

Exchange rate or inflation targeting in monetary policy?

In the new environment of free capital flows, questions have arisen about the suitability of a fixed exchange rate as the nominal anchor of monetary policy. In recent years, various countries have increasingly been adopting “stricter” fixed exchange rate regimes or more flexible exchange rate policies. Consequently, it has been asked what could replace a fixed exchange rate as the anchor of monetary policy. The setting of formal inflation targets for monetary policy has been increasingly advocated by economists and central bankers and a large number of countries have adopted such a regime in recent years. The following article is a general discussion of this development and also presents the question as to whether such a policy might be suitable for Iceland.

1. The choice between a fixed or floating exchange rate

1.1. Exchange rate policy in an environment of free capital flows

Following the currency crisis in South-East Asia and Mexico and the decision by 11 European states to adopt a single currency, economists have increasingly been pondering the most suitable monetary and exchange rate policy. There appears to be growing support for the notion that countries are increasingly being forced to choose between either a “strict” exchange rate policy, involving the adoption of another currency or a currency board, or a much more flexible regime using a different nominal anchor for monetary policy. This is the theory of the vanishing intermediate regime (see, for example, Mishkin, 1999 and Eichengreen, 1999). The main explanation for this development is liberalization of international financial transactions and the huge increase in their volume which followed. Such an environment, whereby large amounts of capital can flow into a country and back out just as quickly, can make it very difficult to maintain a stable exchange rate and could jeopardize financial stability, as will be discussed later.

1. The author is division chief at the Economics Department of the Central Bank of Iceland. This article is a condensed version of two reports on exchange rate regimes and formal inflation targets. The author would like to thank Arnór Sighvatsson, Ingimundur Fridriksson and Már Gudmundsson for useful suggestions.

This development has prompted economists and governments in many parts of the world to consider the need for an exit strategy, if the fixed exchange rate policy runs into difficulties.² Experience shows that the path from a fixed exchange rate policy to a more flexible one can be fraught with problems. Eichengreen (1999) found, for example, that in 23 of 29 cases which he examined where countries abandoned fixed exchange rate regimes in favour of more flexible ones, the change was accompanied by a financial crisis. There appears to be a tendency to back down too late from a fixed exchange rate, and then only when the financial market forces the government to change tack.

1.2. Pros and cons of a fixed exchange rate

Before continuing, it is worth recalling the main pros and cons of a fixed exchange rate. Firstly, a fixed exchange rate reduces transaction costs and exchange rate uncertainty in international trade.

2. According to Eichengreen (1999) such a strategy needs, firstly, to relay a clear message about the alternative nominal anchor to be used. Secondly, a clear plan is needed for gradually increasing exchange rate flexibility, for example by widening currency bands in phases. Timing of reforms is also crucial. Policy changes should be avoided when a currency is weakening and under pressure. Poland, Israel and Chile are examples of a successful changeover from a fixed exchange rate regime to a more flexible one. However, it has been more common for countries to maintain a fixed exchange rate regime for too long and suffer by it, for example the South-East Asian countries and Mexico in recent years, and Brazil early last year.

Levelling out currency fluctuations reduces uncertainty and thereby stimulates trade. However, it is probable that the impact of such costs can be reduced by enhanced methods for minimizing currency risks.³ Secondly, a fixed exchange rate can serve as the anchor of monetary policy and increase its transparency. It can also serve as a suitable mechanism for bringing down inflation, as has been the case in Iceland. Thus, if the fixed exchange rate policy itself is credible, it is possible to benefit from the credibility of the area against which the currency is pegged to bring inflation down to a comparable level to that pertaining there. Thirdly, an imperfect foreign exchange market can cause instability in the economy. Studies suggest that foreign exchange markets are often characterized by herd behaviour and that a currency's exchange rate does not always reflect the economic fundamentals it is supposed to. Fixed exchange rates, which rule out internal fluctuations among participating currencies, reduce such behaviour and could have a beneficial impact on the economy.

However, a fixed exchange rate policy has various disadvantages too. Firstly, it deprives the central bank of its ability to use monetary policy to respond to domestic idiosyncratic shocks.⁴ Likewise, economic shocks in the country against which the currency is pegged will inevitably be reflected in domestic interest rates. In the event of misalignment in business cycles, this can lead to problems. Secondly, countries with fixed exchange rate regimes become prone to speculation against their currencies. If the fixed exchange rate policy lacks credibility there is a risk that investors will seek to rid themselves of that currency, forcing the central bank to buy it back on a large scale in order to defend the peg with rising domestic interest rates. This can prove very expensive and trigger a domestic crisis. Thirdly, a fixed exchange rate policy can reduce the flow of information. A currency's exchange rate contains important information about the country's monetary position and the credibility of domestic monetary

policy. Fixing the exchange rate can prevent such information from being relayed to the monetary authorities. Even though a fixed exchange rate is an easy target to monitor, it results in a less transparent policy. This is less of a problem if the exchange rate is allowed to fluctuate within a specific band, as is done in Iceland. Finally, a fixed exchange rate policy can increase the likelihood of a financial crisis if the bulk of domestic liabilities are of short duration or are denominated in foreign currency, as is common among countries with underdeveloped financial markets or a history of high inflation. Under such conditions, debtors' balance sheets can suffer major shocks when the domestic currency is devalued, if their income is mainly in domestic currency and unindexed. Bankruptcies and defaults with the banking system could result, sparking a financial crisis through the collapse of the financial system's intermediating function. A serious economic crisis often follows.⁵ Likewise, fixed exchange rate regimes can also encourage greater capital inflows since a stable currency reduces the risks faced by foreign investors. Such an inflow can lead to overheating of the domestic economy, especially when coupled with new-found liberalization and privatization in the domestic financial market, which in turn can produce loan losses with severe consequences for balance sheets within the financial system.

1.3. The optimal currency area

A decision about a future currency regime should preferably be based on an assessment of the respective costs and gains from a fixed or a stable exchange rate. It was the recent Nobel laureate Robert Mundell (1961) who first systematically stated the conditions that make a fixed exchange rate or monetary union a more attractive option than a flexible exchange rate. Firstly, there has to be a sufficient level of external trade for the gain from pegging the exchange rate of the currency to another to make a difference. In addition, since import prices weigh more heavily in domestic prices of a relatively open economy than in a closed one, a fixed exchange rate provides an

3. This cost must not be underestimated. For example, the provinces of Canada conduct considerably more trade among themselves than with their neighbouring US states, despite the longer distances involved. See McCallum (1995). The most probable explanation is the use of different currencies in Canada and the USA.

4. For developing countries or countries with a history of poor monetary management, however, this can be an advantage.

5. The experience of Mexico and several South-East Asian countries is a clear example of such a sequence of events. Although a flexible exchange rate could in itself cause a similar effect, the probability is smaller. Speculative attacks on a fixed exchange rate regime generally cause a large and discontinuous fall in the currency which occurs much more rapidly than with a more flexible one.

anchor for an important part of domestic prices and contributes towards tailoring inflation expectations to those in the region against which the currency is pegged. Secondly, the domestic business cycle needs to be reasonably synchronized with that of the region against which the currency is pegged. Asymmetry of domestic and foreign business cycles can lead to more difficult adjustment with a fixed exchange rate than with a more flexible one. However, wage flexibility or mobility of labour to and from the country can enable the labour market rather than the exchange rate to absorb the impact.

Iceland does not fulfil these conditions (see Már Gudmundsson, Þórarinn G. Pétursson and Arnór Sighvatsson, 1999). Even though the Icelandic economy is small, it is more closed than might be expected. In 1997, for example, the proportion of imports and exports to GDP was just under 72%, compared with an average of 70% among the industrial countries. A simple regression suggests that, given the size of the economy, this ratio ought to be in excess of 90%. Moreover, Icelandic business cycles appear to be almost completely out of step with those of other industrial countries. Only 5% of output growth can be explained by EU output growth and the correlation of domestic supply and demand shocks to similar ones in Europe is virtually nil. In addition, the greater part of Icelandic business cycles are explained by real supply shocks, making a fixed exchange rate more difficult than would otherwise be the case. Finally, the real wage flexibility which has prevailed over the past decades has probably been sharply reduced by the deceleration in the inflation rate. The experience of Iceland and other countries does not suggest that much downward flexibility of nominal wages can be expected. Labour mobility to and from Iceland is also relatively low, although it has increased somewhat in recent years. Thus, the domestic labour market does not appear sufficiently flexible to assume the exchange rate's role as the main instrument for adapting to shocks.

It is clear, therefore, that Iceland's economic structure calls for a flexible exchange rate regime.⁶

6. However, this could change in the future, whereby closer cooperation with the Euro countries, and even currency cooperation of some sort or another, could induce greater trade between these regions, resulting in closer correlation between their business cycles. Thus Iceland could fulfil the optimal currency area criteria with the Euro countries at a later date, even though it probably does not do so today.

Monetary policy in Iceland has reflected this need with frequent devaluations in the past and, in recent years, with relatively broad bands in which the currency can fluctuate. The regime has therefore allowed considerable exchange rate flexibility, despite the declared monetary policy target of a stable exchange rate.

2. Foreign exchange regimes around the world – Changing perspectives

Over the past twenty years there has been a reduction in the number of countries using a fixed exchange rate as the formal anchor of monetary policy. In 1979 68% of IMF member states operated a formal fixed exchange rate policy, while their number had fallen to 36% in 1997. Including countries with limited flexibility in their exchange rate arrangement, these respective figures drop from 76% to 44% (IMF, 1999). However, the formal regime only tells part of the story. Actual conduct of monetary policy may change without being reflected in changes in the formal arrangement of monetary policy. Considering the number of countries employing a fixed exchange rate *de facto* as the anchor of their monetary policies, it emerges that a fixed exchange rate in one form or another is still the most important monetary policy anchor in the world. Almost 60% of countries base their policies on a fixed regime, even though only 45% have a fixed exchange rate as a formal monetary policy target. Nonetheless, the number of countries employing a fixed exchange rate has fallen. In 1991 76% had a fixed exchange rate as their main monetary instrument, but this has now dropped to just under 60% (IMF, 1999 and *International Financial Statistics*, August 1999).

Table 1 shows the foreign exchange regimes of IMF members in 1999 in comparison with 1991. It reveals the development in recent years whereby countries with a fixed exchange rate policy have opted for a "stricter" one by adopting a common currency or that of another country, or by adopting a currency board, or conversely have allowed more flexibility in the exchange rate of their own currencies.⁷

7. The trend towards more flexibility in formulation of exchange rate policy is also reflected in the extension of currency fluctuation bands by many countries. Of the 40 countries that have used fluctuation bands at some time, 21 remain. Of the others, 8 have adopted more flexible

Table 1. The vanishing intermediate regime

	No. of countries		Proportion (%)	
	1991	1999	1991	1999
<i>Fixed exchange rate regime</i>				
(1) Currency union.....	14	31	9	17
(2) Currency board.....	8	14	5	8
(3) Pegged against one currency.....	21	17	14	9
(4) Pegged against currency basket	30	13	20	7
(5) Fixed within target zone.....	7	6	5	3
<i>Total</i>	80	81	52	45
<i>Managed floating</i>				
(6) De facto exchange rate target ¹	7	15	5	8
(7) Crawling peg ²	13	3	8	2
(8) Crawling bands ²	3	9	2	5
(9) No pre-announced path ³	8	26	5	14
<i>Total</i>	31	53	20	29
(10) "Soft" fixed exchange rate policy [= (3)+(4)+(5)]	58	36	38	20
(11) "Strict" fixed exchange rate policy [= (1)+(2)]	22	45	14	25
(12) Frequent intervention [= (6)+(7)+(8)]	23	27	15	15
(13) Infrequent intervention [= (9)]	8	26	5	14
(14) "Strict" fixed exchange rate policy [= (11)]	22	45	14	25
(15) Intermediate regime [= (10)+(12)]	81	63	53	35
(16) Infrequent intervention [= (9)].....	8	26	5	14
(17) Independent floating ⁴	42	48	27	26

1. Formally no exchange rate objective, but the exchange rate remains the main anchor of monetary policy. 2. Exchange rate or bands regularly adjusted according to predetermined rule. 3. Frequent government intervention in the foreign exchange market to influence the rate of the domestic currency, even though there is no statement of what the exchange rate target should be. 4. Exchange rate of domestic currency almost entirely determined in the market; government intervention rare and then generally only in order to even out exchange rate fluctuations. This is the closest form to a pure float. Sources: IMF (1999) and IMF, *International Financial Statistics*, August 1999. The classifications in (10)-(16), however, are the author's own.

Thus the theory of the vanishing intermediary regime appears to be justified.

As mentioned above, one of the main reasons for this development is likely to be the removal of restrictions on capital movements and the resulting massive increase in international financial transac-

exchange rate policies and the 11 Euro countries have adopted a common currency. At some time, 35 of these countries have extended their fluctuation bands or used bands which have been regularly adjusted. The pattern appears to be for extending the bands (generally in phases) and this is commonly viewed as preceding a more or less floating currency, with another monetary policy anchor adopted in its place.

tions. The number of countries that have removed restrictions on international capital movements has grown from 35% of IMF members in 1978 to 78% in 1997. An IMF survey (1999) suggests that greater exchange rate flexibility has accompanied the removal of capital restrictions in almost 90% of cases.

3. Inflation targeting – A new monetary policy option

In light of the fact that Iceland's economic structure calls for a flexible exchange rate regime, the idea has been raised of whether a formal inflationary target might be more suitable and could become the anchor of monetary policy in the years to come, to ensure long-term price stability (see Már Gudmundsson, Thórarinn G. Pétursson and Arnór Sighvatsson, 1999).

Another possible anchor of monetary policy could be money supply, which many central banks adopted in the 1970s. Most of them, however, have now abandoned such a policy, most recently the Swiss Central Bank, which adopted inflation targeting in December last year. The main reason that countries have abandoned money supply as an intermediate target in monetary policy is that innovations in the financial markets have made the relationship between money supply and prices highly unstable.⁸ Money supply is not regarded as a reliable indicator of monetary conditions in the short run, although persistent growth in money supply is always a formula for inflation.

3.1. Inflation targeting: Definition, implementation and experience

In recent years economists and central bankers have shown much greater interest in formal inflation targeting as a new approach to monetary policy, ever since New Zealand became the first country to launch such a policy in February 1990. A dialogue on formal inflation targeting is also in full swing in other countries. These include South Africa, Hungary, Poland and Brazil, and in the USA a bill advocating such a reform has been proposed.

Before continuing, it should be explained what is meant by monetary policy with inflation targeting in

8. The former Governor of the Central Bank of Canada, Gerald Bouey, once said: "We didn't abandon monetary aggregates, they abandoned us". Mishkin (1999).

practice. The first chief characteristic of this arrangement is that price stability is formally designated as the main objective of monetary policy, which clearly signals the monetary stance and the criteria for assessing central bank performance. Secondly, a declaration is issued stating a numerical target for inflation within a specific horizon. Thirdly, the government chooses the target, either unilaterally or jointly with the central bank which is granted instrumental independence to achieve the target. Finally, transparency of monetary policy and flow of information from the central bank to the public and government are increased. At the same time, central bank accountability is often outlined in more detail.

When monetary policy is based on an inflation target, no formal intermediate target such as a fixed exchange rate or a specified growth in money supply is used. However, given the key role that the central bank inflation forecast plays in a monetary policy with inflation targeting, the forecast itself can be thought of as an intermediate target (see, for example, Svensson, 1999 and Berg, 1999). In practice, the procedure is that the central bank makes an inflation forecast based on unchanged monetary policy. If the forecast suggests that inflation (for example over the following two years) will move outside the target band, the central bank is obliged to respond. The central bank then decides on the mix of actions which it considers most favourable for achieving its objectives.

The experience of countries which have adopted inflation targeting seems positive. They have managed to reduce the inflation rate and inflation expectations, in excess of what could probably have been expected if no formal inflation target had been set (see Bernanke, Laubach, Mishkin and Posen, 1998). Subsequently, these countries have also successfully contained inflation despite upswings in their economies. The impact of unforeseen price shocks has also apparently been dampened. However, the opportunity cost of a reduced inflation rate (in the form of increased unemployment) has not been lower among countries with inflation targets than those with other monetary regimes.

3.2. Which countries have formal inflation targets?

Table 2 presents a summary of countries using inflation targeting. These countries have adopted inflation targeting for a variety of reasons. Some, such as the UK and Sweden, originally operated a fixed

exchange rate regime which failed when confidence in it waned.⁹ In their search for a new nominal anchor, they opted for formal inflationary targeting. Canada, on the other hand, had tried to apply monetary targeting with little success. Innovations in the financial market had created an unstable relationship between money supply and inflation, and Canada saw inflation targeting as more likely to achieve low inflation. Other countries such as Israel and Poland had achieved considerable success in bringing down inflation and viewed inflation targeting as the most feasible way to maintain that success. Last but not least, economic research has shown that monetary policy only affects nominal aggregates in the long run, and that low inflation boosts efficiency and economic growth. These facts have led to even greater interest in using inflation targeting as the main anchor of monetary policy.

This development is clearly reflected in the structure of the ECB. Under the Maastricht Treaty, the ECB has complete freedom to use its instruments in order to achieve its stated price stability objective. Although money supply, together with an assessment of the price scenario, is the ECB's main monetary policy reference, the ultimate target of monetary policy is an inflation rate in the range 0 to 2%. The reference to money supply is a legacy from the Central Bank of Germany which had long experience of targeting this. However, it can well be argued that the Central Bank of Germany always maintained an inflation target, if only an informal one, because of its readiness to deviate from the declared money supply target if it identified a risk of inflation exceeding acceptable limits.

3.3. Monetary policy frameworks with formal inflation targeting

The implementation of monetary policy with formal inflation targeting varies somewhat from one country to another. This section discusses the main factors that need to be borne in mind in implementation of inflation targeting.

What measure of prices?

In all the countries, the inflation target is based on the

9. Finland and Spain also introduced formal inflation targets after the failure of their fixed exchange rate regimes. Since January 1999, however, they have been members of the European Central Bank (ECB).

Table 2. Countries with formal inflation targeting

<i>Country (date of launch)</i>	<i>Target reference</i>	<i>Target band</i>
Australia (1993)	CPI excluding vegetables and fruit, petrol, mortgage interest payments, officially controlled prices and other highly volatile prices	2-3%
Britain (1992)	Retail price index excluding mortgage interest payments	Lower limit 1-4% until 1997; 0-2½% afterwards
Israel ¹ (1991)	CPI, but underlying inflation is also allowed for in implementation of the policy	8-11% to 1998; 7-10% afterwards
Canada (1991)	CPI excl. food, energy prices and direct impact of indirect taxes	1-3%
New Zealand (1990)	CPI excl. indirect taxes and officially determined prices, major changes in the terms of trade, mortgage interest payments and impact of natural catastrophes	0-2% to Nov. 1996; 0-3% afterwards
Switzerland (1999)	CPI	0-2%
Sweden (1993)	Formal policy based on CPI, but in effect based on underlying inflation since mid-1999	1-3%
Czech Republic (1997)	CPI excl. officially determined prices, impact of indirect taxes and subsidies	5½-6½% in 1998; 4-5% in 1999; 3½-4½% in 2000

CPI is the consumer price index. All countries use annual inflation as a reference point except Australia, which uses inflation over the business cycle. 1. Also employs a fixed exchange rate regime within a $\pm 30\%$ band.

Sources: Bernanke and Mishkin (1997), Bernanke, Laubach, Mishkin and Posen (1998) and central banks' websites.

Consumer Price Index (CPI). The main advantage of the CPI is that the index has a long history and is well known among the public. Furthermore, it is measured monthly with little lag, and is never revised.

Many countries, however, have opted to use the CPI after excluding various items, i.e. underlying inflation. The reason is that the CPI includes various items that lie outside the sphere of monetary policy impact and are considered to have only a temporary impact on inflation. Among them are officially determined prices, indirect taxes and subsidies. Furthermore, the CPI includes various items on which monetary policy actions have an "opposite" short-term effect, such as mortgage interest payments. Another disadvantage in using the headline CPI is that short-term changes in various categories of goods which are frequently susceptible to supply shocks may relay misleading information about the general price trend and thus generate unnecessary responses on the part

of the central bank. This includes categories such as foodstuffs and petrol.¹⁰ For all these reasons, these items are often excluded from the criteria used as reference points in inflation targeting.¹¹

Price level or inflation?

A great deal of academic discussion has taken place about whether it is preferable to target monetary policy towards the price level or inflation. The broad conclusion has been that inflation targeting seems to entail more uncertainty in long-term price forecasting than price level targeting does, which complicates long-term planning by individuals and firms. However, price level targeting is apparently accompanied by greater short-term fluctuations in inflation and output. Another disadvantage is that price level targeting obliges the central bank to counter tempo-

10. A distinction is also often made between temporary fluctuations in these items, which do not call for counteraction, and permanent fluctuations to which a response may be needed. See, for example, Bernanke and Mishkin (1997) and Berg (1999).

11. If another reference than the CPI is used, it is crucial for the central bank to explain to the public the reason for choosing it and its relationship to the CPI. This is important in order to prevent public misconceptions that the index has been chosen to present central bank performance in the most favourable light. Thus it is desirable for the index to be compiled not by the central bank itself, but by an independent agency, such as Statistics Iceland in Iceland's case.

rary inflation by generating disinflation, which when unforeseen can have a negative impact on the financial system. However, credible price level targeting can reduce the risk of persistent disinflation, since a negative deviation from the price level target creates inflationary expectations to offset it. No academic consensus for either price level targeting or inflation targeting has been established, but in practice all countries which now employ inflation targeting use inflation rather than the price level as a reference.

What should the inflation target be?

Although all countries aim for price stability, this does not mean that they literally strive towards achieving zero inflation. Maintaining complete price stability is not considered a preferable aim for four different reasons. Firstly, the CPI overestimates real price rises, due to a substitution bias in the fixed-weight index and systematic failure to account for the impact of quality changes. Research suggests that the CPI overestimates annual inflation by ½ to 2 percentage points. Secondly, reductions in real wages can only take place with price increases, since nominal wages show downward inertia. Very low or zero inflation can therefore reduce labour market flexibility. Thirdly, the economy is highly prone to a disinflation trap when inflation is virtually zero. Persistent disinflation can prompt a financial crisis and general economic depression. Finally, a reduction in real interest rates can prove difficult to achieve under negligible inflation, since it is impossible to bring nominal interest rates down to below zero. This may create problems in the event of a severe economic recession and even more so if it is coupled with a financial crisis.

In most cases, therefore, the inflation target is set at around 2%, except in countries which have been working their way out of higher inflation rates, where the target has been lowered in phases. Also, in all cases the inflation target is stated as a range. The target range reflects the fact that monetary policy measures do not exert complete control over inflation. Another advantage of a target range is that it grants a certain degree of flexibility in monetary policy, as discussed below. In addition, it imposes not only an inflationary ceiling but also a floor, which gives the opportunity to respond to both negative and positive shocks in aggregate demand (see Bernanke and Mishkin, 1997). Some countries such as New

Zealand have also opted to specify scenarios which allow deviations from the set targets, increasing policy flexibility even further. Such deviations may be resorted to in the event of major unforeseen setbacks on the supply side, such as serious terms of trade shocks or natural catastrophes.

What horizon should be used as a reference?

Given that it is neither desirable nor realistic for a central bank to manage to keep inflation within set limits all the time, the central bank needs to be given a specific time to respond if inflation exceeds them or seems to be heading outside them. Such a decision needs to take into account the expected lag between monetary action and its impact on inflation, i.e. the length of the transmission mechanism of monetary policy. It has proved difficult to assess this time factor precisely, but most international studies suggest that the impact of monetary policy on prices through aggregate demand has full impact after as much as one to two years. The direct impact of monetary policy on prices through the exchange rate, however, is felt much sooner.

On account of this uncertainty, flexibility is needed in responding to deviations from the inflation target. If the central bank is made to bring inflation back inside the target range within a shorter period than it is actually capable of, the result could be an unnecessary contraction in production and growth in unemployment.

For these reasons, most countries have decided on a reference period from two and up to four years. The extent of the flexibility that the central bank can allow itself is to a large extent determined by its credibility. If the bank enjoys confidence it can grant itself considerable scope without a loss of faith in the price stability target. If this is not the case, there is a risk that the public will begin to doubt whether price stability is in fact the main target of monetary policy.

Transparency of policy and central bank accountability

Economists and central bankers are increasingly subscribing to the view that transparency is an important precondition for successful implementation of monetary policy. Transparency is a precondition for enabling the public and government to assess the central bank's actions and the results they have achieved, which reduces uncertainty in decision-making

among individuals and corporations. A transparent monetary policy imposes restraint on central banks and makes it more difficult for them to deviate from set targets, since such behaviour would have a more rapid and more serious impact on its credibility. Thus monetary policy transparency increases the probability that the central bank will be made accountable for its actions, which in turn increases the likelihood of successful monetary policy implementation.

Greater transparency of monetary policy and an emphasis on central bank accountability for its actions are key points in implementation of formal inflation targeting. Some countries have made the minutes from central bank strategic planning meetings public and set legal obligations on the central bank to give a public explanation of why the inflation target has not been achieved, stating what it identifies as the cause of the deviations, whether these are temporary in nature, and which of them the bank regards as important in determining its monetary stance.

As in so many other respects, New Zealand has gone a step further than other countries. Its original review of reserve bank legislation assumed that the governor's nominal salary would be directly linked to the rate of inflation and would be lowered if the target was not met. This idea was abandoned at the last minute, however, and the present New Zealand reserve bank legislation includes authorization for dismissing the governor if inflation exceeds the target range. This provision was put to the test in 1995 when inflation exceeded the range for a short while, but after a parliamentary debate it was decided that the governor would remain in his post (Mishkin and Eakins, 1998).

Do other economic goals matter?

Despite the fact that formal inflation targeting specifies price stability as the priority of monetary policy, this policy is sufficiently flexible to enable the central bank to take into account the development of other economic aggregates, *as long as these do not pose a risk to price stability.*

Thus it is completely consistent with inflation targeting for the central bank to concern itself with economic growth and financial stability. The inflation target range, a reduced response to the impact of supply shocks on inflation, and specified allowed exceptions enable the central bank to respond to genuine economic setbacks if it considers that price stability

is not jeopardized. This need not necessarily be at the expense of the bank's credibility in countering inflation, if it can manage to give a clear and credible explanation of what is being done.

Greater scope for responding to specific domestic conditions is particularly important for Iceland, where domestic economic fluctuations are more or less out of synchronization with international ones. Under such circumstances, a strict fixed exchange rate policy may result in a pro-cyclical stance instead of a counter-cyclical one.

Does the central bank need to have complete control over inflation?

The main academic criticism of formal inflation targeting has been the fact that, unlike for example the exchange rate or narrow money, central banks have incomplete control over inflation. It is pointed out that other factors beyond the control of the central bank, such as the fiscal stance and labour market conditions, can have short-term effects on inflation, making it difficult for the central bank to keep inflation within the target range.

It is obviously correct that the less controllable and predictable the inflation rate, the less effective inflation targeting becomes. However, it should be noted that similar problems arise in practice with other types of nominal anchors, such as a currency peg or a monetary target. It is of little use to have perfect control over narrow money if the relationship between narrow money and inflation is very unstable, as experience indicates. The problem of maintaining a fixed exchange rate in an environment of free capital movements has been documented above.

In addition, research has shown that when the final goal of monetary policy is inflation, the best possible intermediate target is the central bank's inflation forecast. In this case the bank uses all the relevant information for conducting policy. Using money or a currency peg as the intermediate target is only efficient if the target variable contains all the information relevant for forecasting inflation. In this extreme case the intermediate target simply becomes the inflation forecast (see Svensson, 1999).

As inflation is also determined by other factors than the exchange rate and money growth, a formal inflation target with the inflation forecast as an intermediate target is the optimal procedure for conduct-

ing monetary policy from a strictly operational point of view. Other intermediate targets do not lead to better results, despite the fact that the central bank has imperfect control over inflation in the short run.

3.4. Preconditions for adopting inflation targeting in Iceland

In order for a policy of formal inflation targeting to succeed, reasonably efficient financial markets need to be at hand, so that central bank actions are actively relayed through the financial system and out into the economy. Such markets are in place in Iceland today, although they often seem to lack sufficient depth. However, given the rapid pace of advances, there do not appear to be any grounds for fearing that underdeveloped financial markets would prevent the adoption of formal inflation targeting in Iceland. By the same token, it is desirable to increase knowledge about the transmission mechanism of monetary policy, and since a monetary policy based on inflation targeting is inherently forward-looking, dynamic forecasting is needed in order to predict inflation and other key aggregates which the Bank regards as important in countering inflation.¹²

Finally, a legal foundation is needed to increase the Central Bank's independence in implementing monetary policy, so as to give participants in the financial, commodity and labour markets faith in its scope to work towards the inflation target. Thus the Bank would be given full freedom to use its instruments in order to achieve the inflation target. In fact, many arguments and international experience suggest that a central bank which is independent in this sense performs better in implementing monetary policy.¹³ Such a reform need not contradict the spirit of democratic tradition, since the central bank is subjected to closer supervision and restraint at the same time as it is made accountable for its actions and is obliged to give the public and the government clear explanations of them. Seen in this light, it is no coin-

cidence that countries whose central banks were previously relatively unimportant have made radical reforms to their central bank legislation and increased their independence considerably. These include New Zealand, the UK, Sweden, Canada, Australia and all the European countries which are currently members of the ECB, which is modelled on the German Central Bank, formerly considered the most independent central bank in the world. Similar developments have occurred in South-America and Eastern Europe.

Bibliography

- Alesina, A. and L. Summers (1993), "Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence", *Journal of Money, Credit and Banking*, 25, 153-162.
- Berg, C. (1999), "Inflation Forecast Targeting: The Swedish Experience", unpublished manuscript, Swedish Central Bank Economics Division.
- Bernanke, B. S. and F. S. Mishkin (1997), "Inflation Targeting: A New Framework for Monetary Policy?", *Journal of Economic Perspectives*, 11, 97-116.
- Bernanke, B. S., T. Laubach, F. S. Mishkin and A. S. Posen (1998), *Inflation Targeting: Lessons from the International Experience*, Princeton: Princeton University Press.
- Blinder, A. S. (1996), "Central Banking in a Democracy", *Federal Reserve Bank of Richmond Economic Quarterly*, 82, 1-14.
- Eichengreen, B. (1999), "Kicking the Habit: Moving from Pegged Rates to Greater Exchange Rate Flexibility", *Economic Journal*, 109, C1-14.
- Gudmundur Gudmundsson (1990), "Tölfræðikönnun á verðbólgu á Íslandi árin 1962-1989", *Fjármálatíðindi*, 37, 43-53. (Statistical Analysis of Inflation in Iceland 1962-1989).
- IMF (1999), "Exchange Rate Arrangements and Currency Convertibility - Developments and Issues", *World Economic and Financial Surveys*, 1999.
- Már Gudmundsson (1999), "Hlutverk og skipulag nútímaseðlabanka", *Vísbanding*, 29. tölublað, 17. árgangur. (The role and organization of modern central banks).
- Már Gudmundsson, Thórarinn G. Pétursson and Arnór Sighvatsson (1999), "Optimal Exchange Rate Policy: The Case of Iceland", forthcoming in *Macroeconomic Policy: Small Open Economies in an Era of Global Integration*, eds. Már Gudmundsson, Tryggvi Th. Herbertsson and Gylfi Zoëga. Reykjavík: University of Iceland.
- McCallum, J. (1995), "National Borders Matter: Canada-US Regional Trade Patterns", *American Economic Review*, 85, 615-23.
- Mishkin, F. S. (1999), "International Experience with Different Monetary Policy Regimes", *Journal of Monetary Economics*, 43, 579-605.
- Mishkin, F. S. and S. G. Eakins (1998), *Financial Markets and Institutions*, 2. ed. Addison-Wesley.
- Mundell, R. (1961), "A Theory of Optimum Currency Areas", *American Economic Review*, 51, 657-65.

12. Icelandic studies of the transmission mechanism include those by Thórarinn G. Pétursson (1999) on the impact of Central Bank interest rate changes on the financial system and studies by Gudmundur Gudmundsson (1990) and Thórarinn G. Pétursson (1998) on the impact of exchange rate, import prices and wages on prices. The Central Bank has years of experience in inflation forecasting, with quite good results. Continuous review is necessary, however, and is in full swing.

13. These arguments can be found in articles by Már Gudmundsson (1999) and Blinders (1996). An example of empirical studies is the article by Alesina and Summers (1993).

Svensson, L. E. O. (1999), "Inflation Targeting as a Monetary Policy Rule", *Journal of Monetary Economics*, 43, 607-54.

Thórarinn G. Pétursson (1998), "Price Determination and Rational Expectations", *International Journal of Finance and Economics*, 3, 157-67.

Thórarinn G. Pétursson (1999), "The Interest Rate Transmission Mechanism in Iceland", Central Bank of Iceland Economics Division, unpublished manuscript.