



Centre for Monetary Economics

Norges Bank Watch 2002

An Independent Review of Monetary Policy and Institutions in Norway

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Preface

The Centre for Monetary Economics (CME) at the Norwegian School of Management BI has for the third time invited a committee of economists for *Norges Bank Watch*, with the objective to evaluate the monetary-policy regime in Norway and Norges Bank's conduct of monetary policy. The new committee for *Norges Bank Watch 2002* consists of Professor Lars E.O. Svensson (chair), Princeton University, Chief Economist Kjetil Houg, Alfred Berg, Doctorate Student Haakon O.Aa. Solheim, Norwegian School of Management BI, and Professor Erling Steigum, Norwegian School of Management BI.

The aim of *Norges Bank Watch* is to contribute to the general discussion on monetary policy and institutions among the political system, the academic community and other interested parties. Two years ago, *Norges Bank Watch 2000* suggested that the Bank's actual interpretation of its stable exchange-rate mandate should be formalized as a flexible inflation-targeting regime. In March 2001, the government introduced a formal inflation target regime. As was the case in last year's report, we do not have the ambitions to suggest another major change of the system, but we hope to highlight important aspects of the present regime and we recommend a number of possible improvements of the regime.

The committee is solely responsible for the report and the views presented there, and the report does not necessarily represent the views of the CME or its members.

Oslo, September 19, 2002

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Executive summary

The Centre for Monetary Economics (CME) at the Norwegian School of Management BI has for the third time invited a committee of economists for *Norges Bank Watch*, with the objective to evaluate the monetary-policy regime in Norway and Norges Bank's conduct of monetary policy. The committee for *Norges Bank Watch 2002* consists of Professor Lars E.O. Svensson (chair), Princeton University, Chief Economist Kjetil Houg, Alfred Berg, Doctorate Student Haakon O.Aa. Solheim, Norwegian School of Management BI, and Professor Erling Steigum, Norwegian School of Management BI. The committee met in Oslo in June 2002, had discussions with key officials at Norges Bank and the Ministry of Finance, and has worked on its report until September 2002.

A realistic view of monetary policy

In order to evaluate the conduct of monetary policy, it is important to have a realistic view of what monetary policy can and cannot achieve. People typically ask too much of monetary policy—no less in Norway than elsewhere. In the long term, monetary policy can only control nominal variables such as inflation and the nominal exchange rate. It is beyond the capacity of any central bank to increase the average level or the growth rate of real variables such as GDP and employment, or to affect the average level of the real exchange rate. At best, monetary policy can reduce the variability of real variables somewhat. An attempt to increase the average level or growth rate of GDP, or to maintain a real undervaluation of the currency, would trigger every-rising inflation, at increasing cost to the economy in terms of less efficient resource allocation and arbitrary and inequitable redistributions of income and wealth. For these reasons, an increasing number of countries have specified low and stable inflation, “price stability,” as the primary goal for monetary policy.

In the short and medium term, monetary policy has effects on both nominal and real variables. However, the complex transmission mechanism of monetary policy, varying lags and strength of the effects through different channels, unpredictable shocks and inherent uncertainty combine to prevent fine-tuning.

Best-practice inflation targeting

There is considerable agreement among policy makers, academics and researchers in the monetary-policy area that so-called flexible inflation targeting is the best monetary-policy setup. Then inflation is stabilized around a

low inflation target in the medium term rather than at the shortest possible horizon, and a gradual and measured policy response avoids creating unnecessary variability in the real economy. Any required real exchange-rate adjustments are achieved through a floating exchange rate. Because of shocks, uncertainty and imperfect control, considerable variability may remain in the real economy, especially for small, open and less diversified economies like Norway. Best-practice central banks that have adopted flexible inflation targeting include the Reserve Bank of New Zealand, the Bank of England and Sveriges Riksbank. We believe these banks provide a relevant standard of comparison for the conduct of monetary policy in Norway.

Fiscal policy and real appreciation

Of special importance to Norway is the fact that a permanent future fiscal expansion, which is implied by the new guidelines for fiscal policy and the phase-in of the oil revenues, is likely to lead to a permanent real appreciation of the krone, a current increase in the neutral real interest rate and an even larger real appreciation of the currency in the short and medium term. This real appreciation is an equilibrium response of the economy to the new fiscal-policy situation and the related increased relative demand for output and resources of the sector producing nontradable goods and services (the sector sheltered from international competition). It will imply reduced competitiveness of the tradable-goods sector in Norway (the export and import-competing sectors exposed to international competition) and will most likely lead to reduced output, employment and profits in the tradable-goods sector. Attempts to delay such an equilibrium adjustment of the real exchange rate by stabilizing the nominal exchange is likely to be quite costly and result in more variable inflation and output gap, without in the end preventing the real appreciation of the currency.

The institutional framework

With regard to the institutional framework for monetary policy, there is considerable agreement among central bankers, academics and researchers in the areas of political economy and monetary policy that the institutional framework that is best designed to achieve the short- and long-term goals for monetary policy in a democratic society is one with (1) a legislated mandate of price stability, (2) operational independence for the central bank in fulfilling the mandate, and (3) accountability structures that make the central bank accountable to the government or the parliament for fulfilling the mandate. During the 1990s, central-bank legislation in many countries has been reformed to meet these requirements.

With regard to the institutional framework for monetary policy in Norway, we find that it has considerable weaknesses. There is no legislated mandate for price stability. Although Norges Bank in practice has considerable operational independence, this independence is insufficiently safeguarded in the central-bank act. There is no explicit accountability structure according to which Norges Bank can be held accountable for its policy. In a well-known international comparison of central-bank legislation, Norges Bank is ranked as the least independent central bank among the developed economies. With regard to the institutional framework, we have the following recommendation:

- A full-fledged institutional reform should be undertaken, similar to those that have been accomplished in the U.K. or Sweden. The reform should specify a mandate for price stability, operational independence, and accountability for Norges Bank.

Within the existing legislative framework, however, there are several potential improvements that we recommend:

- In order to resolve the inherent inconsistency between exchange-rate stability and low and stable inflation for Norway, the references to exchange-rate stability in the monetary-policy guidelines should be deleted. (More precisely, the first sentence should be deleted and the second sentence moved to after the fifth sentence.)
- The appointments to the Executive Board should be of experts on monetary policy and related areas, for instance, macroeconomics and financial markets, so that the members can independently contribute to the achievement of the announced objectives for monetary policy.
- The custom to invite political parties to nominate members to the Executive Board should be discontinued, in order to avoid the risk of sectoral, political or special-interest representation and related risks of deadlocks or policy directed to special interests rather than the country as a whole.
- Nonattributed minutes and attributed voting records from the Executive Board should be published, in order to strengthen the accountability and further improve transparency. These minutes should note without attribution to individual members which issues were discussed and what arguments were presented, as well as how individual members have voted.
- The essential material on monetary policy submitted to or formulated by the Executive Board, for instance, the Strateginotat (Notes on Strategy) outlining policy for the next four months, should be published, in order to strengthen accountability and further improve transparency.
- Several additional improvements to strengthen the accountability of Norges Bank should be undertaken: (1) An evaluation by the Ministry

of Finance of how Norges Bank has conducted monetary policy and achieved the stated objectives for monetary policy should be included in the Kredittmelding (the report by the Ministry of Finance to the Storting). (2) Regular hearings on monetary policy should be held in the Storting with the governor and other officials of Norges Bank, with the assistance of experts appointed by the Storting. (3) An annual or biannual conference on monetary policy in Norway should be held, financed by Norges Bank but organized independently, for instance, by an academic institution, and open to the general public and media. At such a conference, papers evaluating monetary policy by the Bank could be presented by national and international experts followed by comments by Bank officials and public discussion.

The conduct of monetary policy

When it comes to the conduct of monetary policy, we believe Norwegian monetary policy is in very good hands. The Bank has a very competent and highly trained top management and staff. The top management and many in the staff has long experience of economic policy, both monetary and fiscal policy. The Bank has a long tradition of academic research and analysis. Although the Bank has a short experience of inflation targeting, for several years before inflation targeting was introduced, it organized conferences and meetings on monetary policy, including inflation targeting, with academic researchers and central-bank officials from many countries. In this way the Bank built up an understanding of, and a competence in inflation targeting. We believe the Bank's Inflation Reports, the speeches by Bank officials and published articles and working papers by the Bank clearly demonstrate the high quality of the Bank's analysis and understanding. The Bank gives the impression of being a very competent and enthusiastic newcomer to the inflation-targeting camp, and it is our firm view that it masters the insights required for successful inflation targeting.

Overall, we believe Norges Bank is conducting monetary policy in line with the best international practice, like that demonstrated by the Reserve Bank of New Zealand, the Bank of England and the Riksbank. Nevertheless, we would like to recommend a number of improvements to the conduct of monetary policy, which if undertaken would in several cases push the frontier of best-international-practice inflation targeting further out:

- Inflation projections should generally be done conditional on the Bank's preferred instrument-rate path; that is, conditional on its best forecast of its future interest-rate settings. This would normally be a time-varying instrument-rate path. The assumed exchange-rate path should also nor-

mally be the Bank's best forecast of the future exchange rate, also normally a time-variable path. This would avoid some problems and inconsistencies associated with the current standard assumption of constant interest and exchange rates. It may also make monetary policy more predictable and improve the Bank's communication with the market.

- The central projections should be the *mean* projections (the probability-weighted average outcome) rather than mode projections (the most likely outcome). This is in line with established economic theory, which says that it is the mean forecast rather than the mode forecast that is relevant for decisions. This would normally make the somewhat cumbersome adjustment of the mode projection to the balance of risk unnecessary, and the fan charts for the projections would mainly be used to illustrate the uncertainty of the projections.
- The Bank should construct and publish projections of potential output, actual output and hence the output gap, conditional on time-variable instrument-rate paths. In this way the Bank can better reach the most desirable compromise between inflation variability and output-gap variability and the resulting compromise will be more open to external scrutiny.
- The emphasis on the precise two-year horizon of inflation projections on target should be reduced. Instead, the Bank should find the projections of inflation, the output gap and the corresponding instrument-rate path that the Bank thinks would achieve the best compromise between inflation stability and output-gap stability. These projections should be published in the Inflation Report and the Bank should set its instrument rate accordingly. These projections will then be the Bank's best unconditional forecast of future inflation, output gap and instrument rate. Publishing them will maximize the impact on private-sector expectations and thereby implement monetary policy more effectively. Publishing them also opens the Bank's projections for more precise external scrutiny. The fan charts around the projections should be constructed and interpreted as the Bank's best unconditional estimate of the uncertainty in the projections, thus conditional on its own future policy response.
- The Bank's analysis and explanations might benefit from further use of the concepts of potential output, output gap and neutral real interest rate.
- The Bank could be more explicit about the weight it puts on output-gap stability relative to inflation stability.

The debate on monetary policy and currency appreciation

The krone has appreciated strongly in both nominal and real terms. We find the real appreciation of the krone a logical outcome of the new guidelines for fiscal policy, which imply a permanent future fiscal expansion. This is

likely to be accompanied by not only a permanent real appreciation of the krone but an even stronger current real appreciation and a higher neutral real interest rate. These adjustments are equilibrium adjustments of the real economy to the new fiscal policy. Thus, they occur independently of monetary policy, and cannot be prevented by monetary policy. Monetary policy might delay the real appreciation somewhat by focusing on stabilizing the nominal exchange rate instead of inflation and the output gap. Perhaps such monetary policy could delay the real appreciation a few quarters or perhaps a year or so. Such a monetary policy, by being in the short run more expansionary than current policy by Norges Bank, would in the present situation most likely lead to increasing inflation and an overheated economy. The real appreciation induced by fiscal policy would then arise through an increase in the price level. As discussed in the text of the report, historically such policies, because of the inherent inertia in inflation once it has taken off, have led to an over-appreciation and hence overvaluation of the currency, and the boom has quickly turned to bust.

As far as we can see, in the current situation with a zero or positive output gap and considerable inflationary pressure, Norges Bank is conducting inflation targeting according to best international practice. This requires a relatively high real interest rate, but this is not surprising since the *neutral* real interest rate is likely to be higher, because of the future fiscal expansion and related current growth in consumption and aggregate demand.

The current public debate about the real appreciation and monetary policy seems quite confused. Several recent debaters do not seem to understand the relation between the real appreciation and fiscal policy and the limitations of monetary policy. Arguably, the Bank's motivation for the *de facto* inflation target from 1999 may have contributed to the confusion. There, inflation equal to that in Europe was motivated as a way to achieve long-run stability in the exchange rate. This argument relies on long-term purchasing-power parity, that is, the long-term real exchange rate is stable. However, in an oil economy where oil revenues sooner or later will be phased in, long-term purchasing power is unlikely to apply. Indeed, as argued above, a permanent fiscal expansion may trigger a permanent real appreciation of the currency. Although this is well known by the Bank, arguably the Bank could explain the current situation with even more clarity. Thus, we recommend:

- The Bank should more clearly explain the limits of monetary policy in relation to the real adjustment of the Norwegian economy that is likely to take place due to the new guidelines of fiscal policy and, in particular, explain that monetary policy cannot be expected to prevent the associated real appreciation of the krone.

Research at the Bank

Norges Bank has a strong research tradition. Its Research Department plays a leading role in Norwegian macroeconomic research. The department is also very strong in time-series econometrics and the economics of banking.

The Bank is somewhat unusual among inflation-targeting central banks in that the main economic model used for projections and simulations, RIMINI, is largely an empirical so-called reduced-form model that generalizes the empirical properties of Norwegian data. Most other inflation-targeting central banks instead to a large extent use structural models that are closer to macroeconomic theory and have equations that have structural interpretations. An inflation-targeting central bank needs to make projections conditional on alternative instrument-rate settings, for instance, instrument-rate paths. Doing this in a reduced-form model is associated with inherent problems, especially whether the reduced-form model is invariant to the alternative instrument-rate paths. A mostly empirical model is also very sensitive to the problem of being estimated on data from a different monetary-policy regime, in the Norwegian case from periods of exchange-rate targeting and interest-rate regulation.

Although the Bank and individual researchers there have already produced impressive research on the theory and practice of inflation targeting, we believe even more resources should be shifted to such activities. Active research in these areas is of considerable importance to the Bank. The Bank must have its own competence and capacity for such research for several reasons: Such competence and capacity is necessary in order to rightly assess the quality and practicality of research related to monetary policy and inflation targeting conducted at other central banks and academic institutions, which is a prerequisite for taking advantage of and applying such research to Norwegian problems and issues of concern for Norges Bank. Furthermore, such competence and capacity is necessary to do research specifically directed to specific Norwegian problems and issues of concern for Norges Bank. Finally, such competence and capacity at the Bank will allow the Bank to contribute to the world-wide development of monetary policy and inflation targeting. Regarding the research at Norges Bank, we recommend:

- Less emphasis on the Bank's large reduced-form model RIMINI and more emphasis on the development of alternative structural models.
- An even stronger commitment to research at an academic level on issues related to monetary policy in general and inflation targeting in particular.
- A high proportion of the working papers should be of such quality that they are accepted for publication in international scientific journals.

1 Introduction

This report on monetary policy and institutions in Norway, *Norges Bank Watch 2002*, is an evaluation of the institutional framework for monetary policy, the new monetary policy regime of March 2001, and the conduct of monetary policy by Norges Bank under the new regime. The report also includes a number of recommendations for improvement of the institutional framework, the new guidelines and the conduct of monetary policy.

The committee for *Norges Bank Watch 2002* met in Oslo in two periods, during June 10-12 and September 17-19. During the first period, we collected information, had a meeting with officials of the Ministry of Finance, had several meetings with the management and staff of Norges Bank, and had a meeting with Hermod Skånland, former Governor of Norges Bank. We also had preliminary discussions within the committee and outlined the main topics of our report. The report was largely completed in the period between the two periods and finalized during our second meeting in Oslo.

The report is organized in the following way. Section 2 discusses the principles of inflation targeting, a realistic view of what monetary policy can and cannot achieve, the appropriate goals for monetary policy, and, importantly, the real-exchange rate effects of fiscal policy. Section 3 discusses optimal delegation of monetary policy, the institutional framework for monetary policy in Norway, and the monetary-policy guidelines of March 2001. The section ends with a few recommendations for improvements of the institutional framework and the monetary-policy guidelines. Section 4 discusses the impact of fiscal policy and the phase-in of the oil revenues, the new economic-policy framework of March 2001, and the lessons for the Norwegian economy and the challenges for monetary policy. Section 5 discusses how Norges Bank conducts monetary policy, how inflation targeting can and should be evaluated, the appropriateness of the Bank's decision-making process, the Bank's use of projections, the Bank's individual decisions during the year and the Bank's communication of its policy. The section ends with some recommendations for further improving the analysis, conduct and communication of monetary policy. Section 6 provides a discussion of the monetary-policy debate on the appreciation of the krone and the Bank's contribution to the debate, including a recommendation for improvement to the debate. Section 7 discusses the research at Norges Bank as well as giving some recommendations about future research priorities. Section 8 summarizes our conclusions and lists our recommended improvements to monetary policy and institutions in Norway. An appendix reproduces the Regulation on Monetary Policy of March 29, 2001.

2 Principles of inflation targeting

2.1 A realistic view of monetary policy

A review of monetary policy should start from a realistic view of what monetary policy can and cannot do. Such a view of monetary policy is also important in a discussion of the appropriate goals for monetary policy and in understanding why an increasing number of countries have selected low inflation as the primary goal for monetary policy. It is sometimes suggested that monetary policy is unfairly selected as a scapegoat when other economic policies are to blame. To assess the validity of such suggestions also requires a realistic view of what monetary policy can and cannot do.¹

The ultimate objective of economic policy is to guarantee and enhance the citizens' welfare. This is often expressed as a number of separate goals which contribute to the citizens' welfare, for instance, efficient resource utilization, full and stable employment, high sustainable economic growth, price stability, equitable distribution of wealth and income, regional balance and environmental protection.

Monetary policy is part of economic policy. At first, one might think that monetary policy should have the same goals as overall economic policy. However, since monetary policy only has sustained or persistent effects on a limited number of variables affecting economic welfare, it is more appropriate that monetary policy is assigned a subset of goals. Specifying goals for monetary policy that it cannot achieve would, of course, be unproductive and could even be counterproductive. In order to determine which goals are most suitable for monetary policy, one must therefore understand the effects of monetary policy and what monetary policy can achieve.

How monetary policy affects the economy

Monetary policy affects real and nominal variables through a number of channels, together referred to as the transmission mechanism of monetary policy. Central banks normally conduct monetary policy by setting a short nominal interest rate, the central bank's instrument rate (in Norway, Norges Bank's overnight deposit rate). Suppose the central bank lowers the instrument rate. How is the economy affected? In the short term, domestic prices

¹¹ Some of this discussion builds on Svensson (1997, 2001).

and domestic inflation in industrialized countries are relatively slow to change (or sticky). This means that private-sector inflation expectations for the short term are also relatively sticky. This further implies that central banks, by controlling the short nominal interest rate, can also affect the short real interest rate: the difference between the short nominal rate and short-term inflation expectations. Via market expectations of future real rates, longer real rates are also affected. Thus, the lowering of the instrument rate normally lowers short and longer real interest rates. This will increase asset prices and aggregate demand for goods and services.

Furthermore, a reduction in the short interest rate normally depreciates the domestic currency and hence increases the nominal exchange rate (expressed as units of domestic currency per unit of foreign currency). Since domestic prices in practice are sticky, the domestic currency also depreciates in real terms. That is, the real exchange rate also rises (the real exchange rate can be seen as the price of foreign goods and services in terms of domestic goods and services or, alternatively, the price of tradable goods in terms of non-tradable goods and services). The depreciation of the currency implies that the domestic price of imported and exported final goods increases. Since these goods enter the Consumer Price Index (CPI), this means that CPI inflation increases, the extent of which depends on these goods' share in the CPI. This is the so-called *direct exchange-rate channel to CPI inflation*. This effect on CPI inflation usually occurs within about a year, or even quicker.

The fall in short and longer real interest rates mentioned above will stimulate consumption and investment and thereby increase aggregate demand. Since output is demand-determined in the short to medium run, higher aggregate demand will also raise output. This is the so-called *real-interest-rate channel to aggregate demand*. The rise in the real exchange rate makes domestically produced goods less expensive relative to foreign goods. This increases demand for export and for import-competing goods, which also adds to aggregate demand. This is the *exchange rate channel to aggregate demand*. The effects through these two channels usually occur in about a year or so.

The monetary-policy literature has also discussed a so-called *credit channel to aggregate demand*. It works in the same direction as the pure real-interest-rate effect on aggregate demand. For simplicity, we can therefore include the credit channel in the above real-interest-rate channel to aggregate demand. The real-interest-rate channel also includes effects via changes in wealth, for instance, changes in the stockmarket value due to interest-rate changes.

The impact of monetary policy on inflation

Having traced the transmission channels to aggregate demand, let us discuss the effects on domestic inflation: the rate of change in the prices of the domestically produced goods and services. (Inflation in domestically produced tradable and nontradable final goods and services is the main component of CPI inflation; another substantial component is inflation in imported final goods.) As mentioned above, normally we consider actual output as determined mainly by aggregate demand in the short and medium term. *Potential* output is the hypothetical output level that would result in the absence of price and wage stickiness. It is largely determined by factors other than monetary policy.² The output gap is the difference between current output and potential output. It can be seen as a measure of general excess demand in the economy. The above transmission channels to aggregate demand are hence also channels to the output gap. The increase in aggregate demand and the output gap will then lead to an increase in domestic inflation, because increased production increases the costs of production and because increased demand allows firms to raise prices. The increase in domestic inflation usually occurs within another year or so. This is the *aggregate-demand channel to domestic inflation*.

For a given output-gap level, domestic inflation is also independently affected by production costs, for instance wage costs and costs of intermediate inputs, like oil and raw materials. The depreciation of the currency increases the cost of imported intermediate inputs as well as imported final goods, and the reduced purchasing power of wages may trigger increased wage demands. This can be called the *production-cost channel to domestic inflation*. Finally, price and wage setting are affected by expectations of future inflation, since the expected future price level are the natural starting point for individual price and wage setting. This is the *expectations channel to domestic inflation*. Any increased inflation expectations that may be generated by the lowering of the instrument rate and the resulting increase in activity will then independently add to the effect on domestic inflation.

² Potential output is defined inclusive of frictions and imperfections other than price and wage stickiness, for instance, imperfect competition and limited transmission of information in markets. Thus, potential output is lower than the hypothetical economically *efficient* output level that would result with highly efficient markets and perfect competition. Increasing potential output towards the efficient output level is an important objective for *structural policies* aiming at improving the degree of competition in markets for goods and services and the workings of the labor market.

Thus, a reduction in the central bank's instrument rate affects the economy through a number of channels with different lags. The exchange rate and short and longer interest rates are usually immediately affected. Within a year or less, there is an effect on CPI inflation, through the direct exchange rate channel. As this first effect is working through, in about a year or so there is an increase in output and the output gap. Through that linkage, within another year or so there is a second effect on CPI inflation. Both effects work in the same direction, namely to increase inflation. However, the lags mentioned are only very rough rules of thumb. In practice, the lags and the strength of the effects through the different channels vary across channels and over time, and the effects are spread out over several quarters. For instance, the lag and the strength of the direct exchange rate effect on CPI inflation depend on the so-called pass-through of exchange rate changes: the degree to which importers pass on exchange rate changes to buyers rather than absorbing them in their profit margins. The pass-through varies considerably depending on the circumstances, for instance, with the perceived persistence of the exchange rate change, the size of the initial profit margins, and the price sensitivity of demand for imports.

Furthermore, the economy is subject to a never-ending sequence of unanticipated shocks and disturbances, directly and indirectly, to inflation and output. These include price changes of raw materials and oil, shifts in international capital flows, productivity changes, changes in fiscal expenditure and taxes, shifts in wage-setting behavior, etc. Many of these shocks are quite difficult to identify, and many occur during the lag between instrument adjustment and effects on output and inflation. Thus, it is worth emphasizing that the central bank's control over inflation, output and other macro variables is quite imperfect.

The long-term effects of monetary policy

We have seen above how the central bank, by lowering its instrument rate, thereby reducing the short real rate and the real exchange rate, can increase aggregate demand and output for a few years. Can the central bank *indefinitely* maintain a low instrument rate and a depreciated currency in real terms and in this way stimulate the economy indefinitely? The answer is definitely no. In the longer term, the central bank must set its instrument rate so that on average the short real rate is equal to the average *neutral real interest rate*. The neutral real interest rate is the equilibrium real rate that is consistent with output equal to potential output. It is largely determined by factors other than monetary policy. If the central bank tries to maintain a short real rate below the neutral real rate for too long, aggregate demand outstrips potential output, the economy becomes overheated, and inflation in-

creases to high single-digit, then double-digit inflation, and eventually hyper-inflation.³ As history has demonstrated several times, a hyper-inflationary situation eventually results in a breakdown of the market system and a severe economic and financial crisis. Thus, sustained stimulation of the real economy through monetary policy is not a feasible option.

In the long term, monetary policy can only control nominal variables such as inflation and the exchange rate. In the long term, monetary policy cannot increase the average level or the growth rate of real variables such as GDP and employment, or affect the average level of the real exchange rate. There is evidence that monetary policy that leads to high and/or variable inflation is harmful to the real economy and to economic growth, by making the market mechanism work less well and by creating unnecessary uncertainty. However, once monetary policy brings inflation down to relatively low and stable levels, monetary policy has no long-term effects on the *average* level and *average* growth rate of real variables. Nevertheless, monetary policy can affect the *variability* of some real variables, as further discussed below.

2.2 Suitable goals for monetary policy

In the long run, output fluctuates around potential output, which is determined by factors other than monetary policy.⁴ Thus, there is a conspicuous difference between output targets and inflation targets for monetary policy. Whereas a long-run inflation target for monetary policy makes eminent sense and can be achieved, a long-run level or growth target for output does not make sense for monetary policy, because it cannot be achieved. Put differently, in contrast to the inflation target, the long-run output target is not subject to monetary policy choice. Instead it is given by potential output, which is largely independent of monetary policy. In the long term, monetary policy can at best provide a stable environment for the real economy. However, the fact that monetary policy has effects on the level of real variables in the short and medium term creates considerable tensions and temptations that need to be faced and handled.

³ The mirror image of this is a rapidly increasing rate of growth of the monetary base. In order to maintain the short real interest rate below the neutral rate, the central bank has to inject money into the economy at a rapidly increasing rate. At higher inflation rates, this money-growth channel to inflation becomes dominant.

⁴ However, as already noted, bad and volatile monetary policy may well create a volatile and uncertain economic environment that deters investment and hence growth in potential output.

A crucial ingredient in a stable environment for the real economy is a nominal anchor: an anchor for the nominal variables and private-sector expectations of future nominal variables. An increasing number of countries have found that price stability, in the sense of low and stable inflation, provides the best nominal anchor. The reason is that the alternative, higher inflation has serious negative consequences. In practice, higher inflation always comes with higher variability in inflation. High and variable inflation impairs the capacity of the market mechanisms to achieve efficient resource allocation, and the ensuing uncertainty makes it more difficult for firms, consumers and savers to make the right decisions. It leads to arbitrary and inequitable redistributions of incomes and assets, for instance, a shift away from small savers to professional investors and from tenants to owners of houses and property. Inflation is effectively theft from small savers and low-income groups. High inflation has no lasting positive effects, and the adverse effects eventually become unbearable. Numerous historical experiences have demonstrated that bringing inflation down from a high level is costly; as a rule, a recession with high unemployment is required. Accordingly, it is important to avoid letting inflation take off in the first place. For these reasons, an increasing number of countries have specified low and stable inflation as the primary goal for monetary policy.

However, completely disregarding the real consequences of monetary policy in the short and medium term and focusing exclusively on controlling inflation at the shortest possible horizon would have bad consequences. This policy has been called “strict inflation targeting” in the literature. In practice, in an open economy, it would mean relying almost exclusively on the direct exchange rate channel to CPI inflation described above, since it has the shortest lag. For instance, any disturbance to domestic inflation that could arise from a number of different sources would be countered by attempts to move the exchange rate so as to let the domestic price of imported and exported final goods adjust to stabilize CPI inflation. This would require aggressive and volatile policy and lead to considerable volatility in interest rates and the nominal and real exchange rate, which would contribute to increased volatility of output, and surely be detrimental to welfare.

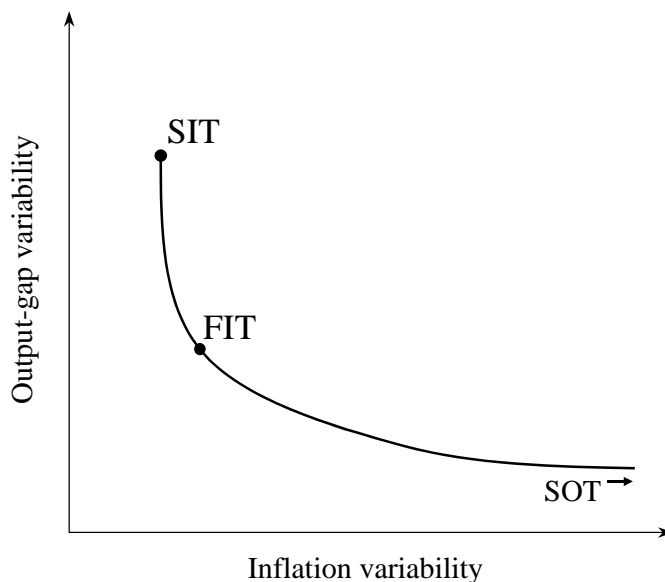
A more moderate policy, called “flexible inflation targeting” in the literature, maintains that the primary goal of monetary policy is to achieve low inflation in the form of an inflation target, but it is recognized that some weight should be given to stabilizing the business cycle and, consequently, stabilizing output movements around potential output. In practice, this means taking a somewhat more gradual and more moderate approach to monetary policy, aiming to achieve the inflation target at a somewhat longer horizon (say 2-3 years) than would be technically feasible (perhaps 3-4 quarters). It also

means accepting that inflation will, in the short term, deviate, sometimes quite a bit, from the inflation target. This approach also relies more on the aggregate demand channel than the direct exchange rate channel to inflation.

2.3 The tradeoff between inflation variability and output variability

The tradeoff between inflation variability and output-gap variability and the choice between strict and flexible inflation targeting have been discussed extensively in the monetary-policy literature, for instance, in several papers presented at the Jackson Hole conferences in 1996 and 1999 (Federal Reserve Bank of Kansas City 1996, 1999). The tradeoff is often illustrated as in figure 2.1, with inflation variability around a given inflation target measured along the horizontal axis and output-gap variability measured along the vertical axis. The intersection of the axes corresponds to zero variability of inflation and the output gap, that is, inflation always equal to the inflation target and the output gap always equal to zero. Because of the complex transmission mechanism of monetary policy, unpredictable shocks, imprecise control and inevitable uncertainty, zero variability is a completely infeasible outcome. Instead, the curve shows the most efficient and feasible combinations of inflation and output-gap variability that monetary policy can achieve. Points above and to the right of the curve correspond to inefficient monetary policy, where either inflation variability or output-gap variability, or both, could be reduced by better monetary policy. Points below and to the left of the curve correspond to outcomes that are infeasible. The point SIT corresponds to strict inflation targeting, when the central bank concentrates on stabilizing inflation without considering the consequences for output-gap variability. It results in the lowest feasible variability of inflation but high variability of the output gap. A point like FIT corresponds to flexible inflation targeting, where the central bank puts some weight on stabilizing output-gap variability. It leads to somewhat increased inflation variability but reduced output-gap variability. The point SOT, to the right outside the figure, corresponds to “strict output-gap targeting,” when the central bank puts all weight on stabilizing the output gap. It would lead to very high inflation variability.

Figure 2.1. The tradeoff between inflation variability and output-gap variability



Discussions among policymakers, experts and researchers in the monetary-policy area have by now resulted in considerable agreement that flexible inflation targeting is the best compromise for monetary policy. There is also general agreement that inflation-targeting central banks in industrialized countries in practice conduct policy in this way. That is, they aim to stabilize inflation around the inflation target but also to some extent stabilize output around potential output—acknowledging that because of the tradeoff, unpredictable shocks, uncertainty and unavoidably imperfect control there will always remain some variability in both inflation and the output gap. For a small, open, oil-producing and less diversified economy like Norway, the remaining variability is likely to be substantial.

However, one important mechanism for improving the tradeoff is by achieving credibility, in the sense of anchoring inflation expectations on the inflation target. Shocks to inflation expectations are historically an important source of variability in inflation and output, since shifts in inflation expectations have independent effects on future inflation—recall the direct expectations channel to domestic inflation mentioned above. Shifts in inflation expectations also cause additional indirect disturbances to output and inflation by affecting real interest rates and exchange rates. As a result, volatility in inflation expectations shifts the curve in figure 2.1 up and to the right and

worsens the variability tradeoff. Conversely, more stable inflation expectations anchored on the inflation target improve the tradeoff, shift the curve down and to the left, and allow inflation variability or output-gap variability (or both) to fall. This is also because inflation expectations anchored on the inflation target create a strong tendency for actual inflation to revert to the inflation target and, everything else equal, mean that monetary policy needs to be less active. Interest rates and output need to move less to counter unfavorable movements in inflation expectations. The economy is to some extent put on autopilot. This situation is every inflation-targeting central banker's dream. Although central bankers often may seem obsessed with credibility, this obsession is for good reason.

The feasibility and desirability of exchange-rate stabilization

Inflation targeting in an open economy will include an element of *implied* exchange-rate stabilization. Independent movements in the exchange rate, due to shocks and changes in international investors' sentiments, for instance, will have, through the direct and indirect exchange-rate channels discussed above, an impact on the CPI. For instance, through the direct exchange-rate channel to the CPI, an appreciation of the currency will, everything else equal, reduce the domestic-currency price of the imported final goods that enter the CPI and thereby lower CPI inflation. An inflation targeting-central bank would then to some extent prevent the lower inflation by more expansionary policy, which would moderate the currency appreciation. Importantly, this implied exchange-rate stabilization is not for its own sake; it is derived from the objectives of stabilizing inflation and the output gap.

A separate issue is the desirability and feasibility of independent stabilization of the exchange rate, that is, stabilization of the exchange rate for its own sake. It is certainly possible for the central bank to stabilize either the interest rate or the exchange rate somewhat, at the cost of increased variability of inflation and/or the output gap. Is it desirable for the central bank to do so? Except in situations of financial fragility with concerns about the stability of the payment and financial system, we find it difficult to see good reasons for such stabilization at the cost of increased inflation and output-gap variability.

It is sometimes suggested that central banks have an additional instrument beyond the instrument rate, namely so-called *sterilized foreign-exchange interventions*, and that central banks can affect the exchange rate independently from the instrument rate. More precisely, sterilized foreign-exchange interventions are central-bank purchases and sales of foreign exchange (in practice, foreign-currency treasury bills) while maintaining the instrument

rate at an unchanged level (which then may require coordinated open-market operations (in practice repurchase transactions in domestic treasury bills) in the domestic money market to undo (sterilize) the impact on the domestic money supply). A *nonsterilized* foreign-exchange intervention allows the intervention to change the instrument rate and is equivalent to a standard open-market operation to adjust the instrument rate. The result of much research and practical experience is that sterilized foreign-exchange interventions normally have only small and short-lived effects. The experience from sterilized interventions by Norges Bank does not contradict this view. Research and experience has, however, that there is one situation when sterilized interventions may have more substantial effects, namely when they are interpreted as signals or threats of future interest-rate changes. But a transparent central bank has much better ways of sending such signals.

There is no evidence that sterilized foreign-exchange interventions by themselves could have any material effect on exchange rate variability. We see no reason why a transparent inflation-targeter should undertake foreign-exchange interventions rather than standard open-market operations.

Increased credibility in the sense of increasingly stable inflation expectations around the inflation target will reduce a major source of shocks to exchange rates. Thus, successful and credible flexible inflation targeting is likely to contribute to less variability of exchange rates. However, exchange rates are by nature volatile asset prices and are affected by a number of shocks beyond inflation expectations. Such shocks will continue to cause unavoidable exchange-rate variability under inflation targeting.

Furthermore, currency markets are notorious for inducing both temporary and more permanent exchange-rate movements that are difficult to understand and often seem quite irrational. During the first few years of inflation targeting in Sweden, the krona appeared to many observers and to Sveriges Riksbank to be priced surprisingly low by international currency markets. During the inflation-targeting regime of the U.K., the pound appears to many observers and to the Bank of England to be priced surprisingly high. When international currency markets persistently price a currency above or below what seems to be a more reasonable real exchange rate, the only reasonable monetary policy seems to be to accept and live with this. For reasons discussed above, attempts by monetary policy to affect a real exchange rate in the long term are normally doomed to fail and only bring further costs in terms of increased inflation and output-gap variability.

But is it not possible to stabilize short-term movements in the real exchange rate without attempting to stabilize it at some particular level in the long run?

In theory it is possible to add another “stabilization objective,” namely the stability of the real exchange rate around its equilibrium rate. Furthermore, this equilibrium real exchange rate is ever-shifting due to shocks that change the underlying real equilibrium of the economy. Estimating the equilibrium real exchange rate is therefore a substantial challenge. Also, any stabilization of the real exchange rate would normally imply more variability of inflation and output gap. In practice, stabilization of the real exchange rate around an estimated time-varying real exchange rate is likely to be too ambitious and fraught with difficulties. Realistically, inflation targeting central banks will have to abstain from any real exchange-rate stabilization beyond that implied by the real exchange rate effects on inflation and the output gap.

2.4 Fiscal expansion and the real exchange rate

Norway is unique among the industrialized countries in its large oil revenues and the strong financial position of the government, due to these revenues and the Government Petroleum Fund (the fund of accumulated oil revenues that the government has invested abroad). As discussed in more detail in section 4, the new guidelines for fiscal policy of March 2001 imply a gradually more expansionary fiscal policy in the future, with great temptations and risks for discretionary even more expansionary policy. A fiscal expansion is likely to lead to a real appreciation of the krone. One way to see this is to note that increased fiscal expenditure will to a large extent fall on domestically produced goods and services, especially private and public services. Increased demand for nontradable goods and services will lead to an increase in their relative price to tradable goods. The increase in this relative price serves to attract labor and other productive resources from the sectors producing traded goods and services, for instance, manufactures, to the sectors producing nontradable goods and services. This process will show up as reduced competitiveness of the tradable-goods sector in Norway and will most likely lead to reduced output, employment and profits in the tradable-goods sector.

The rise in the relative price of nontradable goods corresponds to a fall in the real exchange rate and thus a real appreciation of the krone. It is a logical consequence of a fiscal expansion.⁵ Furthermore, a *permanent* fiscal expan-

⁵ In line with the discussion in section 2.4, we do not imply that fiscal policy is the only source of movements in the real exchange rates in general and the recent appreciation of the krone in particular. It is possible that recent strong real-wage growth in Norway will reduce future potential output and potential employment and require

sion, which is implied by the new guidelines, is likely to lead to a *permanent* real appreciation as well as, as we shall see, an even larger real appreciation in the short and medium term.⁶

The increased future aggregate demand will imply increased future output and income. Then, Norwegian households anticipate higher disposable incomes in the future, either from increased demand and income or from lower taxes in the future. Via a wealth effect, this will tend to increase current consumption and aggregate demand. Keeping current consumption and aggregate demand in balance with current output and avoiding an overheated economy requires a higher real interest rate, corresponding to a higher neutral real interest rate, in order to induce the corresponding amount of saving.⁷

A permanent real appreciation and increased real interest rate in the short and medium term will, everything else equal, lead to an even larger current real appreciation, a real exchange-rate overshooting. The reason is that the krone has to appreciate to such a high level that it can depreciate in real terms to the long-term permanent level. This way, for international investors, the real return from investing in Norway, taking into account both the real interest rate in Norway and the real depreciation of the krone, will remain approximately equal to the real return in the rest of the world. This is an equilibrium condition in the international capital market.

Importantly, these adjustments of the real exchange rate and the real interest rate are *equilibrium adjustments of the real economy* due to the anticipated future fiscal expansion, *independent of monetary policy*. *Monetary policy cannot prevent these adjustments*; it can at most delay them somewhat, but at the cost of more inflation and, as we shall see, probably a future recession. When monetary policy is directed towards maintaining low and stable inflation, the adjustment of the real exchange rate occurs mainly through movements of the nominal exchange rate. Adjustment of the real exchange rate via the nominal exchange rate has the advantage that it can easily be undone, if the underlying real sources of the adjustment in the economy, in this case the fiscal expansion, changes. For instance, if fiscal policy in the future

a higher real interest rate and thus more contractionary monetary policy to close the output gap. The higher real interest rate then induces a current real appreciation.

⁶ Even in the very long run, there need not be constant returns to scale in the production of nontradeable goods and services, due to specific factors of production in limited supply and congestion effects. Therefore, the real appreciation may persist also in the long run.

⁷ This is essentially the same kind of argument as the “new economy” with its increased output growth implying a higher neutral real interest rate.

should change in a more restrictive direction, the real currency appreciation can be undone by a nominal currency depreciation.

Monetary policy can delay the initial real currency appreciation somewhat, by focusing on stabilizing the nominal exchange rate and preventing the nominal appreciation of the currency, but, as we shall see, at a substantial cost to the economy. Delaying the initial real appreciation involves easier monetary policy and initially a lower nominal interest rate. Because the nominal price level is sticky in the short run, this would delay the real appreciation for some time. However, after a few quarters, the easier monetary policy would result in increasing inflation, especially since the adjustment of the real exchange rate and the real interest rate to avoid an overheated economy has been delayed. Then, the required real appreciation instead arises through an increase in the domestic price level in an overheated economy, rather than through a fall in the nominal exchange rate. Eventually, the same real appreciation has been achieved through a rise in inflation and a resulting increase in the price level.

However, achieving the real appreciation through inflation in an overheated economy has the large disadvantage that inflation in practice has considerable inertia. Thus, the high inflation will stay for some time. The higher inflation has the undesirable consequences we have already noted above, that it brings more uncertainty, impairs the capacity of the market mechanisms to achieve efficient resource allocation, makes it more difficult for firms, consumers and savers to make the right decisions, and leads to arbitrary and inequitable redistributions of incomes and wealth. Furthermore, the inertia in inflation means that the real-exchange-rate adjustment can go too far, leading to an excess real appreciation and hence an overvalued currency. Then a boom and expansion can quickly turn into bust and contraction. A real depreciation is then necessary to undo the overvalued currency, and with a stable nominal exchange rate, this requires deflation and a fall in the domestic price level and nominal wages, which normally requires a deep recession. The experience of the Nordic countries and the U.K. in the late 1980s and early 1990s give excellent examples of this tendency to boom and bust under a fixed exchange rate. With a flexible exchange rate, the desired real depreciation instead comes through a quick rise in the exchange rate, a nominal depreciation. This is indeed the reason why monetary policy aimed at low and stable inflation with a flexible exchange rate is considered superior to a fixed exchange rate—and indeed the reason why the fixed exchange rate was effectively abandoned in the late 90s in Norway (and earlier in Finland, the U.K. and Sweden).

Thus, it is quite costly and eventually futile to use monetary policy in an attempt to prevent equilibrium adjustment of the real exchange rate due to underlying changes in the real economy.

2.5 Summary

In the long term, monetary policy can only control a nominal variable, such as either inflation or the nominal exchange rate. It cannot increase the average level or the growth rate of real variables such as GDP and employment, or affect the average level of the real exchange rate. At best it can reduce the variability of real variables somewhat. In the short and medium term, monetary policy has effects on both nominal and real variables. However, any fine-tuning is prevented by the complex transmission mechanism of monetary policy, varying lags and strength of the effects through different channels, unpredictable shocks and inherent uncertainty. There is general international support for a regime of flexible inflation targeting, where inflation is stabilized around a low inflation target in the medium term rather than at the shortest possible horizon, a gradual and measured policy response avoids creating unnecessary variability in the real economy, and required real exchange-rate adjustments are achieved through a flexible exchange rate.

A permanent future fiscal expansion is likely to lead to a permanent real appreciation of the currency, a current increase in the neutral real interest rate and a larger short-run than long-run real appreciation of the currency. Attempts to delay such an equilibrium adjustment of the real exchange rate by stabilizing the nominal exchange is likely to be quite costly and result in more variable inflation and output gap, without in the end preventing the real exchange rate movements.

3 Optimal delegation of monetary policy and the institutional framework for monetary policy in Norway

3.1 Optimal democratic delegation of monetary policy

The situation in Norway differs from that in other European countries with regard to the central bank's independence and the extent to which monetary policy is (formally) delegated (we also discuss below to what extent monetary policy is delegated in practice in Norway). This motivates a discussion of the optimal delegation of monetary policy in a representative democracy.

In democracies, the government and the parliament are ultimately responsible for economic policy and accountable to the people. This is also the case for monetary policy. It does not preclude, however, that the political authorities may find it appropriate to *delegate* the formulation and implementation of the policy to independent authorities when this is considered the most efficient means of achieving the objectives of economic policy. A representative democracy is in itself based on delegation—the people delegates legislative powers to parliament, but holds the political authorities accountable through general elections; the administration of justice is delegated to independent courts which are to judge in accordance with the laws passed by parliament.

Delegating monetary policy to an independent central bank is obviously not a goal in itself. It is solely motivated by its advantages when it comes to achieving the economic policy objectives. What are these advantages? This question has been thoroughly analyzed in academic research. There is also plenty of practical experience from different countries. Research and practical experience show that the most important parts of a successful delegation can be summarized in three points:

(1) *Mandate*. The political authorities define a clear *goal* for monetary policy, preferably legislated, as is the case in an increasing number of countries. According to the discussion in section 2, low and stable inflation, with some weight on stability of the output gap, is the most appropriate goal for monetary policy.

(2) *Independence*. The central bank is given “*operational independence*” (sometimes also called “*instrument independence*”), which implies two things. First, the central bank must have an independent management, so

that it can pursue its monetary-policy goal free of short-term political pressure from the government and from various interest groups. The terms of office and the principles for appointing and removing the central bank's management must be set up with a view to this. Second, the central bank must be given full control over the instruments for monetary and exchange-rate policy, that is, control over open market operations and foreign-exchange interventions.

(3) *Accountability.* An important condition, not only for democratic control but also for efficient delegation, is that the central bank is held *accountable* to the political bodies for the monetary policy conducted. Accountability serves several purposes. In a democracy like Norway, it is a matter of principle that operational independence by any agency is accompanied by accountability. It also creates incentives for the central bank to pursue the goals it has been assigned. Accountability requires *transparency*, both in the form of a clear goal for monetary policy and a transparent reporting system for the central bank's policy actions and the analysis that motivates these actions, so that the bank's performance can be evaluated by external observers. The central bank's policy actions can, for instance, be reported and motivated in the central bank's publications, but also through subsequent—and public—questionings of the central-bank management in parliament. If the central bank is to be held genuinely accountable, specific sanctions may be needed, in the event that the central bank does not achieve the established goal in a satisfactory manner. This is the case in New Zealand, where the governor of the central bank is personally responsible for fulfilling the goal for monetary policy, and he or she can be removed from office, if mistakes in monetary policy result in the goals not being fulfilled. In the U.K., if inflation deviates more than one percentage point from the announced inflation target, the governor of the Bank of England is obliged to send an open letter to the Chancellor of Exchequer, stating the reasons for the breach, what action the Bank is taking to deal with it, and when inflation is expected to return to the target.

Another important element of political and democratic control is an *override clause*. In extreme circumstances, such as disasters or major international political or economic disturbances, the government or parliament should have the power to quickly issue new laws or decrees about monetary policy, temporarily absolving the central bank of its obligation to pursue the previously announced goal, for instance, low inflation. In view of democratic control, it is essential that this is made public and that the central bank cannot be required to depart from the announced objective secretly. This reduces the risk of short-term abuse, for instance by stimulating the economy before a general election in order to win votes in the short run.

What are the benefits of an executive delegation in relation to the three points above? Decades of research and practical experience show that *direct* government control over monetary policy entails, as a rule, great temptations to abuse monetary policy in order to gain short-term benefits. One may, for instance, be tempted to increase the level of output and lower unemployment in the short-term, often also to gain political advantages for the political party in power, not least in connection with general elections.

The general public, trade unions and firms—not least financial markets—sooner or later realize the ramifications of these temptations. This tends to lead to high inflation expectations and thus high wage increases, high long interest rates and high actual inflation. Confronted with this, the government often finds the short-term costs too high—in the form of recession—of conducting a tight monetary policy aimed at low inflation. The government therefore shifts towards an accommodating policy, thus allowing inflation to take off and the currency to fall. The high inflation expectations are thereby fulfilled. The government's repeated assertions that the goal of price stability remains firm may then easily lose credibility, and various explanations indicating that this is merely a temporary departure from long-run policy are not convincing. Public announcements from the Swedish government and from the Riksbank during the 1970s and the 1980s provide many such examples.

Delegating monetary policy according to the three points above is therefore a means for parliament and the government of strengthening the *credibility* of the announced policy. It should be emphasized that the purpose of operational independence for the central bank is not to achieve any other goal than the announced one; instead the principle is to increase the likelihood of achieving the democratically established goal. The experience of many countries reveals the advantages of such delegation (see, for instance, Calmfors *et al.* (1997)). Numerous studies show that countries with a clear delegation of monetary policy to an operationally independent central bank have been more successful in keeping inflation at bay, without sacrificing other economic policy goals such as economic growth and stability of output and employment.

Given these experiences, many countries in Europe and in the rest of the world have implemented institutional reforms in order to permit a clear delegation of monetary policy. This is the case for the countries that have entered the EMU, the Economic and Monetary Union in Europe, but also for several countries in Europe outside the Monetary Union, for instance, the U.K. and Sweden.

3.2 The institutional framework for monetary policy in Norway⁸

The institutional framework for monetary policy in Norway differs from the ideal framework discussed above. In Norway, *there is no legislated goal for monetary policy, and there is no formal operational independence of the central bank*. In an international comparison of central-bank legislation by Cukierman (1992), Norges Bank ranks as the least independent central bank among the developed countries. Furthermore, Cukierman's ranking was done before many countries all over the world reformed their central-bank legislation in the direction of increased central-bank independence.

The Central Bank Law (Sentralbankloven) was passed by the Storting (the Parliament) in 1985, before the modern discussion and reform of central-bank legislation, and has not been changed since. It states (section 2) that Norges Bank "shall conduct its operations in accordance with the economic policy guidelines drawn up by the government authorities and with the country's international commitments," and that "[b]efore the Bank makes decisions of particular importance, the matter shall be submitted to the Ministry of Finance." Furthermore, the government "may adopt resolutions regarding the operations of the Bank. Such resolutions may take the form of general rules or instructions in individual cases." Thus, the government has the right to give direct instructions to Norges Bank, either in the form of general rules or specific instructions in individual cases. In particular, the government can in an instruction reject the Bank's interest-rate decision.

The right of instruction of the government comes with several important checks, though: The instruction must be in the form of "King in Council," which is a more formal government decision than usual. "The Bank shall be given the opportunity to state its opinion before such resolutions are passed" in the form of a letter. "The Storting shall be notified of resolutions [by the government regarding the operations of the Bank] as soon as possible." The notification must be public and include the letter from the Bank. After the Storting has received such a notification, it could in a plenary session instruct the government to conduct an economic policy in line with the views of the majority of the Storting and this way force the government to accept the Bank's interest-rate decision. Clearly, there would be considerable public discussion if right of instruction was used to overrule a decision by Nor-

⁸ *Norges Bank Watch 2001* provides a more detailed discussion of the central bank legislation in Norway. Svensson (2001) provides a more detailed discussion of governance and committees of central banks, with special reference to New Zealand.

ges Bank. The right of instruction has never been formally used to overrule the Bank.

There has been some discussion of how the Central Bank Law is supposed to be applied (see Smith (1994)). The understanding today seems to be that, if the government instructs Norges Bank to act in opposition to the best judgment of the Bank, the governor of Norges Bank will resign.

Regarding *accountability*, the Central Bank Law states that Norges Bank shall submit annual reports and accounts to the government. These reports shall be made available to the Storting. The Ministry of Finance shall report to the Storting concerning activities in Norges Bank at least once a year, and more frequently if special circumstances dictate. These reports are included in the Kredittmelding (the Credit Report), an annual statement from the Ministry of Finance to the Storting. This statement also reports on a number of other public institutions in the credit markets.

The Kredittmelding includes the Bank's own evaluation of its policy, but there is no separate evaluation of the Bank's policy by the Ministry of Finance. There are no regular hearings in the Storting or elsewhere with officials of Norges Bank. Most of the discussion of monetary policy in Norway occurs in the media and in academic research and discussions. *Norges Bank Watch* so far provides the only regular and more thorough scrutiny of monetary policy and institutions in Norway.

The institutional framework in practice

In practice, fortunately, a system of delegation of monetary policy has evolved, which implies that the government does not exercise direct control over monetary policy. Instead, the government issues instructions in the form of general rules for monetary policy, more precisely specifying the nature of the monetary policy regime and the objectives of monetary policy, which apply for several years. Thus, in March 29, 2001, the government issued a Regulation of Monetary Policy that specified an inflation target of 2.5% for Norges Bank.

In practice, Norges Bank has significant operational independence, in the sense that it independently decides what level of its instrument rate (the Bank's overnight deposit rate) is appropriate. Before announcing and implementing its decision, it is still obliged to inform the government through the Ministry of Finance. As mentioned, the government has never formally rejected the Bank's instrument decision; doing so would have been a major political event. Furthermore, if that would happen, the presumption is that

the governor of Norges Bank would resign. Thus, with a strong governor and a strong reputation for Norges Bank, it would seem quite difficult for the government to interfere with interest-rate decisions, once the government has issued a regulation specifying the objectives of monetary policy. On the other hand, a weak governor and a weak Bank might of course adapt interest-rate decisions to what the government is likely to prefer, in order to avoid conflict.

Even if in practice a suitable delegation of monetary policy has currently been established, it is not safeguarded in the legislation about the institutional framework. A new government could interrupt the current practice and issue new instructions that would fundamentally change the monetary-policy regime and even move to day-to-day control of monetary policy, if the Storting does not object. For instance, the government could any time instruct Norges Bank to weaken the krone to some specified level and thereby take direct control over monetary policy. Thus, a legislated reform that would safeguard and strengthen the current practice would seem to be desirable.

The Executive Board

Monetary-policy decisions are made by the Executive Board of Norges Bank. The Board consists of seven members, appointed by the government. The governor and deputy governor are always members of the board. They are appointed for terms of six years, and can be once reappointed. The other five members are appointed for four-year terms. Every year two or three members retire. They can be reappointed to a total term of 12 years.

There is no requirement that the five members must be experts in monetary policy or related areas, like macroeconomics or financial markets. Should Board members be experts in monetary policy or nonexperts? Nonexperts have the advantage that there is a larger group of possible candidates to choose from, and therefore it is easier to find respected candidates who would contribute to the general legitimacy of the committee. However, a lack of expertise in monetary policy means reduced competence for independent assessment and capacity to participate in the technical discussion required in efficient inflation targeting. Nonexperts therefore easily become dominated by committee members with more expertise. There are thus good reasons to limit appointments to candidates with expertise in monetary policy, macroeconomics or financial economics. In line with this, the Bank of England has no nonexperts on its Monetary Policy Committee, and all appointments to the new Executive Board of the Riksbank in 1999 were ex-

perts (more recently a controversial political rather than professional appointment has occurred).

This issue is related to whether monetary policy is a political or technical activity. In Norway, once the government has specified the objectives, monetary policy is overwhelmingly a technical activity; how to best fulfill the stated objectives, more precisely, the given inflation target. Then monetary policy is best done by experts.

This also implies that appointments to the Executive Board with the purpose of sectoral, political or other special-interest representation are mistaken. Not only is it unnecessary, but it brings special-interest conflicts into the Board, which might cause deadlocks or risk policy serving special interests rather than the country as a whole.

By custom, the main political parties represented in the Storting are invited to nominate candidates for the five members Executive Board other than the governor and deputy governor. As far as we know, the government has not opposed these nominations, except that the government has imposed limitations on the gender composition of the Board. The custom of inviting nominations from political parties has no legal basis. It seems to increase the risk of sectoral, political or special-interest appointments. We therefore recommend that the custom be discontinued.

3.3 The monetary-policy guidelines

The current objectives for Norges Bank are specified in the new guidelines for monetary policy, the Regulation on Monetary Policy adopted on March 29, 2001 (reproduced in appendix A.1). The first three paragraphs read (the sentences have been numbered for easy reference):

§ 1.

(1) Monetary policy shall be aimed at stability in the Norwegian krone's national and international value, contributing to stable expectations concerning exchange rate developments. (2) At the same time, monetary policy shall underpin fiscal policy by contributing to stable developments in output and employment.

(3) Norges Bank is responsible for the implementation of monetary policy.

(4) Norges Bank's implementation of monetary policy shall, in accordance with the first paragraph, be oriented towards low and stable

inflation. (5) The operational target of monetary policy shall be annual consumer price inflation of approximately 2.5 per cent over time.

(6) In general, the direct effects on consumer prices resulting from changes in interest rates, taxes, excise duties and extraordinary temporary disturbances shall not be taken into account.

§ 2.

Norges Bank shall regularly publish the assessments that form the basis for the implementation of monetary policy.

§ 3.

The international value of the Norwegian krone is determined by the exchange rates in the foreign exchange market.

In addition to these guidelines, the Stortingsmelding (the Storting Report) No. 29 from the Ministry of Finance of March, 2001 states that “[c]onsumer price inflation is expected to remain within an interval of +/-1 percentage point around the target.”

The monetary-policy guidelines are not, unfortunately, internally consistent. Sentence (1) specifies stability in *both* the krone’s national value (which is the reciprocal of the price level) and international value (which is the reciprocal of the nominal exchange rate) as objectives for monetary policy. Furthermore, the sentence says that monetary policy should contribute to stable expectations about exchange rate developments. As discussed in section 2, especially section 2.4, stability in the price level and the nominal exchange rate cannot be reconciled, especially when a fiscal expansion induces a real currency appreciation. Fortunately, sentences (3)-(6) resolve this conflict by stating that monetary policy shall be oriented towards low and stable inflation and by specifying an inflation target of 2.5% per year for CPI inflation adjusted for direct effects from interest rates, taxes, excise duties and extraordinary temporary disturbances. Sentence (2) states that the Banks shall also put some weight on stable output and employment. Sentences (2)-(6) thus imply that the monetary policy is one of flexible inflation targeting as discussed in section 2, except that it would be more precise to mention either the “output gap” or the “employment gap” (the gap between output and potential output, and the gap between employment and potential employment) instead of “output and employment”. Mentioning both gaps is redundant since they are highly correlated.

A natural and logical improvement of the monetary-policy guidelines is to delete sentence (1) and to move sentence (2) to after sentence (5).

3.4 Potential improvements of the institutional framework

The most important improvement of the institutional framework is a full-fledged institutional reform, requiring a new law for Norges Bank, as discussed above and similar to those that have been undertaken in the U.K. or Sweden, with the three characteristics emphasized above—a legislated mandate, operational independence and accountability. The setup in the U.K. where the government formulates the inflation target would be most similar to the Norwegian tradition.⁹ Thus, we recommend:

- A full-fledged institutional reform, similar to those that have been undertaken in the U.K. or Sweden. The reform should specify a mandate for price stability, operational independence, and accountability for Norges Bank.

Within the existing legislative framework, there are, however, several potential improvements of the framework. We recommend:

- In order to resolve the inherent inconsistency between exchange-rate stability and low and stable inflation for Norway, the references to ex-

⁹ In February, 2002, Fremskrittspartiet (FrP) proposed a change to the Central Bank Law in Stortinget (Fremskrittspartiet, 2002). The main elements of the proposal are:

- The right of the Ministry of Finance to instruct Norges Bank should be removed. The obligation to consult the Ministry of Finance ahead of decisions must be removed.
- The inflation target should be implicitly stated in the law. There should be no reference to exchange rate stability or level.
- The Bank should receive operational independence.
- The Bank should submit semi-annual or annual reports to the Parliament.
- The Government should appoint members of the Executive Board that have a high level of competence and that are politically independent. Moreover, the Government should have the right to replace board members that do not fully subscribe to the inflation target.

Thus, this proposal largely agrees with the conventional wisdom about the appropriate institutional framework for monetary policy. Nevertheless, the proposal was rejected by the Parliament in April. The only votes in favor of the proposal were from the FrP itself. The minister of finance stated in a letter to the Storting that he wanted to consider some elements in the legal framework for Norges Bank during 2002.

change-rate stability in the monetary-policy guidelines should be deleted. (More precisely, the first sentence should be deleted and the second sentence moved to after the fifth sentence.)

- The appointments to the Executive Board should be of experts on monetary policy and related areas, for instance macroeconomics and financial markets, so that members can independently contribute to the achievement of the announced objectives for monetary policy.
- The custom to invite political parties to nominate members to the Executive Board should be discontinued, in order to avoid the risk of sectoral, political or special-interest representation and related risks of deadlocks or policy directed to special interests rather than the country as a whole.
- Nonattributed minutes and attributed voting records from the Executive Board should be published, in order to strengthen the accountability and further improve transparency. These minutes should note without attribution to individual members which issues were discussed and what arguments were presented, as well as how individual members have voted.
- The essential material on monetary policy submitted to or formulated by the Executive Board, for instance, the Strateginotat (Notes on Strategy) outlining policy for the next four months should be published, in order to strengthen accountability and further improve transparency.
- Several additional improvements to strengthen the accountability of Norges Bank should be undertaken: (1) An evaluation by the Ministry of Finance of how Norges Bank has conducted monetary policy and achieved the stated objectives for monetary policy should be included in the Kredittmelding (the report by the Ministry of Finance to the Storting). (2) Regular hearings on monetary policy should be held in the Storting with the governor and other officials of Norges Bank, with the assistance of experts appointed by the Storting. (3) An annual or biannual conference on monetary policy in Norway should be held, financed by Norges Bank but organized independently, for instance, by an academic institution, and open to the general public and media. At such a conference, papers evaluating monetary policy by the Bank could be presented by national and international experts followed by comments by Bank officials and public discussion.

4 The impact of fiscal policy and the phase-in of oil revenues

4.1 Challenges for economic policy in Norway

In the last ten years, Norway's economic growth and general macroeconomic performance have been impressive. The present purchasing-power corrected GDP per capita is 46% above EU average. The rate of unemployment has been below 4% for a number of years, and inflation is under control. Private consumption (purchasing power corrected) is however not larger than the EU-average, reflecting that Norway exports capital on a grand scale.

The government is becoming increasingly wealthy. In 2000 and 2001, the general government's budget surplus was close to 15% of GDP. Despite future population aging and large expected future pension liabilities, the issue of fiscal policy sustainability is much less of a present concern in Norway compared to most other European welfare states. The accumulated funds represent a great opportunity for Norwegian policy makers to insure and increase general welfare in the next decades. Compared to other European governments, the Norwegian government has a lot more room for fiscal maneuver. This new fiscal freedom, however, also brings with it several pitfalls: Fiscal discipline may erode, leading to excessive and wasteful rent-seeking, government bureaucratization and spending as well as distorting private sector incentives to work and increase productivity. The world oil price may drop and remain low for a long time, undermining the sustainability of the Norwegian welfare state. Rent-seeking, lack of fiscal discipline and unsustainable policies has been the normal scenario in many other economies that have relied heavily on oil exports.¹⁰

Looking ahead, Norwegian fiscal policy could become a lot more expansionary for many years without even turning the government budget into a deficit. And even if fiscal deficits should reappear, there is a long way to go

¹⁰ An extreme example is Venezuela that used to have a share of oil exports in total exports of 90% and a share of oil revenue in the government's total revenue of 60%. The high oil price in the beginning of the 1980s triggered an ambitious fiscal spending program that led to debt and currency crises when the oil price plunged in 1986. During the turbulent 1980s, Venezuela's GDP per capita declined by 18%, see Hausmann (1999).

until the net asset position of the government turns into net debt. The increasing wealth of the government has increased the demands and political pressure from various interest groups to cut taxes and increase government employment and spending, a pressure that is hardly possible to ignore for Norwegian governments that usually are weak and not even backed by a stable majority in parliament. If fiscal policy turns much more expansionary than the present fiscal stance, monetary policy could come under great pressure. In particular, the new rule for fiscal policy from 2001 indeed implies that fiscal policy will become more expansionary in the future, which is likely to lead to a sizeable real appreciation of the krone. In fact, this real appreciation, or part of it, may already have occurred.

In what follows we discuss the impact of fiscal policy and the phase-in of oil revenues implied by the new guidelines for fiscal policy. We first take a closer look at the new economic policy framework that was established in April 2001, involving an inflation target of 2.5% and a new fiscal-policy rule. Then we discuss the impact of this for monetary policy and the real exchange rate.

4.2 The new economic-policy framework

The “Solidarity Alternative”

During the last couple of years, the macroeconomic policy framework in Norway has changed. The former framework (the "Solidarity Alternative") was established in the aftermath of the 1988-89 recession and the subsequent poor employment performance in the beginning of the 1990s. The main goal of that framework was to restore full employment with low inflation, by a combination of central wage coordination (the income policy cooperation with the organizations of the labor market) and active counter-cyclical fiscal policy.¹¹ Monetary policy should aim at a stable exchange rate against the ecu/euro as a nominal anchor. After the speculative attack by the end of 1992, the exchange rate was no longer complete fixed, however, but allowed to fluctuate around, at first, an unspecified target level and, from May 1994, a specified level in terms of ecu and later euro. This monetary-policy regime can be described as a managed float. No explicit target band for the exchange rate was announced. Norges Bank stabilized the krone around its unspecified target value by increasing or decreasing the interest rate if the krone was considered too weak or strong, respectively, and in this way kept

¹¹ The name “Solidarity Alternative” refers to the solidarity (in centralized wage settlements) expected of insiders in the labour market towards unemployed outsiders.

it not too far from what it used to be in 1993. Fiscal policy was assigned the sole responsibility for macroeconomic stabilization through active aggregate demand management. For this purpose, a budget-balance indicator was constructed that excludes net government income from the petroleum sector and is adjusted for cyclical components and some other transitory items.

During the recovery from the slowdown of the Norwegian economy in the beginning of the 1990s, this framework served its purpose well. During the 1996-1997 boom, however, weaknesses became apparent. The krone tended to appreciate in the boom, and to prevent this, Norges Bank had to reduce its instrument rate. Thus, by reducing the interest rate in boom, monetary policy became pro-cyclical and further fueled the boom. This placed a large burden on fiscal policy: It was supposed to counteract not only the original overheating of the economy but also the expansionary effect of monetary policy. Table 4.1 presents two fiscal policy indicators for the period 1995-2001. From the first column we see that taxes paid by the mainland economy (excluding taxes on petroleum and shipping) did indeed increase faster than mainland GDP from 1995 to 1997. Moreover, government spending in % of mainland GDP declined substantially during the same period. As a result, total spending minus mainland taxes declined from 9.8% to 5.7% of mainland GDP in 1997. Therefore, it is very likely that fiscal policy did have a counter-cyclical effect during the boom. But it was not sufficient to prevent a very tight labor market, strong wage growth and inflationary pressure.

For the minority government at the time, it was hardly politically possible to tighten fiscal policy sufficiently under the prevailing circumstances. Even if a stable majority in parliament had supported the government, it is doubtful whether a sufficient tightening of fiscal policy would have been feasible without some backing from monetary policy.

Table 4.1. Mainland taxes and total government spending, 1995-2001
(% of mainland GDP).

Year	Mainland taxes (%)	Total government spending (%)	Spending less mainland taxes (%)
1995	46.3	56.1	9.8
1996	47.4	55.5	8.1
1997	48.2	53.9	5.7
1998	47.7	53.7	6.0
1999	49.0	54.9	5.9
2000	49.4	55.1	5.7
2001	-	55.6	-

Source: National Budget 2002.

Implicit inflation targeting

Thus, fiscal policy was not sufficiently contractionary, monetary policy with a fixed exchange rate was effectively pro-cyclical, and the boom continued to build up and increase tensions in the economy. From 1999, the new governor of Norges Bank, Svein Gjedrem, innovatively reinterpreted the fixed-exchange rate instruction from the government as implying a long-run exchange-rate target, and furthermore stated that the best way to achieve the long-run exchange rate target was to aim at inflation at a level similar to that in the Euro zone. This did away with the procyclical tendency of a fixed exchange rate and allowed monetary policy to contribute to stabilizing the business cycle.

This dramatic change in monetary policy to a superior monetary-policy regime was nevertheless not presented as a basic change of the monetary-policy framework, but as a way of improving the performance of monetary policy in the context of the Solidarity Alternative. Still, there can be no doubt that the markets fairly soon realized that Norges Bank had in effect adopted an inflation target of about 2%, and that the previous exchange-rate target had been abandoned.

New guidelines for economic policy

In 2000, a new challenge to the Solidarity Alternative emerged: A dramatic increase in the government's petroleum income triggered by the oil price increase. In table 4.2 we see that the government's petroleum revenue (net cash flow from the petroleum sector) increased from 4.5% of mainland GDP in 1999 to 15.3% in 2000 and to 22% in 2001.¹² The surplus of the central government increased even more, from 4% of mainland GDP in 1999 to 15.6 in 2000 and to the astonishing 23.4% of mainland GDP in 2001. Likewise, the surplus on Norway's current account increased from 6.4% in 1999 to about 20% of mainland GDP in 2000 and 2001. The surpluses implied a rapid growth of the Government Petroleum Fund from 22.1% of mainland GDP by the end of 1999 to 55.9% two years later. Also for the medium term future, large current account surpluses are expected. Although Norwegians have grown accustomed to such numbers, for international observers they are simply amazing.

The government's own estimates in 2000 and 2001 indicated that actual output exceeded potential output somewhat, reflecting a fairly tight labor mar-

¹² In 2001, the share of mainland GDP in total GDP was 75%.

ket. The economic-policy framework therefore called for a relatively tight fiscal policy for 2001. According to the cyclically adjusted non-oil budget-balance indicator mentioned above, next to nothing of the extra oil revenues to the government could be used to cut taxes or increase spending. This situation exposed another weakness of the old economic-policy framework: It was not designed to handle a situation of full employment and large oil revenues. In such a situation, fiscal policy would become overloaded because the short-run goal of counter-cyclical demand management (based on the adjusted budget indicator) would be inconsistent with the goal of phasing in oil revenues and returns from the Government Petroleum Fund. If fiscal policy should bear the main burden of stabilizing the output gap in the short run, it could not at the same time be used to phase in oil revenues optimally. Norway could risk over-accumulating government and national wealth! It became clear that fiscal policy could not bear the sole responsibility for stabilizing the output gap. Monetary policy had to be given a more important stabilization role than what the old policy framework had assigned to it. This dilemma for Norwegian economic policy explains why the government changed the economic policy framework in March 2001.

Table 4.2. *Petroleum revenue, central government surplus, current account surplus, and the Petroleum Fund, 1999-2001 (% of mainland GDP)*

	1999	2000	2001
Net cash flow from petroleum activities to the government (%)	4.5	15.3	22.0
Central government surplus, incl. the Petroleum Fund (%)	4.0	15.6	23.4
Current account surplus (%)	6.4	19.9	20.3
Capital in the Government Petroleum Fund (end of year) (%)	22.1	36.7	55.9

Source: Revised national budget 2002 and Statistics Norway.

The new guidelines for economic policy presented by the (minority) labor government to the Parliament in the Stortingsmelding No. 29, March 2001, involved two major changes in the economic policy framework:

- (1) Fiscal policy should facilitate a cautious and gradual phase-in of oil revenues accumulated in the Government Petroleum Fund, based on a new fiscal-policy rule. According to this rule, under normal business-

cycle conditions, the phase-in of oil revenues in terms of tax cuts and spending increases should correspond to the expected annual real return from the Petroleum Fund estimated at 4%. In addition, however, “emphasis must still be given to stabilize economic fluctuations.”

- (2) As discussed in section 3.3 above, monetary policy should be oriented towards low and stable inflation, with an inflation target of 2.5%. At the same time, monetary policy should “support fiscal policy by contributing to stabilizing output and employment.”

Confusingly, as discussed in section 3.3, the guidelines for monetary policy also stated that monetary policy should stabilize *both* inflation and the exchange rate, as well as contribute to stable expectations about future exchange rates. Furthermore, “[t]he new guidelines for monetary policy, together with the [new] guidelines for fiscal policy..., will provide a good basis for continued stability in the exchange rate, low inflation and a stable development of output and employment.”

Indeed, as we have already seen in sections 2 and 3 above, the implied future fiscal expansion in the new economic policy means that these three objectives are irreconcilable: Stability in the exchange rate cannot be reconciled with low inflation and a stable output gap.

The government also stressed its commitment to continue the incomes-policy cooperation with the labor market organizations. In fact, the Stortingsmelding presents the new policy framework as a way of attaining the goals of the Solidarity Alternative: Work for all, a stable development of production and employment, low inflation, a stable exchange rate, and a strong tradable-goods sector (the sector exposed to foreign competition, in addition to the large petroleum sector).

The Stortingsmelding also gave a strong signal that fiscal policy was supposed to bear a main responsibility for macroeconomic stabilization. Monetary policy should only “to some extent” support fiscal policy, and one should be careful not to place too much burdens on monetary policy. Less attention was paid to the corresponding problem of overloading fiscal policy with short-term demand management tasks in booms, when fiscal policy should also phase in petroleum revenues in a gradual manner. As explained in more detail in the next section, this probably puts unrealistically high demands on fiscal policy.

A large majority in the Parliament supported the labor minority government’s new guidelines for economic policy presented in the Stortingsmeld-

ing. In the fall of 2001, a new centre-right minority government came to power. It immediately announced its commitment to follow the new guidelines of economic policy stated by the previous government. It is noteworthy, however, that the new government signaled a change in the role of monetary and fiscal policy: Monetary policy should play a more important stabilization role, and the main focus of fiscal policy should be long-run goals such as increased potential output and a limit on the rate of growth of public spending. This assignment of responsibilities between monetary and fiscal policy is similar to the practice in most other inflation targeting countries.

The importance of a credible fiscal-policy rule

The new guidelines for fiscal policy have been in operation for a little more than a year, and it is too early to say how fiscal policy will work. Although a large majority in Parliament backs the main element of the fiscal-policy rule, it could come under pressure and be changed in the future. It is outside the scope of this report to evaluate the fiscal policy rule itself. We wish to emphasize, however, that Norway's situation makes it particularly important that there is a commitment to credible rule for fiscal policy that prevents opportunistic overbidding behavior among competing political parties and a loss of fiscal discipline. Without a fiscal rule that provides strong incentives for fiscal discipline, the Norwegian economy runs a large risk of decline and instability under the burden of an excessive and inefficient public sector, as well as insufficient investment and productivity in the private sector. Excessive fiscal expansion would create dangerously high tensions in Norway and make monetary policy extremely difficult. Most likely, the future fiscal expansion already implied by the fiscal-policy rule represents a considerable challenge to Norges Bank.

The limits of discretionary fiscal policy

As noted above, the stabilization role of fiscal policy is an unresolved issue in Norway. There are well-known severe problems associated with any discretionary use of fiscal policy for stabilizing the business cycle. First, there are numerous lags that almost always make fiscal-policy packages arrive too late. There are lags due to the collection of data and the inherent uncertainty in identifying the phase of the business cycle. There are lags in formulating the appropriate fiscal-policy response, and there are lags in the passing of fiscal-policy packages in Parliament, in particular for a weak government. Once a bill has passed, there are also lags in the implementation of expenditure adjustments or tax changes. As a result, it is quite common that fiscal stimulus arrives when the recession is over and a boom has started, and vice versa. Thus, discretionary fiscal policy easily becomes procyclical and de-

stabilizing. Second, it is very likely that a focus on short-term stabilization goals will reduce the effectiveness of fiscal policy in attaining long-term goals. In most countries, it is politically much easier to obtain a majority vote for cutting taxes and increasing spending in business cycle downturns than to agree on spending cuts and tax hikes in booms. Therefore, there is easily an expansionary bias in discretionary fiscal policy, leading to a higher real interest rate, a stronger currency and lower aggregate saving and investment. This line of argument seems to fit the experience in many OECD countries in the 1960s and 1970s. Third, discretionary fiscal policy involves welfare costs. Tax rates become less predictable, the quality and availability of public services will fluctuate with the business cycle, and the disruption of large public investment projects will be costly.

Policy-coordination failure is another potentially serious problem with active fiscal policy. There could be different opinions about the equilibrium rate of unemployment and the current output gap between the government and the central bank. Suppose, for example, that the central bank believes that the current output gap is positive (that is, there is excess aggregate demand) while the government believe that the output gap is zero. If fiscal policy is assigned a main responsibility for short-run stabilization, a coordination problem could arise. If the central bank tightens monetary policy in order to prevent increasing inflation, the government could think that fiscal loosening is appropriate. But then the central bank could react to undo the effects of the fiscal policy, and so on. This process would lead to a very unfortunate policy mix: Too expansionary fiscal policy and a very tight monetary policy.

In general, good coordination of monetary and fiscal policy can be achieved by placing each within a decision framework focusing each on medium-term objectives and making those objectives and related actions transparent. In this way, fiscal actions can take full account of the likely monetary-policy response, and vice versa. Regular information exchange between fiscal and monetary authorities will also contribute to this. The alternative approach to coordination, namely to make fiscal and monetary-policy decisions jointly, is fraught with difficulties and is not feasible, given the operational independence of the central bank that both in practice and in theory is necessary for good monetary policy.

For these reasons, many countries have gradually scaled back discretionary fiscal policy, given more long-term goals to fiscal policy, and let any stabilization by fiscal policy be done by the automatic stabilizers that are built into today's welfare states, like unemployment benefits and income transfers. For an ambitious welfare state like Norway, the stabilizing effects of the

automatic stabilizers are likely to be substantial. Furthermore, as discussed in section 2, a monetary policy characterized by flexible inflation targeting is well designed to stabilize the real economy to some extent.

Lessons for Norwegian economic policy and challenges for monetary policy

As far as we can see, the original guidelines for fiscal policy are too optimistic about the role of fiscal policy in stabilizing the economy. The new government's emphasis on more long-term goals for fiscal policy and reliance on automatic stabilizers rather than discretionary stabilization are therefore welcome. It remains, however, to see whether this government and the Norwegian political system in general can succeed in limiting the discretionary element of fiscal policy.

Regarding the long-term goals of fiscal policy and the new fiscal-policy rule, the phase-in of the oil revenues implies a substantial future fiscal expansion. Furthermore, there is a sizeable risk that discretionary temptations may result in much more fiscal expansion than the rule is supposed to allow.

As discussed in section 2.4, a permanent future fiscal expansion is likely to lead to a long-term real appreciation of the krone, an even larger short- and medium-term real appreciation, and an increase in the neutral real interest rate. Furthermore, these adjustments are equilibrium adjustment to the underlying change in long-term fiscal policy. As we emphasized in section 2.4, this adjustment cannot be prevented by monetary policy. At most, the adjustment can be delayed somewhat, but delaying the adjustment comes with substantial costs in the form of higher variability of inflation and the output gap and is therefore not advisable.

The confusing and mistaken rhetoric about exchange-rate stability in the new guidelines for economic policy seems designed to mislead the Norwegian general public about the economic realities that the new fiscal policy implies. It induces the misunderstanding that the new fiscal policy is consistent with exchange-rate stability. Norges Bank faces a stiff challenge in implementing its monetary policy in the current situation of a boom and real appreciation of the krone. This challenge is made much more difficult, if there is a misunderstanding among the Norwegian public, and perhaps even in the Norwegian government, about the economic realities that Norway faces. In the rest of this report, we shall examine how Norges Bank handles these challenges.

5 How Norges Bank conducts monetary policy

5.1 The current best international practice in inflation targeting

As discussed above in section 2, changes in the central bank's instrument rate affect inflation and output with a lag, usually about one year for output and about two years for inflation. Monetary policy that aims at controlling inflation is therefore best conducted in a forward-looking manner. In principle, this is done by constructing conditional forecasts (projections) of future inflation, conditional on the available information about the current state of the economy, the central bank's view of the transmission mechanism, and alternative levels or paths of the central bank's instrument rate (in Norway, Norges Bank's overnight deposit rate). The current instrument rate is then set so that the corresponding inflation projection is consistent with the inflation target at an appropriate horizon, usually about two years ahead.

Judging whether the inflation projection is consistent with the inflation target requires that the interpretation of the inflation target is clear. As discussed above, inflation-targeting central banks interpret their inflation targets as flexible medium-term point targets, aiming at achieving their inflation targets in the medium term, but also putting some weight on stabilizing the output gap.

In principle, flexible inflation targeting can be implemented by making projections of both inflation and the output gap and then choosing an instrument rate (or a planned instrument rate path) that results in a good compromise between the speed with which the inflation projection approaches the inflation target and the projected output-gap movements required for this. Some analysis (see, for instance, Batini and Haldane (1999) and Svensson (1999)) has pointed out that, in many circumstances, a close to equivalent way of incorporating flexible inflation targeting is by aiming at the inflation target at a longer horizon. This normally implies conducting policy in a more gradual and measured way, for instance, accepting short-run ("first-round") deviations of inflation from the target after a shock, and this way avoiding destabilizing output. While not perfectly equivalent, this approach is the one

adopted by inflation-targeting central banks to date, including Norges Bank.¹³

Which central banks in the rest of the world represent the best international practice in inflation targeting? In our view, in Europe, the Bank of England and the Riksbank are obvious candidates. By now, both central banks have accumulated considerable experience in inflation targeting. They have developed efficient procedures for information collection, analysis and decision-making. They are both very transparent and thus open to scrutiny and evaluation. They have explicitly committed themselves to flexible rather than strict inflation targeting. They have excellent Inflation Reports with published forecasts and have provided regular innovations with regard to both techniques and transparency. Both banks publish the minutes and votes of their decision-making bodies (the MPC for the Bank of England, the Executive Board for the Riksbank). Those minutes reveal that the analysis and discussion before the decisions are sophisticated and of very high quality. Most or all members of their decision-making bodies are experts in monetary policy, macroeconomics or financial markets.¹⁴

Beyond Europe, in line with the conclusion in Svensson (2001), we also consider the Reserve Bank of New Zealand as providing an example of best international practice in inflation targeting. The Bank of Canada and the Reserve Bank of Australia may also seem to be natural candidates. There is no reason to doubt the competence, judgment and accumulated experience of these banks. However, they have so far chosen to be less transparent than the Reserve Bank of New Zealand, the Bank of England and the Riksbank. They have less informative and detailed reports and motivations of their policy, and they do not publish minutes of their policy discussions. Thus, non-public inside information would be required for a more thorough assessment of the quality of their policy-making.¹⁵

¹³ For an example of the practical handling of these issues, see the clarification of the Executive Board of the Riksbank in Sveriges Riksbank (1999), as well as the discussion in Heikensten and Vredin (1998).

¹⁴ The Bank of England and the Riksbank also seem to have been models for the inflation-targeting frameworks set up by the Czech National Bank in the transition economy of the Czech Republic and Banco Central do Brasil in the developing economy of Brazil.

¹⁵ The Reserve Bank of Australia is however similar to Norges Bank in that monetary-policy decisions are made by an Executive Board with several members who are nonexperts in monetary policy and related issues.

The Federal Reserve System in the US or the Eurosystem in Europe are not suitable for comparison, since they operate in very large economies and hence under very different circumstances. Furthermore, the Federal Reserve System is hardly an example of the current best practice in inflation targeting. Although the actual policy has been quite successful, the monetary-policy framework lacks a clear objective and suffers from insufficient transparency.¹⁶

Neither is the Eurosystem (consisting of the European Central Bank and the 12 national central banks in the EMU) an example of the current best practice in inflation targeting. It has been severely criticized for an ambiguous and asymmetric formulation of its inflation target, an inconsistent and confusing two-pillar monetary-policy strategy, and insufficient transparency by a number of external observers.¹⁷

Thus, we find that the Reserve Bank of New Zealand, the Bank of England and the Riksbank are suitable for comparison with Norges Bank as examples of the current best international practice of inflation targeting, also since they operate in open and not too large economies.

5.2 Evaluating inflation targeting

As noted above in section 3.3, the Regulation for Monetary Policy of March 2001 specifies that monetary policy “shall be oriented towards low and stable inflation,” and that “the operational target of monetary policy shall be annual consumer price inflation of approximately 2.5 per cent over time.” Furthermore, “[a]t the same time, monetary policy shall underpin fiscal policy by contributing to stable developments in output and employment.” As discussed above, it makes sense to interpret the last sentence as referring to stability of the output *gap*, the difference between output and potential out-

¹⁶ The guiding legislation (the Federal Reserve Bank Act) arguably lists contradictory goals for the Federal Reserve System, and any move towards a more consistent law about the goals of monetary policy seems stalled. Members of the Federal Open Market Committee (FOMC) are sometimes reported to have different objectives and different perceived models of the economy. Published monetary policy statements are not of the same quality and transparency as those of the inflation-targeting central banks. Several informed observers have suggested that the Federal Reserve System should move to an explicit inflation-targeting regime (Bernanke, Laubach, Mishkin and Posen (1998), Bernanke, Laubach and Posen (2000) and Cecchetti (2000).

¹⁷ See, for example, Gros, Blanchard, Emerson, Mayer, Sinn, St. Paul and Tabellini (1998), Favero, Freixas, Persson and Wyplosz (2000) and Svensson (2000).

put (which in most cases would be highly correlated with the difference between employment and “potential” employment). In addition, “[i]n general, the direct effects on consumer prices resulting from changes in interest rates, taxes, excise duties and extraordinary temporary disturbances shall not be taken into account.”

This regulation thus specifies flexible inflation targeting, with a 2.5% inflation target for a modified consumer price index (CPI) that excludes some direct effects on the CPI. Norges Bank used a CPI adjusted for changes in taxes and energy prices, denoted by the acronym CPIATE.

One way to evaluate the performance of Norges Bank would be to examine whether actual CPIATE inflation has stayed close to the inflation target and whether monetary policy has contributed to stable developments in the output gap. There are two problems with such an approach. The first, temporary, problem is that the new guidelines for monetary policy only started to apply in March 2001. Above we have emphasized the lags between instrument adjustment and effect on output and inflation, perhaps a year for output and up to another year for inflation. Thus, the decisions Norges Bank have made in the first year after the introduction of the new guidelines have not yet had their full impact on output, much less on inflation. We need at least another year or two of data to include the period during which the first year’s decisions have had their impact on output and inflation, and several years of data to be able to assess some average performance. The second, more fundamental, problem is that monetary policy is conducted under considerable—sometimes close to overwhelming—uncertainty, given difficulties in interpreting incoming information, assessing the state of the economy and uncertainty about the lags and effects of monetary-policy actions on the future development of the economy. Also, during the lags between instrument adjustment and impact on output and inflation, unanticipated shocks and disturbances intervene, so the observations of actual output and inflation are contaminated by these shocks. Furthermore, potential output, the reference point for output used to construct the output gap, is notoriously difficult to estimate. Thus, *ex post* evaluation of monetary policy is not as easy to do as one might first think, even if several years of data is available, and unless adjustment for unanticipated shocks is done, it may be quite misleading. In general, with the benefit of hindsight, monetary policy could in most cases have been better. This is not surprising. The real issue, however, is whether there were any serious mistakes, *given available information at the time of decision*.

Thus, because of these two problems, evaluation of monetary policy during the first year of the new guidelines must be *ex ante*. Given the available in-

formation about the state of the economy and the transmission mechanism of monetary policy at the time of decisions, did Norges Bank make the right decisions? As discussed above, best-international-practice inflation-targeting central banks like the Reserve Bank of New Zealand, the Bank of England and the Riksbank in practice implement inflation targeting by setting interest rates such that the corresponding inflation forecast is consistent with the inflation target at a reasonable horizon, usually about two years. This is also the way Norges Bank implements inflation targeting.

Then, the projections provide the way to evaluate policy. A first question is, are the forecasts Norges Bank uses in its implementation reasonably good and unbiased? A second question is, given the projections, in particular the inflation projections, did Norges Bank make the right decisions?

Concerning the first question, we have not been able to independently examine the quality of Norges Bank's forecasts. Sturød (2002) evaluates Norges Bank's forecasts for 2000 for a number of macro variables and compares them with those of a few other forecasters, namely the OECD, Consensus Economics, the IMF and the Ministry of Finance. Norges Bank has the best forecast of inflation and does not have the worst forecast for GDP. A more extensive study over a longer sample is necessary for a precise conclusion, but we nevertheless proceed under the assumption that Norges Bank's forecasts are as good as other forecasters' and in that sense reasonably good and unbiased.

This leaves the second question, whether, given the projections, Norges Bank made the right decisions.

5.3 The big picture

Above, we have outlined the challenges Norges Bank faces. In evaluating the performance of Norges Bank, we start with the big picture. By this we mean whether the Bank has an appropriate decision process for monetary policy, whether its analysis is of sufficient quality, and whether the Bank has the major insights that make it likely that individual decisions are right.

The decision process of monetary policy¹⁸

The Executive Board makes the decisions about the instrument rate. The Bank has developed an elaborate decision process, where large amounts of

¹⁸ Gjedrem (2001b) provides more details on the decision process for monetary policy.

data and information are collected, processed and analyzed in a regular decision cycle. The analysis is summarized in the Bank's Inflation Report, which is published three times a year.¹⁹ The Inflation Report presents an in-depth analysis of the state of the Norwegian economy and the outlook for inflation. The Inflation Report is published, together with a decision about the instrument rate, immediately after a monetary-policy meeting with the Executive Board.²⁰

The Executive Board discusses the economic outlook at a separate meeting, the so-called strategy meeting, three weeks before the Inflation Report is published. On the basis of preliminary projections and analysis, the Executive Board assesses the outlook for inflation some two years ahead, as well as the uncertainty surrounding the projections. The next day, the Executive Board summarizes its discussions and assesses the consequences for monetary policy for the next four months. This assessment, contained in the *Strateginotat* (Note on Strategy), constitutes an important internal reference point when the Executive Board later makes a decision regarding the interest rate. It will also provide a basis for the Bank's externally oriented communication through speeches and the media.

Two members of *Norges Bank Watch* (Steigum and Svensson) have had the opportunity to examine the *Strateginotat* of the strategy meetings before the Inflation Reports of October 2001 and February 2002. They provide analysis of very good quality, in content similar to the Inflation Report. They go further than the Inflation Report, for instance, in discussing consequences of alternative instrument-rate paths and in motivation for the particular instrument-rate intervals considered. The *Strateginotat* is not published; we believe a natural further improvement of the transparency of Norwegian monetary policy is that they are published. Such publication would indeed be very much in line with the definition of transparency as "the extent to which

¹⁹ The Reserve Bank of New Zealand, the Bank of England and the Riksbank publish Inflation Reports (called Monetary Policy Statements in New Zealand) four times a year rather than three. As noted in Kohn (2000), this quarterly frequency puts a lot of stress on the staff. It may very well be that new relevant information for monetary policy normally arrives at such a modest rate that major decisions every four months are sufficient.

²⁰ The Bank has invited Hans Genberg and Charles Wyplosz, Graduate Institute for International Studies, Geneva, to evaluate the Inflation Report. The purpose of the evaluation is to assess (1) how suitable the Inflation Report is as a basis for monetary policy, compared to Inflation Reports in other countries and (2) how good the report is in communicate monetary policy externally, to journalists, the market and other agents.

the external presentation of the decisions corresponds to the internal decision-making process" due to Duisenberg (2000), which definition is approvingly quoted by Gjedrem (2001a, 2002) and Bergo (2002).

The Executive Board uses a simple rule in its interest-rate decision (Gjedrem, 2001b):

“If it appears that inflation will be higher than 2½ per cent with unchanged interest rates, the interest rate will be increased. If it appears that inflation will be lower than 2½ per cent with unchanged interest rates, the interest rate will be reduced.

... Analyses performed by Norges Bank indicate that a substantial share of the effects on inflation occur within two years. Two years is therefore a reasonable time horizon for achieving the inflation target of 2½ per cent. Therefore, the inflation outlook in two years may be viewed as an intermediate target for monetary policy.”

Between the publications of the Inflation Reports, the Executive Board meets for in-depth monetary-policy discussions every six weeks, at pre-announced dates. Then the Board assesses developments in a number of different economic indicators, with special emphasis on substantial deviations from the assessments in the last Inflation Report. Normally, any decisions regarding changes in interest rates are taken at these meetings. The Executive Board's decision is published in a press release immediately after monetary-policy meetings. After each monetary-policy meeting, a press conference is held at which the Bank's assessments are summarized and the Executive Board's decision is presented.

The Bank's analysis and decisions are communicated in an efficient and transparent way, via the Inflation Reports, press releases and the introduction to press conferences after the Board's monetary-policy meetings. These are all available on the Bank's well-organized website.

As far as we can see, Norges Bank's decision process and external communication is very appropriate and comparable to best international practice. As we shall see, this does not prevent us from recommending a few potential further improvements of the decision process and the Bank's analysis and projections.

Summary assessment of the big picture

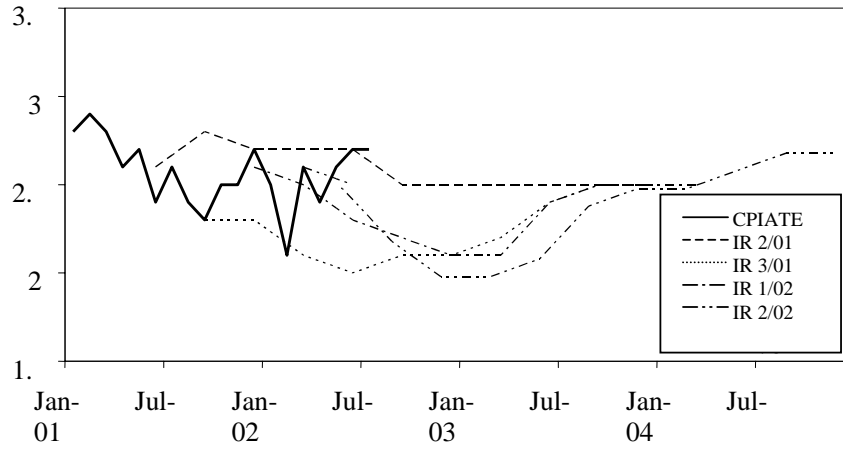
Thus, when it comes to the big picture, we believe we have a firm conclusion. Norwegian monetary policy is in very good hands. The Bank has a very competent and highly trained top management and staff. The top management and many in the staff has long experience of economic policy, both monetary and fiscal. The Bank has a long tradition of research and analysis on an academic level. Although the Bank has a short experience of inflation targeting, for several years before inflation targeting was introduced, it organized conferences and meetings on monetary policy, including inflation targeting, with academic researchers and central bank officials from many countries, and this way building up understanding of and competence in inflation targeting. We believe the Bank's Inflation Report, the Strateginotat, the speeches by Bank officials and articles and working papers published by the Bank clearly demonstrate the high quality of the Bank's analysis and understanding. The Bank gives the impression of being a very competent and enthusiastic newcomer to the inflation-targeting camp, and it is our firm view that it masters the insights required for successful inflation targeting. Again, this praise will not deter us from proposing a number of potential improvements, which in several cases would push the frontier of best international practice in inflation targeting further out.

5.4 Brief evaluation of decisions

Figure 5.1 shows inflation of CPIATE for 2001-2002 and the inflation projections from the last four Inflation Reports, of June and October in 2001 and February and June of 2002. Figure 5.2 shows the Bank's instrument rate, the overnight deposit rate, for 1999-2001.

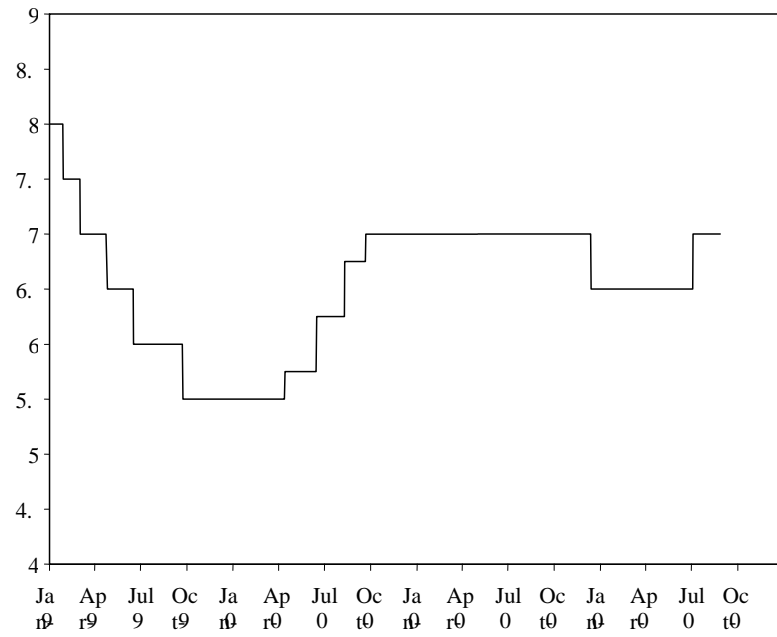
After the current monetary-policy regime was introduced in March, 2001, Norges Bank kept the instrument rate at 7% until December 12, 2001, when it reduced the rate to 6.5%. On July 3, 2002, the Bank increased the rate back to 7%.

Figure 5.1. Inflation and inflation projections (%/yr)



Source: Statistics Norway and Norges Bank.

Figure 5.2. The instrument rate (the sight deposit rate, %)



Source: Norges Bank.

First we shall discuss some general aspects of how Norges Bank uses projections; then we shall discuss some individual decisions.

The assumptions of constant interest rates and exchange rates

The projections Norges Bank uses and reports in the Inflation Report are constructed under some specific assumptions. The appendix to the Inflation Report includes a table with the assumptions made about the most crucial variables. The standard assumptions about the instrument rate and the exchange rate are that they are constant. This is problematic. First, a constant exchange rate is usually not consistent with a constant interest rate and theoretical relations like uncovered interest-rate parity. Neither is a constant exchange rate usually consistent with market expectations of future exchange rates. Fortunately, the Inflation Report also includes some discussion of the consequences of alternative exchange-rate assumptions. Second, a constant interest rate is usually not consistent with the best future monetary policy, the likely future policy, or market expectations. This means that the assumption of constant instrument rates builds in a number of inconsistencies in the resulting projections, which adds a certain degree of arbitrariness to these projections.²¹ Furthermore, since the assumption of a constant interest rate is usually not the best forecast of future instrument rates, the resulting projections of inflation, output and other variables are not the best forecasts of future outcomes. Thus, it makes less sense to compare actual outcomes to constant-instrument-rate forecasts, something that any serious evaluation of forecasts has to take into account.

One argument in defense of constant-interest-rate projections is that they show what would happen if the instrument rate is held constant and therefore often provide a good motivation why it should be moved in a particular direction. On the other hand, this does not say how much the instrument rate should be moved, and how soon. There is often a choice between a smaller adjustment sooner and a larger adjustment later. Which is best? Another argument is that a monetary-policy committee would have difficulties agreeing on something else, like a time-varying path for the instrument rate. This argument is not convincing to us, since a monetary-policy committee is agreeing on a number of other time-varying paths, like the inflation and output projections, for instance. A third argument is that, if a time-varying instrument path were announced in the Inflation Report, market participants and other agents would be confused and interpret this as a firm commitment

²¹ Leitemo (1999, 2001) discusses some of the problems with constant-interest-rate forecasts.

of future instrument-rate setting. This argument seems defeated by the fact that the Reserve Bank of New Zealand for a number of years has published both a time-varying instrument-rate path and inflation and output-gap projections conditional on a time-varying instrument path, without any apparent misunderstanding by market participants and other agents. Indeed, Norwegian market participants and other agents are already used to see inflation projections and seem fully able to understand that these are contingent about available information and the state of the economy, and that they will shift when new relevant information arrives. What is the difference between the appropriate instrument-rate path and the inflation projection shifting when new information arrives and the state of the economy changes?

For these reasons, it seems to us that Norges Bank should further develop its inflation projections so as to make these conditional on time-varying instrument rate paths. Furthermore, the monetary-policy decisions of the Bank should aim at finding a good or even optimal future time-varying instrument-rate path. To some extent, some of that work is already done in the Strateginotat that the Board uses as guides between the major four-monthly decision points. It is just a matter of developing the process a bit further.

The best situation would seem to be if Norges Bank at each major decision point determined what its best instrument-rate plan and corresponding inflation and output-gap projections are. These projections would then become the Bank's best forecasts of these variables and be the natural ones to publish in the Inflation Report. Publishing these best forecasts would seem to have the most effective impact on private-sector expectations and the economy, and thus be the most effective way to implement policy.

Norges Bank has already in the past presented inflation projections conditional on market expectations of future interest rates and exchange rates, so it already knows how to make projections conditional on time-varying paths of these variables.

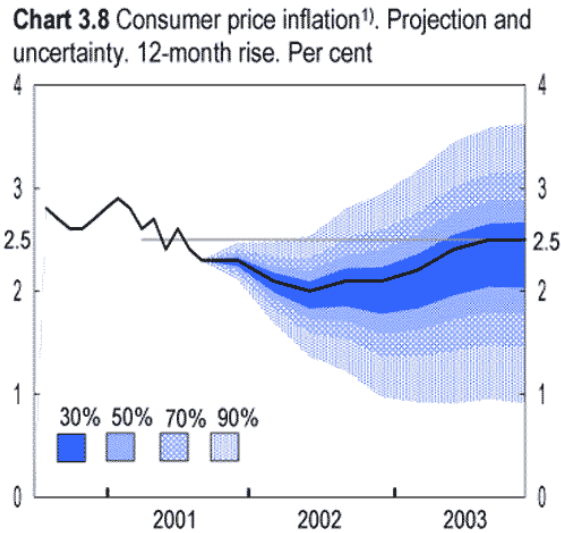
A separate but related point is that, since the Strateginotat contains some essential material that does not appear in the Inflation Report, this should be published as well, alternatively all essential content of the Strateginotat should be added to the Inflation Report. However, one useful principle would be that, with few exceptions, all the material that the Board receives before its monetary-policy decision would be published, possibly with a lag of a few weeks. This would adhere to principles of transparency, in particular the definition due to Duisenberg (2000) mentioned above, but would also, by allowing external scrutiny, even further strengthen the incentives for submitting to the Board high-level analysis that can stand the light of day.

Mean, mode and the balance of risk

Norges Bank, as Bank of England and the Riksbank, uses the *mode* projection (the outcome that the Bank assesses the highest probability to) as their central projection. Thus, whenever the Bank quotes a single number for a projection, this number is the mode.

The graphs of the inflation projections in the Inflation Reports display both the mode and a fan chart illustrating the Bank's view of the probability distribution around the mode. Figure 5.3 shows an example, from IR 3/01, published in October 2001. As we can see, the mode of the inflation projection (the thick dark-blue line) falls below 2.5% until at a horizon of about two years, when the mode coincides with 2.5% until then end of the projection, at the end of 2003. The shaded fields of dark to light blue illustrate the Bank's view of the uncertainty about the projection, the probability distribution for the outcome of inflation, under the stated underlying assumptions for the projection. Thus, 30% of the probability distribution falls within the innermost dark-blue shaded area, 50% falls within that area and the next lighter-blue shaded area, etc. The lightest-blue shaded area (including the darker-shaded area) contains 90% of the probability distribution.

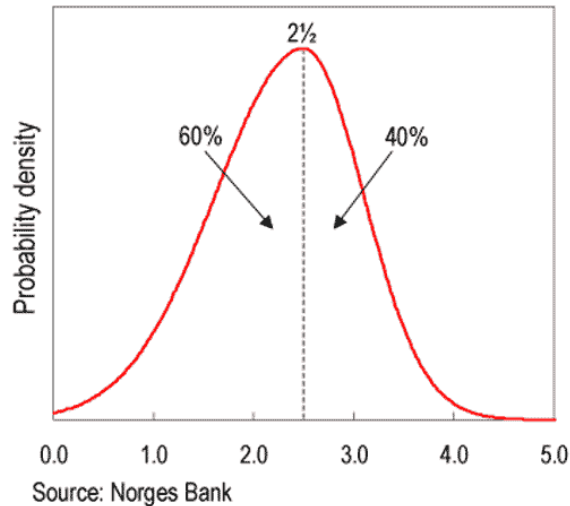
Figure 5.3. Chart 3.8 in IR 3/01.



As we can see in figure 5.3, the blue shades are not symmetric around the mode. More of the probability mass is located below the mode than above. This is seen more clearly in figure 5.4 (chart 3.9 in IR 3/01), which shows the probability density function for inflation at the end of 2003. The mode corresponds to the maximum probability density and equals, in this case, 2.5%. Figure 5.4 shows that 60% of the probability mass falls below the mode and that 40% falls above the mode. Thus, this is a case of an asymmetric probability distribution. The probability that the inflation outcome will fall below the mode is larger than the probability that it will fall above.

Figure 5.4. Chart 3.9 in IR 3/01.

Chart 3.9 Evaluation of risk around the inflation projection at end-2003



Norges Bank takes account of such asymmetries in *bias statements* like

“according to Norges Bank’s assessment, with an unchanged interest rate, the probability that inflation two years ahead will be lower (higher) than 2.5% is greater than/is the same as the probability that it will be higher (lower)”.

Thus, the bias is up/neutral/down means that the probability that inflation two years ahead will be above 2.5% is higher/the same/lower than the probability that it will be lower than 2.5%. Furthermore, the Bank tends to adjust the instrument rate in the same direction as the bias.

The bias statement is actually a statement about the *median* projection, since the median is the outcome with the same probability above and below the outcome. Thus, the bias is up/neutral/down means that the median inflation two-year ahead is above/equal to/below 2.5%. Consequently, the Bank tends to adjust the instrument rate in the opposite direction when the median inflation projection two years ahead deviates from the inflation target.

If this is so, would it not be simpler and more transparent to use the median as the central projection? That is, let the thick blue line in figure 5.3 be the

median rather than the mode. Then the extra formulation about the probabilities is unnecessary, and the fan chart is only used to illustrate the degree of uncertainty, not to adjust the forecast from the mean.

However, the theory says that the *mean*, the probability weighted average, is the right central projection. This is because of so-called *certainty equivalence*. That is, if the transmission mechanism is approximately linear and the objectives can be expressed as an approximately quadratic loss function, optimal monetary policy can be expressed in terms of the mean projections. Put differently, once the mean projections have been constructed, the analysis can proceed as if there were no uncertainty about the mean. The theoretical result about certainty equivalence is one of the most powerful and important results for practical monetary policy.²²

Thus, this suggests that Norges Bank should compute the mean projection and report that as their central projection. Then the fan chart can be used to illustrate the degree of uncertainty in the projections, but no additional adjustment because of asymmetric probability distributions needs to be done. This seems a much simpler and more transparent procedure than the current reporting of mode forecast and subsequent adjustment when the mean forecast differ from the mode.

Norges Bank is not alone in using mode projections; central banks have a tradition to report mode forecasts rather than mean forecasts. The reason is probably that in the construction of informal and judgmental projections, the practice of forecasters is often to discuss the most likely outcome first. The fact that projections often are *constructed* by starting from the mode does not, however, imply that they have to be *reported* as mode forecasts. Since Norges Bank also constructs a probability distribution around the mode, it is trivial to construct the mean projection from the probability distribution. Thus, the practice to start with mode projection does not imply that one cannot report the mean projection as the central projection.

Moving from two-year inflation projections to both inflation and output-gap projections

As discussed, Norges Bank implements flexible inflation targeting by referring to inflation projections about two years ahead. As discussed in section 2, this is an implicit way to achieve a good compromise between inflation

²² Svensson and Woodford (2002) discuss the certainty-equivalence theorem in a fairly general situation when there are forward-looking variables and partial information about the state of the economy.

stability and output-gap stability. It has become the standard way to implement flexible inflation targeting among best-international-practice inflation targeting central banks. Still, it is an approximate and implicit way to implement flexible inflation targeting, and theory has shown that it may be somewhat more imperfect than was first thought (see, for instance, Leitemo (1999, 2001)). Therefore, we believe that Norges Bank could further develop flexible inflation targeting by constructing and publishing output-gap projections parallel to the inflation projections, and then choose a time-varying instrument-rate path that achieves a good compromise between inflation stability and output stability. This would elevate flexible inflation targeting to a new level of sophistication and could mean that Norges Bank on this point takes the lead in the world-wide development of inflation targeting.

An explicit weight on output-gap stability

Another step towards more explicit flexible inflation targeting would be to be more explicit about the weight on output-gap stability. Indeed, as discussed in section 2, since flexible inflation targeting, implies a delicate choice between inflation and output-gap variability, transparency would seem to be well served if inflation-targeting central banks became more explicit about this choice and their preferences between inflation and output stability. Svensson (2002a, b) has argued that central bank's should come out in the open and be explicit about their relative preferences between inflation and output-gap stability by deciding on and announcing the weight they put on stability of the output gap relative to stability of inflation. Norges Bank, with its devotion to transparency, could take the lead here and be the first to announce this relative weight. An intermediate step would be to make an internal preliminary decision about the relative weight and see to what extent that would be useful in policy decisions.

Norges Banks decisions from September 2001

We also discuss some individual decisions of Norges Bank since the publication of the last *Norges Bank Watch* in September 2001. Naturally, we have more to say on the principles for decisions and instrument-rate setting and somewhat less to say on the actual interest-rate levels chosen, since we have not had the time and resources for a thorough evaluation of each decision.

As noted above, the Board of Norges Bank conducts monetary-policy meetings about every six weeks. The first meeting after the last *Norges Bank Watch* was published in September 2001 was held on September 19, 2001. The potential consequences of the events of September 11 had presented central banks all over the world with a new challenge and increased uncer-

tainty. In the aftermath of the events of September 11, central banks across Europe had conducted cuts in the short-term interest rates. In contrast, Norges Bank kept the instrument rate unchanged at 7%. The press release stated that the bias was neutral, that is (cf. discussion above), that the median inflation projection two years ahead was on target. This was the same statement as after the previous monetary-policy meeting on August 8. Thus, the inflation projection two-years out had not changed after September 11.

The interest-rate decision was somewhat controversial and took the market by surprise. The real uncertainty at this point was about international factors and their impact on the Norwegian economy.

The Board stated in its decision (Introduction to the press conference, September 19, 2001):

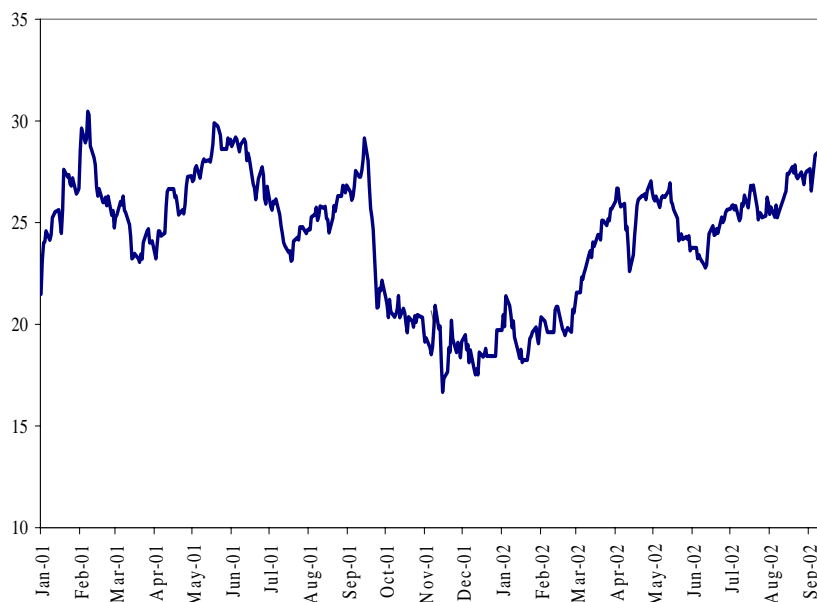
“The Norwegian economy is characterized by high capacity utilization and high cost inflation. The mainland economy appears to be expanding approximately in line with growth in output potential. At present, we do not have sufficient evidence to assert that international developments will change this situation as long as oil prices remain high. House prices and household borrowing are rising at a rapid pace. The announced increase in spending of petroleum revenues could lead to a more expansionary fiscal stance than in recent years.”

Thus, the Bank’s view was that activity and demand remained high and that there was not yet sufficient evidence that international developments would change this and affect the inflation projections, which would make wait and see the appropriate policy.

We have not had the time and resources to scrutinize this view and decision in further detail, nor to look more into the issue of how sensitive the Norwegian economy is to international disturbances that affect export demand and export prices separately from the effect through oil prices and the exchange rate.

In the 10 days after September 11, the oil price dropped from around USD 28 per barrel to USD 21, while the krone remained basically unchanged (see figures 5.5 and 5.6). Moreover, the Norwegian stock market followed global equity markets into nose dive of more than 30 percent. Clearly, the Bank faced a difficult situation.

Figure 5.5. The oil price (Brent blend, \$/barrel)



From an *ex post* point of view, the Bank's decision on September 19 to keep the instrument rate unchanged at 7% appears to be the right one. The recession feared by many in the days after September 11 did not materialize, perhaps to a large extent because of the easing of monetary policy by other central banks.

The (unpublished) Strateginotat of October 4 (which has been read by Steigum and Svensson) and the subsequent Inflation Report of October, 2001, present, in our view, a competent and cool-headed analysis of this difficult situation with a focus on medium-term fundamentals.

The mode inflation projection presented in the Inflation Report is shown in figure 5.1 (the curve for IR 3/01) and figures 5.3-5.4. Although, the mode projection two-years ahead was on target, the bias was down, as stated in the bias statement of October 31. According to Norges Bank's simple rule, this could have motivated a lowered interest rate already then, even though activity and demand remained high.

At the next Board meeting, on December 12, the instrument rate was cut by 0.5 percentage points to 6.5%. Even with the new interest rate, the bias was

still down. The oil prices had not recovered from the September decline and still seemed to be on a downward trend.

The next meeting was held on January 23, 2002. The Bank kept the instrument rate unchanged, in spite of still stating that the median inflation projection two years out remained below target. At this time, the risk of a deep recession in the world economy appeared to have diminished. By early March, the oil price was back above USD 20 per barrel. By then, it seemed clear that there would not be an international recession. At the Board meeting on February 27, the bias statement was changed to neutral. The Bank moved the focus back to domestic issues, where uncertainty about upcoming wage negotiations was high. After the Board meeting on April 10, the Bank stated that (Introduction to the press conference):

“Wage negotiations are under way, but at this stage it would be premature to draw any conclusions about the outcome.”

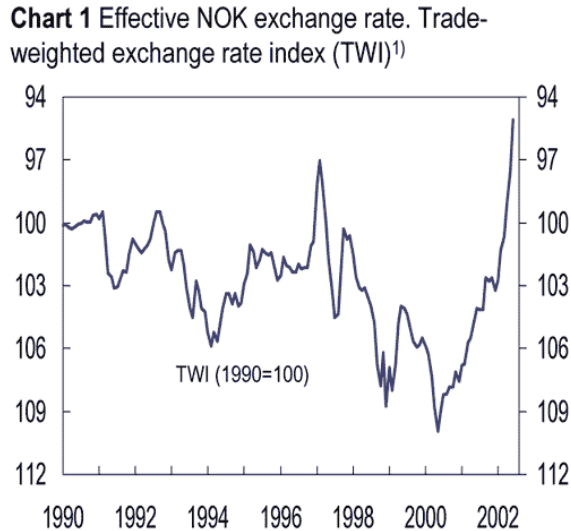
At the next meeting, held on May 22, the trend in the wage agreements was confirmed. The Board changed the bias to up.

Strong wage growth, faster growth in consumption, a higher oil price and a more favourable global economic outlook made the increased tensions in the Norwegian economy in the late spring and summer of 2002. The krone continued to appreciate, as one would expect, both from the future fiscal expansion implied by the new guidelines for fiscal policy and by the general increase in demand, but, according to the Bank’s statement, not sufficiently to counteract these tensions (Introduction to the press conference):

“The effective krone exchange rate is now 4½ per cent stronger than the rate assumed in the February Inflation Report. ... [T]he appreciation of the krone cannot fully counteract stronger wage growth, faster growth in consumption, a higher oil price and a somewhat more favorable global economic outlook.”

In June and July 2002 the perception of economic developments in the US as well as Europe took a negative turn. Financial markets experienced severe turbulence, and stock indices fell, adding to the uncertainty of the situation.

Figure 5.6. Effective NOK exchange rate (Chart 1, p. 8, of IR 2/02)



¹⁾ A rising curve denotes an appreciation of the krone

Source: Norges Bank

On July 3, Norges Bank raised the interest rate 0.5 percentage points to 7%. The Inflation Report of July, 2002, still showed an inflation projection conditional on an instrument rate of 6.5%. The mode projection is shown in figure 5.1 (the curve for IR 2/02). As seen in the figure, the mode projection exceeds the target two years ahead, in July 2004. The bias statement of July 3 was up. The statement does not explicitly mention whether this is conditional on a 6.5 or 7% interest rate (a slight transparency slip). We interpret it as conditional on 7%; if so, even after the 0.5 percentage point increase, the median projection exceeded the target. The Inflation Report contains a very interesting discussion of the consequences of alternative assumptions about both interest rates and exchange rates (including an instrument-path consistent with market expectations of an increased instrument rate). The Introduction to the press conference provided further details:

“Growth in the Norwegian economy picked up towards the end of 2001 and into 2002. Private consumption has shown a substantial rise as a result of strong income growth. Households also expect continued strong income growth in the period ahead. Households are still borrowing heavily. Housing investment is high and financial investment is low. House prices are rising. Public expenditure is growing as a percentage of GDP. The level of petroleum investment is ex-

pected to be high. Large projects in the aluminum industry are boosting mainland business investment, whereas other investment may be low. There are strong pressures on economic resources. Wage growth is markedly higher than estimated in the February Inflation Report. The results of the various pay settlements point to wage growth of between 5½ per cent and 6 per cent this year. This year's wage settlements resulted in different pay increases for different groups ... These developments may easily trigger and amplify wage-wage spirals. Persistently high wage growth is contributing to a high rise in prices for domestically produced goods and services. ...

There is uncertainty as to developments in many of the factors that will influence inflation in the period ahead. This also applies to the krone exchange rate. Relationships in the foreign exchange market are unstable. Our projections for inflation are based on the assumption of a krone exchange rate equal to the average for the second quarter. The krone is now stronger than this. A persistently strong krone will have a dampening impact on inflation compared with the projections we have presented."

Given the strong inflationary pressure referred to in the July 3 decision, it would probably have been reasonable to assume a new instrument rate increase on the next meeting, August 7. However, the Board chose to keep the rates stable, although the bias was still up.

Throughout July and August, data for the Norwegian economy indicated a softening of domestic demand. Seasonally adjusted goods consumption decelerated, industrial activity remained weak, and unemployment picked up. Moreover, the Prime Minister signaled that the National Budget, due on October 3, would imply a tight policy stance in order to prevent excessive stimulus to the economy. In line with this, the term structure of interest rates indicates an expected fall in the instrument rate.

At the Board meeting on September 18, the instrument rate was left unchanged and bias was changed to neutral.

5.5 Market anticipation of interest-rate decisions and market communication

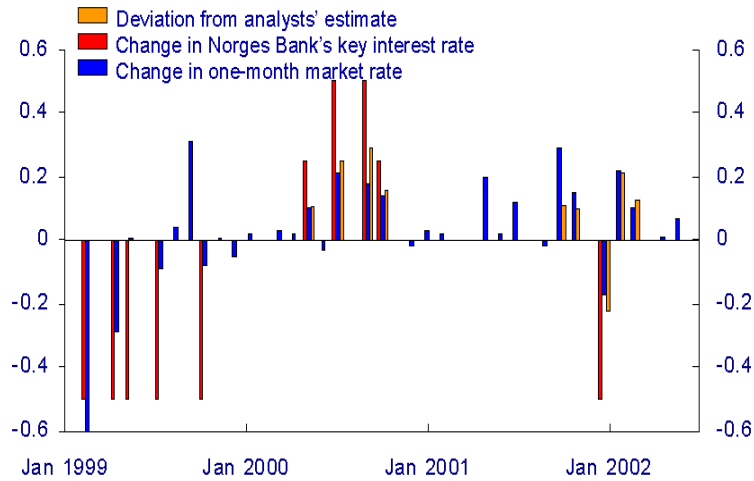
The so-called surprise factor, the shift in market interest rate due to interest-rate decisions by the central bank, has been larger in Norway compared with other inflation targeting countries (Bernhardsen and Kloster (2002)). Such a shift indicates that the market had not fully anticipated the interest-rate deci-

sions (see figure 5.7 for the change in the one-month interest rate after monetary-policy meetings). The impact on Norwegian short term interest rates has been somewhat stronger than a broad international average for the 1990s. The Bank suggests that one reason for this may be that Norway's inflation target is recent, and that it takes time for market participants and Norges Bank to gain experience with regard to response patterns and communication. Another possible reason is that the instrument rate has been adjusted by a half percentage point in Norway, while other central banks with lower interest rates have more frequently changed key rates by a quarter percentage point. Furthermore, the inflation-targeting regime is new and both market participants and the Bank may need more experience in order to increase the predictability of interest-rate decisions.

Figure 5.7. Changes in the one-month rate after monetary-policy meetings



Changes in the one-month rate after monetary policy meetings



Sources: Norges Bank and Reuters

Gjedrem CME/BI 10 June 2002

Increased predictability of monetary policy is desirable because it makes the implementation of monetary policy more effective and reduces volatility in the market. Of course, this does not mean that the Bank should set the inter-

est rate so as to fulfill market expectations. As noted by Gjedrem (2002): “If a central bank always acts in line with market expectations, there would no longer be an objective anchor for financial market expectations.”

We are confident that some of our recommended improvements would reduce the surprise factor and make interest-rate decisions more predictable. Our recommendation to announce the Bank’s best projection of its future instrument-rate path would contribute to this. This will guide the market both with respect to timing and levels of the changes in interest rates and further improve the effect of monetary policy through the term structure of interest rates. Publishing the Strateginotat will give further details into the Bank’s analysis and plans. Finally, we note with approval the effort the Bank is already making in arranging regular meetings with market participants with discussions of the conduct of monetary policy.

5.6 Potential improvements to the conduct of monetary policy

Although we believe Norges Bank is already conducting inflation targeting according to best international practice, we nevertheless see a number of instances where its way of conducting monetary policy could be improved. These instances would in several cases involve pushing the frontier of best international practice further out:

- Inflation projections should generally be done conditional on the Bank’s preferred instrument-rate path; that is, conditional on its best forecast of its future instrument-rate settings. This would normally be a time-varying instrument-rate path. The assumed exchange-rate path should also normally be the Bank’s best forecast of the future exchange rate, also normally a time-variable path. This would avoid some problems and inconsistencies associated with the current standard assumption of constant interest and exchange rates. It may also make monetary policy more predictable and improve the Bank’s communication with the market.
- The central projections should be the *mean* projections (the probability-weighted average outcome) rather than mode projections (the most likely outcome). This is in line with established economic theory, which says that it is the mean forecast rather than the mode forecast that is relevant for decisions. This would normally make the somewhat cumbersome adjustment of the mode projection to the balance of risk unnecessary, and the fan charts for the projections would mainly be used to illustrate the uncertainty of the projections.
- The Bank should construct and publish projections of potential output, actual output and hence the output gap, conditional on time-variable in-

strument-rate paths. In this way the Bank can better reach the most desirable compromise between inflation variability and output-gap variability and the resulting compromise will be more open to external scrutiny.

- The emphasis on the precise two-year horizon of inflation projections on target should be reduced. Instead, the Bank should find the projections of inflation, the output gap and the corresponding instrument-rate path that the Bank thinks would achieve the best compromise between inflation stability and output-gap stability. These projections should be published in the Inflation Report and the Bank should set its instrument rate accordingly. These projections will then be the Bank's best unconditional forecast of future inflation, output gap and instrument rate. Publishing them will maximize the impact on private-sector expectations and thereby implement monetary policy more effectively. Publishing them also opens the Bank's projections for more precise external scrutiny. The fan charts around the projections should be constructed and interpreted as the Bank's best unconditional estimate of the uncertainty in the projections, thus conditional on its own future policy response.
- The Bank's analysis and explanations might benefit from further use of the concepts of potential output, output gap and neutral real interest rate.
- The Bank could be more explicit about the weight it puts on output-gap stability relative to inflation stability.

6 The debate on monetary policy and the currency appreciation

6.1 The debate on currency appreciation

The krone has now appreciated significantly against most other currencies (see figure 5.6). This is a matter of considerable concern in the traded-goods sector, because it adds to an already high cost level. On average, Norwegian companies have lost some 15% of their competitive power over the last two years.

As discussed in section 2.4, a real appreciation of the currency is what should be expected under a fiscal expansion. More precisely, the new guidelines for fiscal policy imply a permanent future fiscal expansion. This is likely to be accompanied by not only a permanent real appreciation of the krone but an even stronger real appreciation in the short and medium term and a higher neutral real interest rate. These adjustments are equilibrium adjustments of the real economy to the new fiscal policy. Thus, they are independent of monetary policy, and cannot be prevented by monetary policy. Monetary policy might delay the real appreciation somewhat, by focusing on stabilizing the nominal exchange rate instead of inflation and the output gap. Perhaps such monetary policy could delay the real appreciation a few quarters or perhaps a year or so. Such a monetary policy, by being in the short run more expansionary than current policy by Norges Bank, would in the present situation most likely lead to rapidly increasing inflation and an overheated economy. The real appreciation induced by fiscal policy would then arise through an increase in the price level. As discussed above, historically such policies, because of the inherent inertia in inflation once it has taken off, have led to an over-appreciation and hence overvaluation of the currency, after which the boom often has turned to bust.

As far as we can see, in the current situation with a zero or positive output gap and considerable inflationary pressure, Norges Bank is conducting inflation targeting according to best international practice in its effort to trying to keep the two-year-ahead inflation projection on target. This requires a relatively high real interest rate, but this is not strange since the *neutral* real interest rate is likely to be higher, because of the future fiscal expansion and related current growth in consumption and demand. Arguably, a good measure of the tightness of monetary policy is not the short real interest rate (the instrument rate less actual inflation or short term inflation expectations) but the short real interest rate *gap*, the *difference* between the short real in-

terest rate and the neutral interest rate. Then, monetary policy is actually less tight than one might at first think.

The current public debate about the real appreciation and monetary policy seems quite confused. Several recent debaters do not seem to understand the relation between the real appreciation and fiscal policy and the limitations of monetary policy. Several participants in the debate have complained about the strong krone and its consequences, explicitly or implicitly blaming Norges Bank's for contributing to this by its instrument-rate increase in July, 2002, and its focus on stabilizing inflation, without in our view a proper analysis of the reasons for the appreciation.

As noted above in section 3, the government's guidelines for monetary policy are also confusing and even inconsistent on this point, and the reference to stability of the exchange rate should be deleted from the guidelines.

Arguably, the Bank's motivation for the *de facto* inflation target from 1999 may have contributed to the confusion. There, inflation equal to that in Europe was motivated as a way to achieve long-run stability in the exchange rate. This argument relies on long-term purchasing-power parity, that is, that the long-term real exchange rate is stable. However, in an oil economy where oil revenues sooner or later will be phased in, long-term purchasing power need not hold. Indeed, as argued in section 2.4, a permanent fiscal expansion may imply a permanent real appreciation of the currency.²³

²³ There is also a more technical problem with the idea that the same inflation target in Norway and the rest of Europe would imply a stable nominal exchange rate, even if the real exchange rate is stable or even constant. *Inflation* targeting is distinct from *price-level* targeting in the following way. Suppose the inflation target is exceeded one year, so inflation is higher and the price level rises more than the inflation target. In following years, under inflation targeting, this miss of the inflation target is not undone. Instead, the inflation target applies from the new higher price level. This will introduce a unit root in the (log) price level. In the simple case when inflation deviations from the inflation target is white noise, the (log) price level will be a random walk with drift equal to the inflation target. With a constant real exchange rate, the nominal exchange rate will be proportional to the ratio of the domestic price level and the foreign price level. That is, the log exchange rate will be equal to a constant plus the difference between the log domestic price level and the log foreign price level. If both log price levels have a unit root, the log exchange rate will be nonstationary rather than stationary and stable. In the special case when both domestic and foreign inflation deviations from the inflation targets are white noise and the domestic and foreign inflation targets are the same, the log exchange rate will be a random walk. If instead both Norway and the rest of Europe had a monetary-policy regime of price-level targeting (with price-level targets rising at the

Is the Bank currently explaining these insights in the best way? In its letter of March 2001 to the Ministry of Finance regarding the new guidelines for monetary policy (Norges Bank, 2001), the Bank states:

“Norges Bank would assert that a gradual phasing in of petroleum revenues approximately in step with the expected real return of the Petroleum Fund will, *ceteris paribus*, contribute to deteriorating conditions for businesses exposed to international competition [the tradable-goods sector].”

This sentence would perhaps be even clearer if it was followed by a statement that the main mechanism through which the tradable-goods sector is shrunk is through a real appreciation of the currency, and that this is a real adjustment that is not due to monetary policy.

The Inflation Report of June 2002 contains a box on p. 8-10 with the title “Why Has the Krone Exchange Rate Appreciated?” This box states:

“The Government and the Storting adopted the guideline for the use of petroleum revenues in March 2001. The rule implies a gradual increase of the use of petroleum revenues over the central government budget in the years ahead. Higher demand for private and public services means that the sheltered sector [the nontradable sector] will absorb a greater share of available labor resources. In an economy with full capacity utilization this can only occur through a transfer of resources from the internationally exposed sector to the sheltered sector. *This implies a real appreciation of the krone.*” [Our emphasis.]

On the other hand, the box mentions a number of other potential factors affecting the exchange rate, so this particular explanation does not get more weight than others. Perhaps debaters should be somewhat excused if they do not grasp the significance of this explanation?

Several recent speeches of Bank officials discuss the impact of the guidelines for fiscal policy and the phasing in of oil revenues, but arguably they could be even clearer on this point. Furthermore, these speeches, in our view, do not sufficiently emphasize that the real appreciation of the currency

same inflation target), the two price levels would be trend-stationary with the same trend, and the log nominal exchange rate would be stationary.

is a real and not a monetary phenomenon, and that it is not due to monetary policy. Also, the Bank does not seem to use the concept of the neutral real interest rate, nor even explicitly the output gap, in its explanations of monetary policy, and as noted in section 5, they might add to the Bank's analysis and explanation. A graph of the output gap and the forecast of the future output gap appeared in the Inflation Report of December 2000, chart 3.11 shows a graph of the output gap and even a forecast of it. We have not seen any references to the output gap in later Inflation Reports. The main message from the Bank on the issue of currency appreciation seems to be that inflation targeting implies that currency movements will increase and be more similar to the variability experienced in other countries with inflation targeting. Moreover, occasionally it has been communicated that a commitment to the inflation target will over time be the best guard against exchange-rate fluctuations, which we consider somewhat misleading, at least for an oil-producing economy with increasingly expansionary fiscal policy.

6.2 Potential contributions by Norges Bank to the debate on currency appreciation

- The Bank should more clearly explain the limits of monetary policy in relation to the real adjustment of the Norwegian economy that is likely to take place due to the new guidelines of fiscal policy and, in particular, explain that monetary policy cannot be expected to prevent the associated real appreciation of the krone.

7 Research at Norges Bank

The research at Norges Bank is mostly done at the Research Department of Norges Bank. The Research Department was gradually built up during the 1980s and 1990s. It is now playing a leading role in Norwegian macroeconomic research. The department is also very strong in time-series econometrics and the economics of banking. From the start the department has encouraged international publishing and networking. Its reprint series goes back to 1988. It demonstrates that the department has quite a decent publication record. Below we discuss the Bank's RIMINI model and the challenges for research at Norges Bank.

7.1 The RIMINI model

Since the 1980s, the development, revision and maintenance of a quarterly dynamic macroeconomic model of the Norwegian economy have been important tasks of the Research Department. The RIMINI model (Real economy and Income accounts – a MINI model) has been developed over a number of years. It now comprises 375 equations, 74 of which are estimated behavioral relationships. The estimation periods go back to 1968. The underlying modeling strategy is ambitious, putting strong emphasis on developing econometrically well-specified dynamic equations with error-correction mechanisms and parameter invariance both with respect to new observations and shifts in exogenous variables. The model builders give high priority to good forecasting and simulation properties. Each equation is normally modeled separately from the rest and then combined into a complete system. The model is backward-looking rather than forward-looking, in the sense that there are no forward variables or expectations variables in the model.

The RIMINI model serves several purposes for the Bank. The most important purpose is forecasting 2-5 years ahead to make projections for the Inflation Report. It has also been used for econometric monetary-policy evaluation and for analyses of financial stability and fragility. Often, the model is used in conjunction with smaller models to address special issues, such as models for several components of CPI. Discretionary judgmental adjustments like add factors (intercept corrections) are often used to adjust the model forecasts. Therefore, the projections published in the Inflation Reports express an overall assessment of the results from different models with considerable judgment.

The model allows simulations with exogenous interest rates and exchange rates. The standard assumptions for Norges Bank's projections are constant interest rates and exchange rates, but the model can also accommodate an exchange rate in line with uncovered interest-rate parity.

For outsiders, it is difficult or even impossible to make a detailed evaluation of the properties of the model, since the documentation of the entire model has not yet been published. Moreover, the model is constantly being revised and further developed.

RIMINI is an example of the approach to fitting reduced-form models that is sometimes called the LSE approach and is associated with the work of David Hendry. This is from a methodological point of view a rather controversial approach to model building (see, for instance, Faust and Whiteman (1997a,b) and Hendry (1997)). Furthermore, an inflation-targeting central bank needs to make projections conditional on alternative instrument-rate settings, for instance, instrument-rate paths. Doing this in a reduced-form model is associated with inherent problems, especially whether the reduced-form model is invariant to the alternative instrument-rate paths. A largely empirical model is also obviously very sensitive to the problem of being estimated on data from a different monetary-policy regime, in Norwegian case from periods of exchange-rate targeting and interest-rate regulation.

Norges Bank is somewhat unusual among central banks in putting such emphasis on this particular model-building approach.²⁴ Other central banks have instead put strong emphasis on structural models, for instance, the FRB/US model developed at the Federal Reserve Board or the variants of the Quarterly Projection Model developed at Bank of Canada and further developed and used by the Reserve Bank of New Zealand and the Riksbank. These structural models are somewhat eclectic applications of modern open-economy macroeconomics where the equations have structural interpretations and therefore may be more invariant to policy changes. This means that the models can accommodate both backward- and forward-looking variables, and hence include forward-looking expectations formations and asset prices. The models can also work as a theoretical framework during policy discussions and thereby contribute to more coherent and disciplined arguments.

²⁴ The Reserve Bank of Australia also has a model inspired by this approach, see Beechey, Bharucha, Cagliarini, Gruen and Thompson (2002). The RBA model is more compact, with only five estimated equations against RIMINI's 74, and better documented.

The major investment into building RIMINI was made before inflation targeting was introduced in Norway. RIMINI may very well be an efficient empirical model for unconditional forecasting (forecasting not conditional on particular instrument-rate paths, for instance), but the committee has severe doubts about whether RIMINI is the most appropriate model given the new demands for conditional projections and simulations that arise under inflation targeting. We believe Bank of Norway should invest resources into building structural models that at least can be used parallel with RIMINI. A suite of not-too-large models for different purposes may very well be most appropriate. The committee is inherently skeptical towards all-purpose models. They tend to grow larger and more complex over time, as the different purposes call for more details in different directions. Maintaining, re-estimating and developing complex all-purpose models are quite costly, commits the staff to do a high proportion of routine work, and may prevent other more constructive activities in a central bank's research department.²⁵

Norges Bank using similar models as other inflation-targeting central banks will also make information exchange, model discussions and research cooperation with other such banks easier. The fact that RIMINI is not a transparent and clear-cut structural model that could easily be compared to models used by other central banks may reduce the effectiveness of sharing empirical results and model experience with other central banks.

7.2 Challenges for research at Norges Bank

The new framework of inflation targeting will continue to provide challenges for research at Norges Bank. Given the academic strength of the Bank and its research traditions, we are confident that it will be able to meet this challenge.

²⁵ One potential problem with RIMINI is that the effects of interest-rate changes on output, employment and inflation in many cases are surprisingly small and with surprisingly long lags (see for instance a box in the Inflation Report 4/2000, of December 2000). There are a number of reasons why this is the case, namely estimation on data from other policy regimes, inadequate modeling of expectations formation or the interplay between the interest-rate and exchange-rate channels, etc. It may also be that the results of RIMINI are adequate. We have not had the time and resources to look into this issue. We understand, though, that when RIMINI is used, the model structure is frequently adjusted *ad hoc* such as to permit quicker effects of interest rate changes on employment and output. This is hardly a satisfactory solution.

We have already suggested that the dominance of RIMINI should be reduced and that new more structural models should be developed. Norges Bank will also need more general theoretical and empirical research on issues related to monetary policy in general and inflation targeting in particular. Individual researchers at the Bank have already demonstrated high competence in these areas and made important contributions to such research. Active research in these areas is of considerable importance to the Bank. The Bank must have its own competence and capacity for such research for several reasons: Such competence and capacity is necessary in order to rightly assess the quality and practicality of research related to monetary policy and inflation targeting conducted at other central banks and academic institutions, which is a prerequisite for taking advantage of and applying such research to Norwegian problems and issues of concern for Norges Bank. Furthermore, such competence and capacity is necessary to do research specifically directed to specific Norwegian problems and issues of concern for Norges Bank that therefore may not be done elsewhere. Finally, such competence and capacity at the Bank will allow the Bank to contribute to the world-wide development of monetary policy and inflation targeting.

An even stronger commitment by the Bank to maintain and improve such competence and capacity may be necessary for Norges Bank to maintain the status of a best-international-practice inflation targeter that we think it currently deserves. Competition is stiff at the top, and the other top inflation targets are hard at work at new research. The Research Department at the Riksbank has as a norm for productivity that each researcher shall produce on average 1-2 working papers per year and that almost all of these shall be published in international scientific journals. It is desirable that a high proportion of the working papers produced are of such quality that they are accepted for publication in international scientific journals.

7.3 Potential improvements to research at Norges Bank

Potential improvements to research at Norges Bank includes

- Less emphasis on the Bank's large reduced-form model RIMINI and more emphasis on the development of alternative structural models.
- An even stronger commitment to research at an academic level on issues related to monetary policy in general and inflation targeting in particular.
- A high proportion of the working papers should be of such quality that they are accepted for publication in international scientific journals.

8 Conclusions and list of potential improvements

With regard to the institutional framework for monetary policy in Norway, we find that it has considerable weakness. There is no legislated mandate for price stability. Although Norges Bank in practice has considerable operational independence, this independence is insufficiently safeguarded in the central-bank act. There is no explicit accountability structure according to which Norges Bank can be held accountable for its policy. With regard to the institutional framework, we recommend the following improvements:

- A full-fledged institutional reform should be undertaken, similar to those that have been accomplished in the U.K. or Sweden. The reform should specify a mandate for price stability, operational independence, and accountability for Norges Bank.

Within the existing legislative framework, there are, however, several potential improvements of the framework that we recommend:

- In order to resolve the inherent inconsistency between exchange-rate stability and low and stable inflation for Norway, the references to exchange-rate stability in the monetary-policy guidelines should be deleted. (More precisely, the first sentence should be deleted and the second sentence moved to after the fifth sentence.)
- The appointments to the Executive Board should be of experts on monetary policy and related areas, for instance, macroeconomics and financial markets, so that members can independently contribute to the achievement of the announced objectives for monetary policy.
- The custom to invite political parties to nominate members to the Executive Board should be discontinued, in order to avoid the risk of sectoral, political or special-interest representation and related risks of deadlocks or policy directed to special interests rather than the country as a whole.
- Nonattributed minutes and attributed voting records from the Executive Board should be published, in order to strengthen the accountability and further improve transparency. These minutes should note without attribution to individual members which issues were discussed and what arguments were presented, as well as how individual members have voted.
- The essential material on monetary policy submitted to or formulated by the Executive Board, for instance, the Strateginotat (Notes on Strategy) outlining policy for the next four months should be published, in order to strengthen accountability and further improve transparency.

- Several additional improvements to strengthen the accountability of Norges Bank should be undertaken: (1) An evaluation by the Ministry of Finance of how Norges Bank has conducted monetary policy and achieved the stated objectives for monetary policy should be included in the Kredittmelding (the report by the Ministry of Finance to the Storting). (2) Regular hearings on monetary policy should be held in the Storting with the governor and other officials of Norges Bank, with the assistance of experts appointed by the Storting. (3) An annual or biannual conference on monetary policy in Norway should be held, financed by Norges Bank but organized independently, for instance, by an academic institution, and open to the general public and media. At such a conference, papers evaluating monetary policy by the Bank could be presented by national and international experts followed by comments by Bank officials and public discussion.

Overall, we believe Norges Bank is conducting monetary policy in line with the best international practice demonstrated by the Reserve Bank of New Zealand, the Bank of England and Sveriges Riksbank. Nevertheless, we would like to recommend a number of improvements to the conduct of monetary policy, which if undertaken would in several cases push the frontier of best-international-practice inflation targeting further out:

- Inflation projections should generally be done conditional on the Bank's preferred instrument-rate path (Norges Bank's instrument rate is its overnight deposit rate); that is, conditional on its best forecast of its future instrument-rate settings. This would normally be a time-varying instrument-rate path. The assumed exchange-rate path should also normally be the Bank's best forecast of the future exchange rate, also normally a time-variable path. This would avoid some problems and inconsistencies associated with the current standard assumption of constant interest and exchange rates. It may also make monetary policy more predictable and improve the Bank's communication with the market.
- The central projections should be the *mean* projections (the probability-weighted average outcome) rather than mode projections (the most likely outcome). This is in line with established economic theory, which says that it is the mean forecast rather than the mode forecast that is relevant for decisions. This would normally make the somewhat cumbersome adjustment of the mode projection to the balance of risk unnecessary, and the fan charts for the projections would mainly be used to illustrate the uncertainty of the projections.
- The Bank should construct and publish projections of potential output, actual output and hence the output gap, conditional on time-variable instrument-rate paths. In this way the Bank can better reach the most de-

sirable compromise between inflation variability and output-gap variability and the resulting compromise will be more open to external scrutiny.

- The emphasis on the precise two-year horizon of inflation projections on target should be reduced. Instead, the Bank should find the projections of inflation, the output gap and the corresponding instrument-rate path that the Bank thinks would achieve the best compromise between inflation stability and output-gap stability. These projections should be published in the Inflation Report and the Bank should set its instrument rate accordingly. These projections will then be the Bank's best unconditional forecast of future inflation, output gap and instrument rate. Publishing them will maximize the impact on private-sector expectations and thereby implement monetary policy more effectively. Publishing them also opens the Bank's projections for more precise external scrutiny. The fan charts around the projections should be constructed and interpreted as the Bank's best unconditional estimate of the uncertainty in the projections, thus conditional on its own future policy response.
- The Bank's analysis and explanations might benefit from further use of the concepts of potential output, output gap and neutral real interest rate.
- The Bank could be more explicit about the weight it puts on output-gap stability relative to inflation stability.

Regarding the debate about the current situation with the new guidelines for fiscal policy and the corresponding real appreciation of the krone, arguably the Bank could explain the current situation with even more clarity. Thus, we recommend:

- The Bank should more clearly explain the limits of monetary policy in relation to the real adjustment of the Norwegian economy that is likely to take place due to the new guidelines of fiscal policy and, in particular, explain that monetary policy cannot be expected to prevent the associated real appreciation of the krone.

Regarding the research at Norges Bank, we recommend:

- Less emphasis on the Bank's large reduced-form model RIMINI and more emphasis on the development of alternative structural models.
- An even stronger commitment to research at an academic level on issues related to monetary policy in general and inflation targeting in particular.
- A high proportion of the working papers should be of such quality that they are accepted for publication in international scientific journals.

Appendix:

Regulation on monetary policy, March 29, 2001

Established by Royal Decree of 29 March 2001 pursuant to Section 2, third paragraph, and Section 4, second paragraph, of the Act of 24 May 1985 no 28 on Norges Bank and the Monetary System

I

§ 1.

Monetary policy shall be aimed at stability in the Norwegian krone's national and international value, contributing to stable expectations concerning exchange rate developments. At the same time, monetary policy shall underpin fiscal policy by contributing to stable developments in output and employment.

Norges Bank is responsible for the implementation of monetary policy.

Norges Bank's implementation of monetary policy shall, in accordance with the first paragraph, be oriented towards low and stable inflation. The operational target of monetary policy shall be annual consumer price inflation of approximately 2.5 per cent over time.

In general, the direct effects on consumer prices resulting from changes in interest rates, taxes, excise duties and extraordinary temporary disturbances shall not be taken into account.

§ 2.

Norges Bank shall regularly publish the assessments that form the basis for the implementation of monetary policy.

§ 3.

The international value of the Norwegian krone is determined by the exchange rates in the foreign exchange market.

§ 4.

On behalf of the State, Norges Bank communicates the information concerning the exchange rate system ensuing from its participation in the International Monetary Fund, cf. Section 25, first paragraph, of the Act on Norges Bank and the Monetary System.

II

This regulation comes into force immediately. Regulation no. 0331 of 6 May 1994 on the exchange rate system for the Norwegian krone is repealed from the same date.

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