeting central banks have an explicit targeting horizon.

Five inflation-targeting central banks have an explicit targeting horizon: Canada, Chile, New Zealand, Norway and Sweden (see Table 2). The *normal* targeting horizon is usually expressed as an interval, e.g. one to two years in Sweden, six to eight quarters in Canada and New Zealand and one to three years in Norway.²⁷ This form of target has the advantage

TABLE 2. INFLATION REPORT/MONETARY POLICY REPORT

	Frequency	Accountable for report	Explicit targeting horizon	Inflation forecast
Australia	4/year	Bank as a whole	No	Yes
Brazil	4/year	Monetary policy committee	After target deviation	Yes
Canada	2 + 2/year	Executive board	6–8 quarters	Yes
Chile	3/year	Executive board	8 quarters	Yes
Colombia	2/year	Executive board	No	Yes
Czech Republic	4/year	Executive board	No	Yes
Hungary	4/year	Staff	No	Yes
Iceland	4/year	Bank as a whole	After target deviation	Yes
Israel	2/year	Executive board and staff	After target deviation	Yes
Mexico	4/year	Bank as a whole	No	Yes
New Zealand	4/year	Governor	In practice 6–8 quarters	Yes
Norway	3/year	Governor and executive board	4–12 quarters	Yes
Peru	3/year	Bank as a whole	No	Yes
Philippines	4/year	Monetary policy committee	After target deviation	Yes
Poland	4/year	Staff	No	Yes
Republic of Korea	4/year	Monetary policy committee	No	Yes
South Africa	4/year	Staff	No	Yes
Sweden	4/year	Executive board	Normally 4–8 quarters	Yes
Thailand	4/year	Monetary policy committee	No	Yes
U.K.	4/year	Monetary policy committee	After target deviation	Yes

Sources: Central banks' inflation reports and Fracasso, Genberg & Wyplosz (2003).

²⁵ Svensson (2005) shows how a central bank can incorporate subjective judgements in model work and then choose the forecasts for the target variables that look good without specifying a reaction function.

²⁶ Leeper (2003) asserts, however, that the VAR literature does not unequivocally confirm one to two years as a control horizon.

²⁷ If the targeting horizon is longer than two years, this also affects the forecasting horizon, which needs to be longer than the targeting horizon. Leeper (2003) considers that a forecasting horizon of more than two years is also important for testing the consistency of model outcomes.

of serving as a rule of thumb for the central bank's ambition without the need to state in advance exactly how the bank will react to different shocks. The drawbacks of discretionary decision-making and inflation bias can then be avoided without relinquishing the possibility of stabilising the real economy, see Woodford (2004).

If a shock were to greatly increase the forecast rate of inflation, the central bank may want to bring inflation back more gradually and therefore extend the targeting horizon. The bank could admittedly use large interest rate hikes to bring inflation back inside the control horizon or the normal targeting horizon, but if it attaches weight to output stabilisation, this can be manifested by a slower return to the target, that is, the targeting horizon can be flexible.²⁸ This *flexible* targeting horizon is dependent on the weight the central bank attaches to stabilising output relative to stabilising inflation and to the magnitude of a particular shock, see Apel, Nessén, Söderström & Vredin (1999).

Working with a flexible targeting horizon for inflation is therefore in large measure tantamount to conducting monetary policy by making forecasts for both the output gap and inflation and then choosing a path for the instrumental rate that results in a suitable compromise between returning inflation to its target and minimising fluctuations in the output gap, see Svensson (2002), Batini & Haldane (1999) and Svensson (1999). Woodford (2004) has pointed out that this matches the requirements of an optimal monetary policy in connection with supply shocks in that it is along the path of inflation that a potential conflict exists between stabilising inflation and the output gap, respectively.²⁹

A practical example of this is provided by Norges Bank (2004): "Norges Bank sets the interest rate with a view to stabilising inflation at the target within a reasonable time horizon, normally 1–3 years. The more precise horizon will depend on disturbances to which the economy is exposed and how they will affect the path for inflation and the real economy ahead."

Five central banks present an explicit targeting horizon only when inflation has clearly deviated from the target: Brazil, Philippines, Iceland, Israel and the United Kingdom. In other countries there is no explicit targeting horizon. In Australia this is because it is average inflation over an unspecified business cycle that is targeted. In practice, however, monetary policy is conducted in a similar manner in all countries in the sense that

Five other central banks present an explicit targeting horizon when inflation has clearly deviated from the target; in other countries there is no explicit targeting horizon.

²⁸ The Riksbank's clarification of monetary policy provides for such a flexible targeting horizon, see Sveriges Riksbank (1999).

²⁹ Faust & Henderson (2004) are critical about adjusting the targeting horizon for inflation out of consideration for the real economy and find it would be better to work with a clear objective function and minimise the variability in both inflation and the output gap.

inflation is stabilised in the medium run so as to avoid unnecessary fluctuations in employment and growth.³⁰

Inflation reports promote understanding

There are several reasons why independent, inflation-targeting central banks should be transparent about the assessments behind monetary policy decisions, see e.g. Woodford (2004). A clear motivation of how the inflation target is to be met facilitates decisions by households and firms. It also makes monetary policy more understandable and permits accountability, which is important in a democracy. An open attitude to the basis for monetary policy probably also makes central-bank economists more concerned to produce sound assessments, which enhances efficiency. It is important, however, to strike a reasonable balance between unduly detailed information and the central components for achieving the inflation target. All in all, there are therefore grounds for regularly publishing reports that analyse the fundamental factors behind monetary policy decisions.

An inflation or a monetary policy report is published in every country where inflation is targeted.

An inflation report or a monetary policy report is published in every country where inflation is targeted; most central banks present such a report four times a year, others do so two or three times a year (see Table 2). The content of these reports is relatively similar. As a rule, there are accounts of the factors that influence the path of inflation, i.e., international economic and financial market developments, supply and demand in the real economy, transitory effects (e.g. tax changes) and inflation expectations. Faust & Henderson (2004) consider that the publication of inflation reports is a very valuable way of promoting the understanding of monetary policy and that this type of information about monetary policy, assembled in a single document, is not available in countries that do not target inflation.

Still, inflation reports do differ in a number of respects. In an evaluation of inflation reports in 19 inflation-targeting countries, Fracasso, Genberg & Wyplosz (2003) note fairly large differences in the extent to which they are informative about target trade-offs, inflation forecasts and the monetary policy rule system.³¹ All of a year's inflation reports in New Zealand, Sweden and the United Kingdom are evaluated by Leeper (2003), who analyses the credibility of the inflation forecasts and what

³⁰ This includes Australia, see Debelle (1999).

³¹ Fracasso, Genberg & Wyplosz (2003) did not study all the information in every inflation report over a year, neither did they look at all the press notices and monetary policy minutes that many central banks publish; this markedly affects the result of their evaluation. For a more descriptive account of the differences between the central banks' inflation reports, see Schmidt-Hebbel & Tapia (2002).

can be done with the aid of econometric models to improve the accounts of the current economic situation and the forecasts.

Below I shall discuss some of the most policy-relevant aspects that are analysed in the literature on central banks' inflation reports. They include the presence of inflation forecasts and assessments of uncertainty, as well as the assumptions made about the paths of interest and exchange rates.

Inflation forecasts motivate interest rate decisions

There are a number of reasons for the central bank to be transparent about its assessment of future inflation, see Svensson (1997b, 2002) and Geraats (2002). One important reason is that, due to the time lag between an interest rate adjustment and its impact on inflation, the inflation forecast plays a central part in the monetary policy decision. If inflation is expected to deviate from the target at the given horizon, monetary policy should react. Publishing the inflation forecast makes it easier for the central bank to motivate its interest rate decision. The central bank may have more information than the private sector, so that publishing the forecasts can reduce uncertainty.³²

Inflation forecasts are published by all inflation-targeting central banks (see Table 2). A number of the first central banks to adopt an inflation target have successively developed the information about their forecasts; the Riksbank is one of them, for example, see Berg, Jansson & Vredin (2004). Central banks in emerging-market countries, e.g. Brazil, have been able to learn from the pioneers and publish comprehensive inflation reports from the start.

Inflation forecasts are published by all inflation-targeting central banks.

Leeper (2003) finds it difficult to tell just how the inflation forecast that is presented in inflation reports has been produced because it is not based on a specific statistical model. However, while all inflation-targeting central banks use models of various kinds, experience has shown that the forecast can hardly be based on a single model of the economy. Sector experts and judgements of various kinds are also needed to obtain good forecasts. Most central banks work continuously to improve pedagogic aspects, econometric forecasting and simulation models. Central banks that publish their inflation forecasts face a number of challenges in the work of forecasting.

³² Another advantage with published forecasts is that it is then more possible to call the central bank to account, see below.

Constant interest rate assumption – pros and cons

A common alternative is to publish inflation forecasts that assume an unchanged instrumental rate.

The first challenge concerns the interest rate assumption on which the forecast is based. While market observers are very interested in the interest rate adjustments that may lie ahead, the central bank is normally not prepared to be explicit about this because it can be misinterpreted as a binding commitment. A common alternative, therefore, is to publish inflation forecasts that assume an unchanged or constant instrumental rate; this is done by about two out of three of the central banks that publish inflation forecasts (see Table 3). There is a pedagogic advantage in starting from a constant instrumental rate: the monetary policy decision is made in the light of whether, given the current direction of monetary policy, inflation is expected to deviate from the target; there is then a clear motivation for an instrumental rate adjustment if forecast inflation is above or below the target.

At the same time, assuming a constant instrumental rate has the drawback of a rather small probability of this assumption holding throughout the forecast period. This has a number of consequences. Sector experts and modellers may have difficulty in producing assessments with this technical assumption. Sector experts use various types of household and business surveys, for instance, in which the responses are

TABLE 3. CONFIDENCE INTERVAL AND FORECASTING ASSUMPTIONS

	Confidence interval inflation	Confidence interval GDP growth	Interest rate assumption	Exchange rate assumption
Australia	No	No	–	–
Brazil	Yes	Yes	Constant rate ¹	Constant rate ¹
Canada	No	No	–	–
Chile	Yes	Yes	Constant rate	Market-expected
Colombia	Yes	No	Endogenous	Endogenous
Czech Republic	Yes	Yes	Endogenous	Endogenous
Iceland	Yes	No	Constant rate	Constant rate
Israel	Yes	No	–	–
Hungary	Yes	No	Constant rate	Constant rate
Mexico	No	No	–	–
New Zealand	No	No	Endogenous	Endogenous
Norway	Yes	Yes	Market-expected	Market-expected
Peru	Yes	No	Constant rate	–
Philippines	Yes	No	Constant rate	PPP
Poland	Yes	No	Constant rate	Market-expected
Republic of Korea	Yes	No	Constant rate	–
South Africa	Yes	No	Constant rate	–
Sweden	Yes	No	Constant rate ²	Endogenous
Thailand	Yes	Yes	Constant rate	Endogenous
U.K.	Yes	Yes	Market-expected	Average of UIP and random walk

¹ In Brazil the forecast is also presented assuming market-expected interest rates and exchange rates.

² As of March 2005 scenarios based on market-expected interest rates are also included.

Sources: Central banks' web sites and Fracasso, Genberg & Wyplosz (2003).

not conditioned on a constant interest rate. Neither is it easy to assume a constant monetary policy in an econometric model; moreover, the effect will depend on how this assumption is interpreted. Consequently, the published inflation forecast will not necessarily be the best possible forecast. This problem is accentuated when the instrumental rate is unusually far above or below its normal level.

Some central banks therefore prefer other interest rate assumptions for their inflation forecasts. One alternative here is to start from a path for the interest rate that is consistent with inflation being on target at a given horizon. This can be done with an econometric model with monetary policy as an endogenous component. In many cases such models also have to be supplemented with some type of "judgement" for the monetary policy trade-off. Three inflation-targeting central banks that publish inflation forecasts present endogenous interest rate paths, namely those in Colombia, New Zealand and the Czech Republic. Publishing such interest rate paths has the advantage that as prices and wages are not fully flexible, expectations of future monetary policy have real economic effects. In more advanced models of monetary policy, it is the entire future path of short-term real interest rates that has consequences for consumption and investment, see e.g. Woodford (2003).

However, publishing interest rate paths can have the drawback of making the central bank's internal decision-making more difficult, see Mishkin (2004). Agreeing on a path for monetary policy that stretches several years into the future can be a problem, particularly when this is done by a collegial board. Another alternative, therefore, is to condition the inflation forecast on market agents' expectations of the future path of the instrumental rate. One approach to approximating the market's expected interest rate path is to use implied forward interest rates.³³ The Bank of England and Norges Bank publish projections conditioned on a path for official interest rates implied by market yields. From October 1999 until March 2003 the Inflation Report of Sveriges Riksbank contained boxes with estimates based on a survey of market expectations of the repo rate. As of March 2005 the Inflation Report will include scenarios, based on implied forward rates, with an extended forecast horizon (see Table 3).

Some central banks prefer other interest rate assumptions based on a path.

Another alternative is to start from the instrumental-rate expectations of market agents.

³³ However, forward interest rates include maturity premiums and perhaps these should be taken into account when approximating the interest rate expectations of market agents.

Another way is to use survey data on the interest-rate expectations of market agents. An advantage of this type of interest rate path is that it can be seen as a technical assumption that is more realistic than a constant instrumental rate without amounting to a central bank commitment. As shown by Bernanke & Woodford (1997), however, the strategy has the drawback that it may contribute to uncertainty if market agents assume that the central bank bases its decisions on the market's view and this leads to a vicious circle of market guesses and the central bank's interest-rate decisions. Consequently the central bank may have difficulty from time to time in refraining from adopting a position about such an interest rate path, particularly when it results in a forecast that deviates from the target.

Discussing a complete interest rate path can thus create new conditions for communicating monetary policy. Norges Bank demonstrated this in the summer of 2004 when, conditioned on a path for official interest rates implied by market yields, its published forecast pointed to inflation below the target. Two alternatives for easing monetary policy were discussed in the inflation report. One was to lower the short-term instrumental rate. The Bank chose the other, which was to communicate that it had grounds for keeping the interest rate at the current low level for longer than the market had counted on, see Norges Bank (2004). Does this type of communication mean that the central bank may also need to pick out the best possible interest rate path for fulfilling the inflation target? If so, it seems rather natural to also want to be transparent about this and publish such a path, which the Bank of New Zealand already does, for example. The Norwegian example shows that it is perfectly possible for the central bank to note that market expectations represent an unduly restrictive monetary policy without the need to present an alternative path.

Tactical forecasts?

Central banks that publish inflation forecasts are also liable to be criticised for presenting forecasts that tend to be close to the target or coloured by tactical considerations. Such criticism is not particularly relevant. On the contrary, it is quite reasonable that, given a credible inflation target, the forecast is fairly close to the target. For one thing, a credible target provides an anchor for inflation expectations. A target also seems to render the inflation process less persistent.³⁴ For another, as central banks adjust the instrumental rate whenever fundamental factors modify inflation

³⁴ In other words, future inflation becomes less dependent on past inflation, see page 41.

prospects, sizeable changes in the inflation forecast are seldom called for.³⁵

Neither is the forecast likely to be conditioned by tactical considerations. In that it is published, outside observers are in a position to compare it with other forecasts and judge whether or not it is biased. Central banks might therefore also present the forecasts of other institutions in their inflation reports, as is done, for example, in Sweden, Thailand and the United Kingdom.

The publication of inflation forecasts enables people to judge whether or not the forecast is biased.

The challenge of uncertainty

The uncertainty inherent in all forecasting work is a greater challenge. Besides the instrumental rate's relatively uncertain impact on the demand situation and hence on inflation, there is the potential impact of factors the central bank cannot control. The latter include supply shocks on account of genuinely exogenous changes due to, for example, the weather, oil prices or technology. There are also international imbalances, geopolitical developments and other events with consequences that are very unpredictable. Finally, inflation may be affected by political decisions, particularly of a fiscal nature, either directly (indirect taxes) or after a time lag due to changes in aggregate demand. The best way for the central bank to deal with problems of this type is to make the prevailing uncertainty clear in some way.

The most common way is to publish a fan chart showing the confidence intervals for the inflation forecast. Roughly two out of three inflation-targeting central banks do this (see Table 3) and almost one in three also presents a fan chart for GDP growth. Moreover, a fan chart depicting the possibility of various future inflation outcomes indicates whether the balance of risks in the main scenario's inflation forecast is upside or downside. If upside risks are judged to predominate, the area above the main scenario is larger than the area underneath and vice versa. The main scenario normally represents the forecast mode, that is, the scenario that is judged to be most probable (this is done in, for example, the United Kingdom and Sweden), while monetary policy is more likely to be based on the path that represents the expected mean of future inflation. So if the upside risks are larger (smaller) than the downside risks, monetary policy will be based on a path for inflation that is higher (lower) than the main scenario.

Roughly two out of three inflation-targeting central banks present confidence intervals for their inflation forecasts.

³⁵ Inflation prospects may change quickly, however, in a clear cyclical upturn or slowdown, as well as in the event of a marked, exogenous inflation shock.

Svensson, Houg, Solheim & Steigum (2002) consider it would be more natural to use the expected mean of future inflation for the main scenario. It can be added that in the actual forecasting process the main scenario constitutes a very detailed assessment and when this scenario is produced, both sector and model experts may find it easier to condition it on the expected mean. The spectrum of risks is obtained iteratively and is normally less detailed.³⁶

The Riksbank also publishes an indication of the degree of uncertainty in the assessment and this determines the width of the inflation fan chart two years ahead. Leeper (2003) has pointed out that the Riksbank sometimes gauges the uncertainty in its reports as more than normal but never as less than normal. This could be because in the period since the introduction of the new Executive Board, inflation has been exposed to unusually many sizeable shocks. It may also be the case that decision-makers always feel rather uncertain and are psychologically averse to the notion that uncertainty is below normal. Still, over a longer period these uncertainty assessments ought to average out as normal uncertainty. This suggests that in time there will be grounds for re-calibrating what is meant by normal uncertainty.

Exchange rate forecasts – genuinely uncertain

Another challenge when forecasting inflation concerns the exchange-rate assumption. Exchange rate forecasts are genuinely uncertain but even though they seldom hold, it is important to be clear about the assumptions behind them. This helps to make the inflation assessment in the report comprehensible.

Six central banks, including the Riksbank, use an exchange-rate assessment motivated by fundamentals.

In the short run the exchange rate moves in an arbitrary way, known as a random walk. This could justify the assumption of a constant exchange rate. In practice, however, that is done by only three of the central banks that disclose their exchange rate assumption (see Table 3). This is probably because, over a period of years, the exchange rate is affected by fundamental factors and taking these into account can make the exchange rate forecast more accurate than the assumption of a constant rate. Moreover, a path for the exchange rate is a more reasonable assumption in econometric models. Six central banks, including the Riksbank, use an exchange-rate assessment motivated by fundamentals (see Table 3).³⁷ Another common approach is to condition the projection for inflation on the development of exchange rates that the financial mar-

³⁶ For a suggested way of setting up an analysis of uncertainty, see Blix & Sellin (1999).

³⁷ If the instrumental rate is assumed to be constant in the forecast period, a correction may be needed when establishing the path of the exchange rate.

kets count on (in the forward market), though that poses the problem that this assumption may not be consistent with other assumptions in the forecast.³⁸

Decision-making and accountability

Decision-making is an important aspect of monetary policy. The decisions of inflation-targeting central banks usually concern both the instrumental rate and the assessment of inflation.

There are a couple of arguments to the effect that monetary policy should be decided by a collegial board, not by a single person. One stems from the need to balance different preferences. Members of a board can differ about, for example, the trade-off between stabilising inflation and the output gap, respectively. At the same time, central bank credibility needs to be maintained even when board members are replaced. Faust (1996) and Waller (1989) consider that this favours a committee whose members have different backgrounds and are replaced successively. The other argument concerns the importance of ensuring that decisions are made with broad competence that is the best available.

There are arguments in favour of deciding monetary policy in a collegial board.

The Riksbank's monetary policy decisions are made collegially by an executive board with six members, of whom the chairman (the central bank governor) has the casting vote, see Berg & Lindberg (2001). Decisions by most other central banks are likewise made by a board or a committee but in a couple of cases, Israel and New Zealand, the interest rate is set by a single person, the governor (see Table 4).

In Sweden the executive board is also accountable for the inflation report and the inflation forecast, as is only natural since this is the basis for the monetary policy decisions. The central bank's management is likewise responsible for the inflation report in almost half of the other countries (see Table 4). An inflation forecast is also published in every case where the management is accountable for the inflation report.

An important advantage of publishing the forecasts is that it makes it more feasible to hold the central bank accountable. Current monetary policy can be evaluated as soon as the inflation forecast has been published and motivated. The general public and the political system can then judge whether the forecast is reasonable and monetary policy well balanced given the published forecast. An evaluation can also be made after some time when the outcome of inflation is available. This outcome can

Publishing inflation forecasts makes it more feasible to hold the central bank accountable.

³⁸ There are, moreover, central banks, especially those which do not publish any forecasts, that do not specify the exchange rate assumptions on which the assessment in the inflation report is based.

TABLE 4. MONETARY POLICY MEETINGS AND MINUTES

	No. of members	Decision taken by:	Press notice	Minutes published
Australia	9	Consensus	Yes	No
Brazil	9	Vote ¹	Yes	Yes, after 8 days
Canada	6	Consensus	Yes	No
Chile	5	Vote ¹	Yes	Yes, after 12 weeks
Colombia	7	Vote	Yes	No
Czech Republic	7	Vote ¹	Press conference	Yes, after 11 days
Hungary	Maximum 6	Vote ¹	Yes	No
Iceland	3	Vote ²	Yes	No
Israel	5	Governor	Yes	No
Mexico	5	Vote	Yes	No
Norway	7	Consensus	Yes	No
New Zealand	Varies	Governor	Speech by governor	No
Peru	7	Vote	Yes	No
Philippines	7	Vote	Yes	No
Poland	10	Vote	Press conference	Yes, after 6 weeks
Republic of Korea	7	Vote	Press conference	Yes, after 3 months
South Africa	8	Vote ¹	Press conference	No
Sweden	6	Vote ¹	Yes ³	Yes, after 2 weeks
Thailand	7	Consensus	Press conference	No
U.K.	9	Vote ¹	Yes	Yes, after 2 weeks

¹ The Governor has the casting vote, reservations are published in the minutes.

² The monetary policy committee is an advisory body with no vote.

³ For an interest rate adjustment there is also a press conference.

Sources: Central banks' web sites and Fracasso, Genberg & Wyplosz (2003).

be compared with the target and the forecasts that were published earlier.³⁹

In countries where the interest rate is set by the central bank governor alone, it is the governor as a rule who is also accountable for the inflation report. In three countries (Hungary, Poland and South Africa), however, the report is the responsibility of the staff. The inflation forecast is published in these countries. Making the staff accountable for the forecast can serve to relieve the board of full responsibility for it and use it as just a part of the basis for monetary policy. This can have the advantage of providing more freedom when deciding monetary policy. The drawback is that should the board decide not to endorse the published forecast, uncertainty may arise about the grounds for the interest rate decision and accountability. There are also a number of countries where responsibility for the report rests with the bank as a whole or its management plus the staff.

A challenge for central banks with collegial decision-making is that those involved often disagree. Decisions are made on a majority vote in

³⁹ This is more complicated, however, if the forecast is based on an assumed constant instrumental rate.

about three out of four of the countries, including Sweden; in other countries with a collegial system, a consensus is required. In roughly one out of two of the countries where a vote is taken for interest rate decisions, the minutes of the meeting are also published and reservations against the decision are noted. The time lag before the minutes are published ranges from eight days to three months; the interval in Sweden is a fortnight. Publishing the minutes of monetary policy meetings has the advantage that it informs the market about the reasoning behind the decision. Moreover, the minutes can be used to accentuate the board members' individual accountability.

In two out of three of the inflation-targeting countries the central bank is also held accountable in parliamentary hearings (see Table 5), as important aspect of the process of delegation in a democracy. In a third of the countries, if inflation deviates from the target, the central bank is required to submit a letter or a report explaining the causes of the deviation and how inflation is to be brought back on target.

All in all, in a majority of countries the introduction of an inflation target has entailed a major institutional change in the implementation of and accountability for monetary policy. The next step in the present analysis is to consider whether this institutional change has also affected economic developments in these countries.

In most countries, including Sweden, decisions are made on a majority vote; in other countries a consensus is required.

TABLE 5. ACCOUNTABILITY

	Hearing in parliament	Open letter or report when off target
Australia	Yes	No
Brazil	No	Yes
Canada	Yes	No
Chile	Yes	No
Colombia	Yes	No
Czech Republic	Yes	No
Hungary	Yes	No
Iceland	No	Yes
Israel	Yes	Yes
Mexico	Yes	No
New Zealand	Yes	Yes
Norway	Yes	Yes
Peru	No	No
Philippines	Yes	Yes
Poland	Yes	Yes
Republic of Korea	Yes	No
South Africa	No	No
Sweden	Yes	Yes
Thailand	No	No
U.K.	Yes	Yes

Sources: Truman (2003) and Heikensten (1999).

Economic effects of inflation targets

What are the effects of conducting monetary policy with an explicit target for inflation? The earliest inflation targets have now been implemented for between ten and fifteen years, so it is becoming possible to analyse the economic consequences of this practice. This is usually done by comparing developments in the inflation-targeting countries with a control group of countries without such a target. Economic theory holds that the introduction of an inflation target should primarily affect the path of inflation, its variability and inflation expectations. If the target enhances monetary policy's credibility, one would expect an effect on nominal variables such as inflation and inflation expectations. But as monetary policy does not influence either growth or employment in the longer run, the impact on the real economy should be less evident. Nevertheless, if inflation targeting does lower inflation and its variability, it is important to check whether or not this is achieved at the expense of greater fluctuations in the real economy. Has a reduction of inflation and its variability been accompanied by increased fluctuations in GDP growth?

Studies indicate that inflation is reduced in countries that adopt an inflation target.

A number of studies show that the introduction of an inflation target is followed by lower inflation, see Pétursson (2004)⁴⁰. They find that, even after controlling for the global fall in inflation in the 1990s and the domestic business cycle, introducing an inflation target contributes to a reduction of the average rate of inflation by 2–3 percentage points. There is one study, however, where the reduction of inflation in inflation-targeting countries was found to be no greater than in a control group of countries without such a target, see Ball & Sheridan (2004). The reason for this result, according to the authors, is that before a target was adopted, inflation in the countries that did so had been higher than in the control group and this introduced a bias in the econometric estimation, a regression towards the mean. With an adjustment for this (the inclusion of earlier inflation on the right-hand side), the study found little evidence that inflation outcomes had become lower in inflation-targeting countries. However, these results raise two problems. One is that they permit the alternative interpretation that the inflation target did in fact bring inflation down in the targeting countries but that this is reflected in the adjusted estimation by the coefficient in front of earlier inflation, see Gertler (2003).⁴¹ The other problem is that the analysis by Ball & Sheridan (2004) is confined to inflation-targeting industrialised countries and in these

⁴⁰ See also Corbo, Landerretche & Schmidt-Hebbel (2002), Neumann & von Hagen (2002) and Truman (2003).

⁴¹ Ball & Sheridan (2004) seem to consider that inflation returns to a low level by itself, irrespective of the direction of monetary policy or the monetary policy regime.

countries inflation had usually been brought down a good deal before the introduction of an inflation target.

The same adjusted equation has been estimated by Pétursson (2004) for all inflation-targeting countries, including emerging-market countries. He finds that, if other factors and non-targeting countries are controlled for, the introduction of a target does lead to lower inflation but mainly in emerging-market countries. It can be concluded that the adoption of an inflation target does seem to have lowered the average rate of inflation in all targeting countries but that this effect is most pronounced in emerging-markets. At the same time, there are measurement problems which make it difficult to be more specific about the degree of this reduction, particularly in industrialised countries.

A number of studies also suggest that inflation has become less persistent in countries where it is targeted, see Levin, Natalucci & Piger (2004)⁴². Less persistence makes future inflation less dependent on inflation in earlier periods. After a disturbance that drives inflation up or down, in targeting countries inflation moves back towards the target.

Studies indicate that inflation has become less persistent in countries that target it.

A central role in this process is played by inflation expectations. The announcement of inflation targets has also been followed by lower inflation expectations, see Johnson (2002). This fall in targeting countries was greater than in a control group without a target. Moreover, inflation expectations correlate with earlier inflation in a control group but not in countries that target inflation, see Levin, Natalucci & Piger (2004). A study of survey data suggests that in Sweden, the inflation target has helped to anchor inflation expectations, whereas the corresponding effect could not be detected in the United States, see Bryan & Palmqvist (2004). In addition, errors in forecasting future inflation are reduced in inflation-targeting countries, see Corbo, Landerretche & Schmidt-Hebbel (2002). Taken together, these results are highly important in that they support the idea that adopting an explicit inflation target plays a role in anchoring long-run inflation expectations. The policy of targeting inflation can therefore be seen as a regime that enhances the credibility of combating inflation.

A number of studies indicate that after the introduction of a target, the variability of inflation has also been lower, see Jonas & Mishkin (2003) and Pétursson (2004). This is hardly surprising, since inflation normally varies less when it is lower. Some studies do in fact also indicate that inflation's variability has decreased to the extent the lower inflation motivates,

Studies indicate that after the adoption of a target, inflation has been less variable.

⁴² See also Pétursson (2004), Kuttner & Posen (1999), Siklos (1999), Kuttner & Posen (2001) and Corbo, Landerretche & Schmidt-Hebbel (2002).

see Johnson (2002) and Truman (2003).⁴³ Thus, the introduction of a target can be said to have contributed to both lower inflation and lower inflation expectations, which in turn has helped to make inflation less variable.

This brings us to the question of whether this increased credibility for anchoring long-run inflation expectations has been achieved at the expense of greater fluctuations in real economic activity. The empirical findings do not point to greater variability in GDP growth. According to Levin, Natalucci & Piger (2004), for example, less persistent inflation in the inflation-targeting countries has not been accompanied by more volatile growth. Pétursson (2004) finds that the adoption of an inflation target has actually led to improved growth in emerging-market countries, though in industrialised countries there is no impact on growth. The results in Corbo, Landerretche & Schmidt-Hebbel (2002) suggest that after the adoption of an inflation target, manufacturing output in these countries has become less volatile and the output gap less sensitive to disturbances in inflation.

All in all, the available studies indicate that in the countries that have adopted a target, inflation has become lower and inflation expectations more clearly anchored to the target. The consequences for growth are less clear-cut, as is also expected. But there is no support for inflation-targeting countries having lower or more volatile growth.

Conclusions

Inflation-targeting has proved to be a successful policy in the countries concerned.

In the countries that have adopted an inflation target, the policy has proved successful. An inflation target clarifies what a central bank can achieve – price stability – and what it cannot – boosting average growth or employment. Central banks that target inflation are transparent about their assessments, which helps to anchor inflation expectations to the target. A numerical inflation target also makes it easier to hold the central bank accountable for its monetary policy. All in all, inflation-targeting policy is a rule-based regime that has established greater credibility for low inflation and low inflation expectations without leading to increased volatility in growth or employment.

All inflation-targeting central banks are transparent about their assessments of future inflation and publish forward-looking reports of high quality. Here, however, there are some interesting differences.

Relatively few inflation-targeting central banks make it clear *whether*

⁴³ Levin, Natalucci & Piger (2004) find, however, that inflation is more volatile in inflation-targeting countries than in a control group but that this is explained by the former being exposed to larger inflation shocks.

or *in what way* monetary policy decisions take real economic developments into account. In view of the difficulty in specifying an explicit objective function for the trade-off between the inflation target and the fluctuations in growth or employment, some central banks have begun to be more explicit about paths for future inflation and growth, with a discussion of the considerations behind the judgement that is deemed most likely to lead to the target.

Roughly one in two of the central banks that publish inflation reports base their interest rate assumption on a constant instrument rate. This assumption has been found to carry a pedagogic advantage for a monetary policy decision in that it clarifies the expected outlook for inflation, given the current direction of monetary policy.⁴⁴ Still, counting on a constant instrument rate throughout the forecast period may be unrealistic. Some central banks have therefore introduced other interest rate assumptions when forecasting inflation. The Bank of England and Norges Bank condition their projections on an interest rate path derived from implied forward interest rates. As of March 2005, Sveriges Riksbank will supplement the assumption of an unchanged repo rate with long-term forecasts based on implied forward rates. The Reserve Bank of New Zealand publishes an endogenous interest rate path that leads to target fulfilment, a practice that is facilitated by the interest rate decision being made by a single person, the governor. In this way, several inflation targeting central banks have created new conditions for the monetary policy communication of current and future interest rate decisions.

⁴⁴ This definition of the current direction of monetary policy is not self-evident; if the current direction is defined instead as the expected path of interest rates, the pedagogic advantage of assuming a constant interest rate is less clear.

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