



Centre for Monetary Economics

## Norges Bank Watch 2007

### An Independent Review of Monetary Policymaking in Norway

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**Norges Bank Watch Report Series No. 8**

Centre for Monetary Economics  
BI Norwegian School of Management  
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The Centre for Monetary Economics (CME) is a privately funded research centre at the Department of Economics, BI Norwegian School of Management. CME has established a professional network and organizes meetings and seminars where researchers and economists working in the financial community in Norway - including the Treasury and Norges Bank - can exchange views and accumulate knowledge.

Each year CME asks a committee of independent economists to evaluate Norges Bank's monetary policy. The reports from the annual Norges Bank Watch committees are published by CME in a separate Norges Bank Watch Report Series.

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**Foreword**

Each year the Centre for Monetary Economics (CME) appoints an independent group of experts to examine monetary policy in Norway. This year the group consists of the following: Professor Marvin Goodfriend of the Tepper School of Business, Carnegie Mellon University, Knut Anton Mork, Chief Economist for Norway in Handelsbanken, and Ulf Söderström, Assistant Professor of Economics at Bocconi University in Milan, Italy. The committee is solely responsible for the report and the views presented within. The report does not necessarily represent the views of CME or its members.

Oslo, 19 February 2007

Centre for Monetary Economics

Arne Jon Isachsen

## **Mandate for Norges Bank Watch 2007**

The objective of the Norges Bank Watch report of 2007 is to evaluate Norges Bank's conduct of monetary policy, given the mandate for the monetary policy set by the Government in March 2001. The committee should evaluate if the objectives stated in the monetary policy mandate concur with those expressed by Norges Bank and whether Norges Bank uses its policy instruments efficiently in order to achieve the relevant objectives.

The committee should also address other issues that it may find relevant for the present conduct of monetary policy.

Finally, the committee should evaluate the communication strategy of Norges Bank.

The report shall be presented at a press conference no later than 1 June 2007.

## **Acknowledgements**

First of all, we would like to thank the Centre for Monetary Economics for asking us to undertake the Norges Bank Watch review for 2007. It has been a most rewarding experience. We have learnt a lot during the process. Furthermore, we have benefited greatly from discussions with representatives of Norges Bank, the Ministry of Finance, the Financial Supervisory Authority (Kredittilsynet), the Norwegian Confederation of Trade Unions (LO), and fellow economists in academia and financial institutions. Norges Bank, the Ministry of Finance, and the Centre for Monetary Economics have provided useful comments on a preliminary draft of this report. Needless to say, none of these bear any responsibility for remaining errors or omissions. The conclusions and recommendations in this report are our own and not those of our employers nor the Centre for Monetary Economics.

Lastly, we would thank the Centre for Monetary Economics for technical assistance and Svenska Handelsbanken AB (publ.) for letting us use its resources.

Oslo, February 19, 2007

Marvin Goodfriend

Knut Anton Mork

Ulf Söderström

## Executive Summary

The Norwegian economy presents some unique challenges for monetary policy, not only because it is smaller and more open than most, but also because of the many supply shocks that the country has experienced in recent years, such as the rise in oil prices, the sharp decline in the prices of imported consumer goods, the substantial inflow of foreign workers, and important productivity improvements in key sectors. This contrasts with the common emphasis on demand shocks in monetary-policy studies and serves as an important reminder that the objective of monetary policy is not to prevent business-cycle fluctuations, but to help the economy attain its full potential. In the presence of supply shocks, this potential does not develop smoothly over time, but is itself subject to fluctuations.

To structure our thoughts, we base our evaluation of Norwegian monetary policy on a conceptual discussion of the underlying purpose of inflation targeting. Our evaluation then gives rise to a number of recommendations, some of which could be put into effect immediately and others that should be carefully evaluated whether or not they deserve to be implemented. After summarizing the conceptual framework, we collect our discussion and recommendations under four headings: *Mandate, Institutions, and Communication; Forecasting; Data; and Research Direction.*

### 1. Inflation Targeting, Welfare, and Credibility: Conceptual Discussion

It is mainly for practical reasons that inflation targeting has become the dominant strategy of monetary policy around the world. Nevertheless, monetary theory has played, and continues to play, an important supporting role, because it serves as a basis for discussions of policy among academic economists, market participants, and central bankers. In recent years, monetary theory has converged on a benchmark consensus model for monetary policy. We employ this model to provide a conceptual understanding of how inflation targeting works, and as a basis for our evaluation and assessment of inflation targeting in Norway.

The conceptual basis of our report is the modern consensus model of monetary policy known alternatively as the New Neoclassical Synthesis or the New Keynesian model, now recognized internationally as the foundation for inflation targeting. The New Synthesis model implies that low and stable inflation best minimizes macroeconomic inefficiencies due to price and wage stickiness. The key is that monetary policy should target an index of the prices of goods and services which exhibit significant

stickiness, i.e., prices that firms find too costly to adjust flexibly to changing economic conditions, to minimize the need for those prices to adjust. As a practical matter, the idea is to target an index of sticky prices in order to anchor inflation expectations and provide a firm nominal anchor for monetary policy around which flexible prices are free to adjust.

In this manner, inflation targeting makes aggregate output fluctuate much like a flexible-price real business cycle. Although the real business cycle model may have had somewhat limited success in explaining actual business cycles, we consider it an excellent normative benchmark for how the economy can function under monetary policy of successful inflation targeting. Thus, low and stable inflation is not a goal in itself, but an important means to allow the economy to make the best possible use of its resources.

This goal cannot always be reached perfectly. For example, wage stickiness may give rise to short-run tradeoffs between inflation and employment if an outright fall in nominal wages is required to stabilize inflation. In such cases, monetary policy must temporarily weigh the goal of low and stable inflation against the goal of employment stabilization. This is the essence of flexible inflation targeting.

In practice, there are degrees of price stickiness in an economy. The logic of the benchmark model is that flexible prices should not be included in the price index targeted by the central bank. Thus, the main purpose of monetary policy should be to use inflation targeting as a nominal anchor for prices in those sectors where stickiness is the most prevalent. Once this core of sticky prices is effectively anchored, flexible prices can be free to adjust on their own.

To secure the credibility of a central bank's commitment to low inflation, inflation targeting needs strong institutional support. A central bank should have the operational independence to use its interest rate policy instrument flexibly and aggressively if needed, it should have the support of a legislative mandate directing it to target inflation, though flexibly, it should be held accountable by the government for this mandate, and it should be transparent to help secure the credibility of its inflation target.

Inflation targeting needs structural models, forecasting models, and reliable macroeconomic data—to evaluate quantitatively the state of the economy, to indicate inflationary forces that policy has to offset, and to determine the interest rate policy actions needed to do the job. Careful consideration must be given to the construction of the core price index to target, in part because the boundary between sticky and flexible prices is a matter of judgment in practice. Once this choice has been made clear, however, a cen-

tral bank can utilize a variety of measures of inflation other than the core index to help judge inflation or deflation pressures and act against them. In addition, it should utilize a variety of goods and labor market indicators of inflation pressure to enable interest rate policy actions to be taken preemptively against deviations of inflation from the target.

The closed-economy benchmark consensus model is a useful starting point for thinking about inflation targeting. However, for our evaluation of monetary policy in Norway, we need to consider a small open economy extension of the benchmark model. In principle, the index to target should only include domestically-produced goods and services. In practice, however, especially in the Norwegian context, there may be good reasons to include at least some import prices.

For inflation targeting to work well, the central bank must allow the foreign exchange rate to float. However, exchange rate flexibility is not a goal in itself, but a necessary prerequisite for monetary policy to help the real economy function efficiently. Monetary policy must take account of the indirect effects that shocks and policy actions themselves have on targeted core inflation and employment, in part, through their effect on the foreign exchange rate. Shocks to the terms of trade and other international factors play an especially important role in a small open economy. Nevertheless, the fundamental principle of monetary policy carries over from the benchmark closed-economy model: the flexible targeting of core inflation, with the help of international factors to judge inflationary pressures in the non-traded, sticky price sector, delivers welfare-maximizing monetary policy.

## **2. Mandate, Institutions, and Communication**

### ***Regulation on Monetary Policy***

Any evaluation of a central bank's performance needs to be based on the Bank's formal mandate. However, for such an evaluation to be meaningful, the mandate needs to be clear. In this regard, we see some problems for the case of Norges Bank, whose formal mandate is contained in the Regulation on Monetary Policy. First, the Regulation's focus on stability in the Norwegian krone's national and international value is internally inconsistent. It is impossible to stabilize both inflation and the exchange rate in the presence of terms of trade shocks. Furthermore, there are signs that the interest rate forecasts published by Norges Bank are not entirely believed by market participants. We suspect this is because market participants perceive a constraint on Norges Bank's

policy related to the explicit mention of the exchange rate in the mandate. Certainly, monetary policy should take into account effects on inflation and employment that come via the exchange rate. However, it is essential to dispel any suspicion of a constraint on inflation targeting due to a separate objective for the exchange rate or a separate regard for specific industries.

- We recommend that references to the exchange rate be removed from the Regulation to strengthen the credibility of the inflation target.

Second, the level of the inflation target—2.5%—makes Norway stand out from most other economies with formal inflation targets, for which 2% has become the *de facto* standard. Although there may have been good reasons for choosing this level in 2001—for example, to accommodate the expected real appreciation resulting from a systematic fiscal expansion—we find these arguments unconvincing today.

- We recommend that the inflation target be reduced to 2%.

Third, while stipulating the inflation target as “annual consumer price inflation,” the Regulation is not explicit on the specific index to be targeted. The mandate allows Norges Bank to ignore “the direct effects on consumer prices resulting from changes in interest rates, taxes, excise duties and extraordinary temporary disturbances.” The underlying theory suggest, however, that the case for inflation targeting is derived from nominal stickiness, so that targeting should be aimed at those prices whose movements are most clearly hampered by stickiness.

- We recommend that the inflation target be defined explicitly in terms of a core index of consumer prices of those sectors most affected by price stickiness.

We would like to encourage Norges Bank and the Government to explore the possibility of targeting an index of the consumer prices of domestically produced, non-energy goods, adjusted for indirect taxes. We expect such an index to cover most of the markets where price stickiness is prevalent, and monetary policy would be able to stabilize such a price index more readily than one including imported goods. For this transition to be possible, Statistics Norway would need to publish such an index.

- We recommend that Norges Bank and the Government explore the possibility of targeting an index of the consumer prices of non-energy, domestically produced goods and services, adjusted for indirect taxes.

Finally, the Regulation only asks for consumer price inflation to be approximately 2.5% without specifying what “approximately” means. The Government White Paper of

March 2001 specifies a range of acceptable inflation fluctuations of  $\pm 1$  percentage point around the target. We believe that this range should be formally included in the Regulation. Accountability is important for an inflation-targeting regime to be successful. This requires clear criteria on which the outcome of monetary policy can be judged. A target range would also facilitate flexibility in the targeting of inflation as well as accountability by allowing for incremental criticism of Norges Bank if inflation moved to the edge of the target range. We believe it is important that criticism can be formulated incrementally, in other words, that the government be able to criticize the central bank without that criticism being read as a signal of total system failure or indeed an indication that the Governor should resign.

- We recommend that the Regulation include a fluctuation band of  $\pm 1$  percentage point around the inflation target.

For the credibility of inflation targeting, it is also important that the central bank's mandate be stable. Large changes should thus not be undertaken too often.

- Major revisions of the framework within which monetary policy is conducted should be undertaken infrequently and only with good reason so as not to undermine the credibility of the inflation targeting regime.

### ***Monetary Policy Institutions***

There is widespread agreement that central banks should be operationally independent from politics. However, Norges Bank does not have full operational independence because the Bank must inform the Ministry of Finance before making important decisions (including interest-rate decisions), and because the Government has the right to instruct Norges Bank. The right to instruct constitutes an unusual restriction on central bank independence which may strain the credibility of monetary policy.

- We recommend that the Government's right to instruct Norges Bank be abolished and that the meeting between the Governor and the Minister on the day before the Executive Board meeting be discontinued.

The Executive Board has decided against publishing minutes or voting records from its meetings, and the external members of the Executive Board do not discuss monetary policy issues in public. These decisions place restrictions on the transparency of the decision process and do not serve to enhance credibility and public trust that decisions are well-balanced.

- We recommend that the Bank publish non-attributed minutes and attributed voting records from Executive Board meetings, and that also external members explain their views in public.

### **Communication**

Earlier Norges Bank Watch groups have commended Norges Bank on its communication with markets and the public, most recently for releasing forecasts of the policy interest rate. While these commendations are well deserved, we think that Norges Bank should release more of the *ex ante* information used to reach its policy decisions. This includes a clearer exposition of the role and explanation of the Bank's use of models of various kinds as well as the quantitative reasoning behind judgments made to amend or override the models. Such information will improve the capacity of outsiders to reasonably evaluate Norges Bank's policy decisions.

- We recommend that Norges Bank make more fully available the *ex ante* information employed in policy decisions.

On the other hand, some users, such as financial market participants, have a need for a more succinct presentation of the main arguments behind the Bank's decisions than what is currently available. The succinctness of the inflation reports could be improved further if the reasons underlying the Bank's decisions are related more closely to its models and judgment. Also, we see some risk of misunderstanding in the repeated use of special phrases describing current policy, such as "small and not too frequent steps" or "it is unlikely that rates will be raised at every monetary policy meeting." We furthermore feel the publication of the Bank's own interest rate forecast greatly reduces the need for such phrases.

- We recommend that Norges Bank make its press releases and inflation reports more concise by providing brief executive summaries and by relating the reasoning underlying its decisions more closely to its models and judgment.
- Special phrases such as "in small and not too frequent steps" should be used sparingly.

### **3. Forecasting**

Because monetary policy under inflation targeting is forward looking, it needs to be based on forecasts of how the course of the economy is likely to evolve. Good forecasts require good models as well as good judgment. The Bank must and does employ a

structural model to ensure that its forecasts of inflation, the output gap, the interest rate, and the exchange rate are internally consistent, and that they are consistent with good monetary policy. However, structural models do not always forecast well compared with pure forecasting models that are less constrained by economic theory. This may partly explain why the structural model currently used by the Bank for forecasting has over-predicted inflation and under-predicted its uncertainty. It may also explain why the Bank currently forecasts very little change in the exchange rate despite an expected shift to a large positive interest rate differential vis-à-vis trading partners over the coming years. Although atheoretical, statistical forecasting models are no substitute for structural models when it comes to policy decisions, they should be used to form judgment about how the predictions of structural models should be amended.

Given Norges Bank's objective of flexible inflation targeting, forecasts of the output gap—and thus of potential output in addition to actual output—are almost as important as the inflation forecasts. However, the Bank only publishes forecasts of the output gap and not current estimates or forecasts of actual and potential output. Forecasts of potential output, as well as estimates of its current level, are always subject to significant uncertainty, which Norges Bank should note. Furthermore, potential output must not be assumed to follow a smooth trend over time. This is particularly important for the Norwegian economy, where supply shocks that move potential output seem to be prevalent.

With regard to forecasting and analysis at the Bank, we therefore recommend the following:

- Norges Bank should employ atheoretical statistical forecasting methods to help quantify the judgment that amends its structural forecasts.
- Norges Bank should publish in its inflation reports estimates and projections of actual and potential output with some indication of the statistical uncertainty surrounding each, in addition to publishing estimates of current and future output gaps.
- Norges Bank should provide more quantitative detail underlying the exchange rate forecast and its relation to the projection for the interest rate.

#### **4. Data**

Flexible inflation targeting is quite demanding in terms of economic data. Although Norway has a long and distinguished tradition of economic data production, we see room for improvement. These improvements need to come from Statistics Norway.

Exploration of the possibility of defining the inflation target in regard to a core index of the type that we suggest above requires that Statistics Norway publish a price index for non-energy domestically produced consumer goods and services, adjusted for indirect taxes. Currently, Norges Bank looks at a number of alternative measures of underlying inflation, such as trimmed means and volatility-weighted indices. Such indices are useful to help forecast the direction of the targeted core index.

- We recommend that Statistics Norway construct and release monthly an index of the prices of non-energy domestically produced goods and services, adjusted for indirect tax changes.
- We also recommend that Statistics Norway publish monthly alternative measures of underlying inflation, such as trimmed means and volatility-weighted indices.

The ILO-compatible labor market survey is carried out on such a small sample that the data are released only as three-month moving averages. Furthermore, the population underlying the samples of this survey excludes *ex ante* guest workers unless they have taken up domicile in Norway. Productivity statistics are not published on a regular basis, although they can be constructed by the user, which Norges Bank does. The only complete wage statistics are annual and constructed by a committee including members from the social partners. Capacity utilization is currently published indirectly as part of the Business Tendency Survey for manufacturing, mining, and quarrying, but curiously not for oil and gas extraction. Moreover, the figures are typically given as percentages of firms that find capacity to be a constraining factor for output growth, not as a percentage of capacity utilization itself.

We therefore recommend that

- The ILO-compatible survey be expanded into a true monthly survey and preferably include foreign workers. It should furthermore be supplemented by a monthly—or, at least, quarterly—establishment survey patterned on the one by the same name in the United States. Comprehensive wage statistics can be consolidated into this survey.
- Statistics Norway publish productivity statistics on a regular basis. The productivity and wage data can then be combined into estimates of unit labor costs and, in turn, pricing markups.
- Capacity utilization statistics be improved by including the oil and gas sector and expressed as a percentage of capacity utilization.

Forward-looking policy must be based not only on good forecasts, but also on a good assessment of the current state of the economy. International experience suggests that surveys often provide the best indications about the current state of the economy. However, we are struck by the paucity of such data in Norway.

- We recommend that Statistics Norway conduct regular surveys of purchasing managers and consumer confidence according to international standards.

## **5. Research Direction**

Norges Bank has made great strides in recent years building up a research-based model apparatus. The Bank's researchers participate actively in the international research community. We believe that two areas should be strengthened in future research. First, because Norway is a rather small and extremely open economy, research on monetary policy in small and open economies should receive special emphasis. Second, we would like to see empirical research on wage and price stickiness and flexibility in Norway. Such findings should provide information on which prices need to be included in the index targeted by monetary policy.

- We recommend that Norges Bank strengthen its research on monetary policy in small, open economies.
- We would also like to see empirical research on wage and price stickiness and flexibility in Norway with a view to providing guidance on which prices to include in the index targeted by monetary policy.

## Introduction

The Norwegian economy presents some unique challenges for monetary policy, not only because it is smaller and more open than most, but also because of the many supply shocks that the country has experienced in recent years, such as the rise in oil prices, the sharp decline in the prices of imported consumer goods, the substantial inflow of foreign workers, and important productivity improvements in key sectors. This contrasts with the common emphasis on demand shocks in monetary-policy studies and serves as an important reminder that the objective of monetary policy is not to prevent business-cycle fluctuations, but to help the economy attain its full potential. In the presence of supply shocks, this potential does not develop smoothly over time, but is itself subject to fluctuations.

Furthermore, important recent shocks to the Norwegian economy have not been aggregate shocks, but have affected different sectors differently. It has called for changes in relative prices, for example, by making apparel and air fare cheaper and energy goods more expensive relative to other goods and services. Thus, although sectoral policy is not the domain of central banks, these shocks raise the question of how monetary policy can help the economy adapt to such shocks.

In order to study these issues, we have had to move beyond our main charge, formulated in our mandate as “to evaluate Norges Bank’s conduct of monetary policy, given the mandate ... set by the Government.” That is, we have had to evaluate the mandate itself. In that regard, we follow the tradition of several earlier Norges Bank Watch groups. We furthermore justify it from our mandate’s invitation to “address other issues that [the committee] may find relevant for the present conduct of monetary policy.”

In so doing, we believe our exercise can offer important insights. Most importantly, we have attempted to review, on a fundamental basis, the underlying purpose of inflation targeting. Low and stable inflation is not a goal in itself. Rather, it represents a contribution to economic welfare, a help towards the efficient allocation of resources for the production and consumption of real goods and services. The ultimate goal is an environment where the economy’s potential can be utilized to the maximum extent possible in a sustainable manner. Monetary policy certainly cannot do this alone. Fiscal policy, trade policy, competition policy, and other regulatory policy are needed as well. However, monetary policy is uniquely suited to address one particular problem, namely, the inefficiencies caused by price and wage stickiness in the presence of inflation or defla-

tion. The cure that monetary policy can offer for stickiness is to anchor nominal prices to a credible inflation target.

Although Norwegian monetary policy works well in this regard, we believe improvements can be made, several of which require changes in Norges Bank's mandate. The references to the exchange rate as a separate objective should be taken out, and the operative inflation target should be lowered from 2.5% to the 2% that has become the *de facto* international standard. Furthermore, we recommend that the Government explore the possibility of redefining the inflation target in terms of a core index of consumer prices of those sectors most affected by stickiness. We suspect that this mainly means the consumer prices of domestically produced goods and services.

However, we have also reviewed the conduct of Norwegian monetary policy in 2006. From the information that Norges Bank has made available, we do not feel we can attempt to recreate the environment surrounding each policy decision. Thus, rather than evaluating policy in view of *ex ante* information, which we would have preferred, we have sought to discuss the general issues involved in formulating policy in the face of the kind of shocks that the Norwegian economy has been facing. In general, we feel Norges Bank's actions fit well with the conclusions we draw from this discussion.

Our mandate finally asks us to "evaluate the communication strategy of Norges Bank." On this front, we notice one major recent change in that 2006 has been the first full year that Norges Bank has published its own interest-rate forecasts as part of its Inflation Reports. This step has added to the transparency of Norwegian policy making, which is positive for building credibility for the inflation target. However, it also introduces new risks in that it can uncover weaknesses that might exist in Norges Bank's forecast activities. And its success would be threatened if substantial discrepancies between market expectations and the Bank's forecasts should arise and persist over long periods.

Our report is organized in four sections. Section 1 offers a conceptual discussion of the justifications and purposes of flexible inflation targeting. Section 2 surveys the performance of Norwegian monetary policy in 2006, including Norges Bank's communication of its policy. Section 3 reviews the needs for improvement that we perceive regarding research and modeling, as well as the data needed for these purposes. Section 4 discusses Norges Bank's mandate as well as other institutional issues in view of the preceding discussion.

## 1. Inflation Targeting, Welfare, and Credibility: A Conceptual Discussion

The rationale for targeting inflation is rooted in both theory and practice. It is mainly for practical reasons that inflation targeting has become the dominant strategy of monetary policy around the world. It did so for three reasons: (i) failing to put a priority on price stability led to inexorably rising trend inflation and go-stop monetary policy that increased the volatility of both inflation and output, (ii) nearly a quarter century ago central bankers discovered that determined monetary policy *could* bring inflation down and stabilize it at a low rate, and (iii) since then low and stable inflation has been associated with a great moderation in the volatility of output around the world. Indirect strategies for stabilizing inflation involving either monetary targeting or a fixed nominal exchange rate to import low inflation from abroad had problems in practice that encouraged central banks to target inflation directly.

Even though practical experience is the primary reason for the spread of inflation targeting, monetary theory played, and continues to play, an important supporting role. In the 1970s, monetary theorists helped to persuade central bankers that determined monetary policy could bring inflation down on a sustained basis with no permanent unemployment cost. Since then, as a result of evidence accumulated in stabilizing inflation and revolutionary advances in academic modeling of the macro-economy, the theory of monetary policy has undergone a great transformation. The disarray then famously reflected in debates between monetarist and Keynesian economists has today been resolved in a consensus benchmark model of monetary policy referred to as the New Neoclassical Synthesis or New Keynesian model, the two names reflecting the two directions from which the convergence came.

Today, the theory of monetary policy continues to play an important role, in part, because it serves as a basis for discussions of policy among academic economists, market participants, and central bankers. The benchmark consensus serves as a coherent framework for considering policy options inside central banks and provides a basis for communicating central bank concerns and intentions to the public. Moreover, because the benchmark model is consistent with practical experience across countries and over decades, it serves as a secure foundation for quantitative theoretical elaborations sure to improve our understanding of monetary policy and the performance of monetary policy in the future. We, however, employ the consensus benchmark for yet another purpose—to provide a conceptual understanding of how inflation targeting works—as a basis for

our evaluation and assessment of the practical implementation of inflation targeting in Norway.

Our conceptual overview of the New Neoclassical Synthesis (New Keynesian) model will address five issues that are particularly important for understanding inflation targeting in practice: the mechanics of inflation targeting, why inflation targeting is welfare-maximizing monetary policy, the case for targeting “core” inflation, the role of credibility and transparency, and open-economy extensions of the benchmark model.<sup>1</sup>

### 1.1 The Mechanics of Inflation Targeting

At the heart of the model, output is produced by monopolistically competitive firms that set their product prices at a markup over the marginal cost of production. Because pricing decisions are costly, firms consider changing their product prices only when demand or cost conditions are expected to compress or enlarge their markups significantly and persistently relative to their flexible-price profit-maximizing markups. For instance, firms may consider raising product prices if marginal cost moves above trend due to a productivity growth slowdown or if wage inflation accelerates due to a tightening of the labor market. To sustain the targeted rate of inflation, monetary policy influences aggregate demand so as to offset the effect of such shocks on marginal cost, i.e., to keep marginal cost growing at the targeted rate of inflation. Then, firms will continue to raise product prices at the targeted rate of inflation, irrespective of such shocks, knowing that doing so will keep actual markups at profit-maximizing markups.

If nominal wages are sufficiently flexible, then monetary policy can stabilize marginal cost fully by acting on wages alone through its influence on aggregate demand for goods and labor. This is more likely to be the case when stabilization merely requires nominal wages to rise faster or more slowly for a period of time. However, in some circumstances monetary policy might face a *short-run tradeoff* between inflation and unemployment. For instance, if an outright fall in nominal wages is required to stabilize inflation, and nominal wages are temporarily rigid downward, then to stabilize inflation monetary policy must create an output gap and enough unemployment to drive *upward* the marginal physical product of labor in order to produce the required effect on mar-

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<sup>1</sup> The exposition of the consensus benchmark model presented here has its origins in Goodfriend and King (1997, 2001) and in Goodfriend (2002). See also Clarida, Galí, and Gertler (1999). Woodford (2003) explores monetary policy comprehensively in the benchmark model and in many of its elaborations. Rotemberg and Woodford (1997) is an early example of this modeling style.

ginal cost.<sup>2</sup> In this case, a central bank must choose how much inflation to tradeoff in the short run to stabilize unemployment until the shock subsides and inflation can be brought back to target. This tradeoff lies at the heart of flexible inflation targeting.

## 1.2 Why Inflation Targeting is Welfare-Maximizing Monetary Policy

An economy in which monetary policy stabilizes inflation by sustaining profit-maximizing markups minimizes the *need* for sticky prices to be adjusted. Thus, it operates *as if* firms sustain profit-maximizing markups themselves by adjusting their own product prices flexibly. Therefore, inflation targeting makes aggregate output fluctuate much like a *flexible-price* real business cycle—due to supply shocks to productivity, the terms of trade, or the labor force, etc. Inflation targeting is welfare-maximizing monetary policy because it neutralizes, as much as monetary policy can, macroeconomic distortions due to costly price adjustment and yields the most efficient cyclical stabilization of employment and output that monetary policy can deliver.

It is worth emphasizing that the consensus model employs real business cycle reasoning in a very different way than was initially proposed. Real business cycle models were introduced originally in the early 1980s to explore fluctuations in employment and output in models in which prices and wages are perfectly flexible. Business cycles are optimal in such models and monetary policy plays little if any role in the determination of employment and output. In other words, real business cycle models were proposed as an *alternative* to monetary policy models of aggregate fluctuations. Nevertheless, an important insight of the New Neoclassical Synthesis (New Keynesian) consensus is that real business cycle models play a central *normative* role in monetary policy analysis. If the effects of frictions are removed, then the result is an economy that actually works like a real business cycle model, and the optimality argument makes sense. The consensus does not argue that all cycles are good, but that monetary policy should make sure that the good cycles are the only ones allowed to occur, and they should be allowed to occur fully.

## 1.3 The Case for Targeting Core Inflation

Some prices are typically more flexible than others. In many countries, the prices of goods such as food and energy are highly flexible. In the case of Norway, food may not be a good example, but energy is; and other prices, such as air fares, could be added as a

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<sup>2</sup> Wage rigidity has been analyzed in this context by Erceg, Henderson, and Levin (2000), Huang and Liu (2002), Blanchard and Galí (2005) and others.

result of deregulation. So the question arises, should targeted inflation include flexible as well as sticky prices, or should a core measure of sticky-price inflation be targeted? The above reasoning suggests that monetary policy should target the measure of inflation that allows the economy to operate as much like a flexible-price economy as possible. Targeting a core index of sticky-price inflation does this. Core inflation targeting makes the sticky-price sector operate as if prices were flexible there and allows prices in the flexible-price sector to adjust freely relative to core prices.

In practice, it may be difficult to determine which prices are mostly sticky and which are mostly flexible. As a rule, it would seem less costly to leave a sticky price out of the core index than to include a flexible one because, whenever this flexible price changes, the latter policy then imposes countervailing changes in the prices where such changes are costly.

#### **1.4 The Role of Credibility and Transparency**

Credibility for low inflation is central to the efficient operation of inflation targeting. This is so because firms care about expected future marginal cost in setting current prices. If a central bank has credibility, then on average firms will expect monetary policy to ensure that departures of actual from profit-maximizing markups will be temporary. Hence, credibility anchors inflation to the target by insulating inflation from current and expected future shocks.

In contrast, the absence of credibility makes expectations of future marginal cost excessively sensitive to shocks, exposing a central bank to inflation scares. Inflation scares are easy to understand from the perspective of the benchmark model: monetary policy has the power to stimulate aggregate demand in the short run, which firms are happy to accommodate by hiring more labor. Thus, the public understands that a central bank has an incentive to cheat on its commitment to price stability to increase employment. The model emphasizes, however, that such monetary stimulus will precipitate higher wages, compress markups, and prompt firms to raise prices to restore their profit-maximizing markups, ultimately neutralizing the effect of monetary stimulus on employment and output.

To secure the credibility of a central bank's commitment to low inflation, it is a good idea for inflation targeting to have strong institutional support. A central bank should have the operational independence to use its interest rate policy instrument flexibly and aggressively if need be to stabilize inflation. A central bank should have the

support of a legislative mandate directing it to target inflation. A central bank should be held accountable by the government for targeting inflation.

A central bank should also use transparency to help secure the credibility of its inflation target. Monetary policy geared to targeting low inflation is demanding, not only of institutions, but also of the competence of a central bank to manage interest rate policy to sustain low inflation. Transparency of institutional arrangements and of a central bank's understanding of the state of the economy, the channels of monetary transmission, and its medium-term objectives with respect to inflation and unemployment reinforce the public's confidence in a central bank's commitment and competence to sustain targeted inflation, and thereby enhances the efficiency with which monetary policy can achieve its objectives.

Transparency can be counterproductive if it exposes the fact that a central bank has inconsistent objectives, hidden or otherwise, or incoherence in its internal analysis of monetary policy. On the other hand, limited transparency with regard to institutions or operations exposes the central bank to shocks to the credibility of its commitment to low inflation. A central bank should resolve such tensions so that it can make efficient use of transparency to secure the credibility of its inflation target.

With regard to monetary policy operations, it is worth emphasizing that inflation targeting needs structural models, forecasting models, and reliable macroeconomic data—to evaluate quantitatively the state of the economy, to indicate inflationary forces that policy has to offset, and to determine the interest rate policy actions needed to do the job. Given the spread of inflation targeting around the world, there is a growing community of monetary economists and central bankers with modeling experience to draw on. Central bank economists must continually adapt the latest modeling techniques to their own national circumstances in order to build models best suited to support monetary policy in their respective countries.

A central bank must make sure that it has available sufficiently comprehensive and reliable macroeconomic data to support inflation targeting. In particular, a central bank must give careful consideration to the construction of the core price index to target, in part because the boundary between sticky and flexible prices is a matter of judgment in practice. A central bank can utilize profitably a variety of measures of inflation other than the core index it chooses to target in order to help judge inflation or deflation pressures and act against them. In addition, a central bank should utilize a variety of goods and labor market indicators of inflation pressure (such as price-cost markups relative to

their historical average, time series on unit labor costs, measures of the output gap, and estimates of unemployment relative to the natural rate) to enable interest rate policy actions to be taken preemptively against deviations of inflation from the target.

### **1.5 Open-Economy Extensions of the Benchmark Model**

The closed-economy benchmark consensus model is a useful starting-point for thinking about inflation targeting. However, to provide specific conceptual guidance for our report on Norwegian monetary policy, we consider a small open economy extension of the benchmark model. In addition to a monopolistically competitive sector that produces goods for domestic consumption, it supposes that the economy has an export sector that sells its output at a foreign-currency price given in world markets. It furthermore supposes that the economy imports a share of consumption goods at a foreign-currency price also given in world markets. The economy has a floating foreign exchange rate.

The principles outlined above suggest that monetary policy in the small open economy should target a core index of domestic-currency denominated prices of goods and services produced for domestic use by monopolistically competitive firms. Core inflation should be stabilized subject to a potential short-run tradeoff between inflation and unemployment due to nominal wage rigidity as discussed above. Export and import prices would then be free to adjust relative to targeted core domestic-currency prices of non-traded goods. The domestic currency prices of exports and imports would fluctuate partly due to movements in the foreign-currency price of exports and imports, and partly with respect to fluctuations in the foreign exchange rate.

In practice, one can make a case for including import prices in the targeted inflation index. To the extent that the domestic value added of imports is a significant part of cost, there is scope for monetary policy to influence import costs through its pressure on domestic resource utilization. A price index that excludes imports furthermore might be deemed too narrow to serve as a reliable, credible inflation target. The problem is exacerbated if, as is the case in Norway, some prices are administered or a significant portion of non-traded goods and services are provided by government without explicit prices. Moreover, empirical evidence from many countries has indicated that importers to a large extent do not pass cost adjustments through to their customers, but instead “price to market.”

With respect to this argument, however, we would emphasize that it would be exceedingly difficult in practice for a central bank to control the marginal cost of imports at the border because that would almost amount to controlling the exchange rate. Fur-

thermore, our remarks in Section 1.3 suggest that it would be more of a problem to include import prices in the core index if they indeed are flexible than to exclude them if they are sticky.

In any case, for inflation targeting to work well, the central bank must allow the foreign exchange rate to float freely so that interest rate policy is not constrained by an explicit or a hidden commitment to stabilize the exchange rate. Interest rate policy must have the independence and the flexibility to act aggressively as needed, irrespective of the foreign exchange rate, to sustain targeted core inflation. Moreover, interest rate policy must be *believed* by the markets to have that flexibility so that current interest rate policy actions can exert maximum leverage over expected future short-term interest rates (and long-term interest rates) with a minimum of short-term interest rate volatility. Otherwise, the credibility of the inflation target may be compromised, and with it the efficiency of monetary policy itself.

We emphasize that the full flexibility of the exchange rate is not a goal in itself, but a necessary prerequisite for monetary policy to help the real economy function efficiently. Therefore, even though monetary policy should not react directly to exchange rate movements, policy must take account of the indirect effects that shocks and policy actions themselves have on targeted core inflation, in part, through their effect on the foreign exchange rate. Shocks to the terms of trade and other international factors play an especially important role in a small open economy. Nevertheless, the fundamental principle of monetary policy carries over from the benchmark closed-economy model: the flexible targeting of core inflation, with the help of international factors to judge cost pressures in the non-traded, sticky price sector, delivers welfare-maximizing monetary policy.

## 2. Monetary Policy Performance in 2006

Norges Bank held nine policy meetings during 2006. At three of these meetings, in March, June, and November, new Inflation Reports were released. As shown in Table 2.1, five of the meetings tightened policy, each time raising the policy rate by 25 basis points, whereas the remaining four meetings left the policy rate unchanged. During most of the year, the tightening clearly was done “in small and not too frequent steps,” as frequently expressed by the Bank. In hindsight, this clearly meant tightening at every other meeting, which represented a slight quickening from 2005. The pace seems to have quickened further towards the end of 2006, with tightening at two consecutive meetings. A forewarning of this quickening could be read from the upward revision of the Bank’s interest-rate forecasts between the March and June meetings and Inflation Reports. An even stronger signal came with the more substantial upward revision of the interest-rate forecast in November.

Date	Inflation Report?	Policy rate change	Rate forecast changes (basis points)		
			4 qtrs ahead	8 qtrs ahead	12 qtrs ahead
Jan 25	No	None			
Mar 16	Yes	+ 25 bp	10	-2	n.a.
Apr 26	No	None			
May 31	No	+ 25 bp			
Jun 29	Yes	None	28	34	33
Aug 16	No	+ 25 bp			
Sep 27	No	None			
Nov 1	Yes	+25 bp	50	54	21
Dec 13	No	+25 bp			

Source: Norges Bank

As a matter of principle, we would have liked to assess these individual policy decisions. In fact, our mandate can be said to ask for it. To do this meaningfully, however, we would have needed access to the full *ex ante* information on which Norges Bank based its decisions when they were made. We discuss the need for such information further in Section 2.4 below. In its absence, we have chosen to focus instead on our general understanding of the challenges facing Norwegian monetary policy this year. Based on what we have been able to ascertain, we feel Norges Bank has shown a good grasp of the issues at hand and has made reasonable choices. We also feel that some of the exter-

nal criticism has been misplaced in that it has paid insufficient attention to some of the recent positive supply shocks that we consider below. Moreover, we feel the debate has uncovered some important issues whose interest stretches well beyond the Norwegian borders. We will discuss three such issues, namely, the apparent dilemma for monetary policy in 2006, possible structural changes, and Norges Bank's communication of its policy during this year.

## 2.1 Dilemma or Not?

Even as exceptionally strong real growth has continued this year, underlying inflation (as measured by the CPI-ATE) has remained well below the 2.5% target. Headline inflation has been higher, but apparently temporarily as the result of a spike in electricity prices following the summer drought. At the same time, the real economy has been booming, as evidenced by high growth and low and falling unemployment. Thus, Norges Bank would seem to have faced a classical dilemma for monetary policy as the low inflation should call for easing and the boom for tightening.

Current macroeconomic developments are always difficult to judge. Therefore, we are not surprised to have found a range of opinions in our conversations with various observers. Our own view tends to focus on the string of positive supply shocks that appear to have affected the Norwegian economy in recent years, such as the entrance of new, low-cost producers in the global economy, the rise in oil prices, increases in labor supply, and important productivity improvements in certain sectors. We believe these shocks have raised potential GDP even as they have changed equilibrium relative prices. This kind of environment may introduce tradeoffs between keeping inflation at the target on the one hand and effectively utilizing the economy's potential on the other.<sup>3</sup> As noted in Section 1.1, wage stickiness may add to the tradeoff. Furthermore, positive supply shocks tend to reduce the economy's natural rate of interest; in other words, monetary policy needs to turn expansionary to make sure that the economy's potential is utilized in full.<sup>4</sup> This is particularly true in the early part of such a period as the positive nature of the shocks have not become apparent to all agents. As time passes, however, tightening is needed if people start to take temporary improvements for granted as permanent blessings.

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<sup>3</sup> Woodford (2003), pp. 200–204.

<sup>4</sup> Positive supply shocks raise aggregate demand, but by less than the improvement in current potential output because households tend to smooth consumption gains over time. Thus, the real interest rate needs to decline for supply and demand to match. See, for example, Woodford (2003), p. 80.

Thus, although the details can be discussed, the monetary easing of recent years seems to us generally appropriate, as does the current tightening. However, several of our discussion partners pointed out some risks to the gradual approach that Norges Bank so far has taken:

- The resulting labor market tightening may raise inflation down the road, perhaps requiring a sharp policy reversal. In our view, this may be the greatest risk at the present time. Norges Bank seems to share this view as well, as evidenced by its actions and public statements in late 2006 and early 2007.<sup>5</sup>
- Real investments undertaken in an environment of low interest rates could prove excessive and unprofitable once rates normalize, so that the current boom could bear the seeds of a subsequent recession.
- Unrealistic expectations that ultra-low interest rates have come to stay may have caused firms or households to borrow excessively, thus raising the risk of future financial instability.

Although we feel somewhat uncertain about the importance of the two latter risks, we suspect that the risks in general could have been mitigated if the inflation target had been expressed in terms of the inflation rate of domestically produced non-energy goods rather than the broader CPI or even CPI-ATE, as this would have implied a less expansionary monetary policy. Thus, the suggestion we make in Section 1.5 above bears direct relevance to the Norwegian situation from 2003 on. On the other hand, we emphasize that the choice of inflation index to use as a target should not be changed in response to individual shocks to the economy, but on general grounds as discussed in Section 1. We will return to this issue in Section 4.

We furthermore add that the risk of financial instability may have been driven less by the extent of the 2003–2005 easing than by the length of time that the policy rate was left unchanged at 1.75%. Such an extended period of unchanged interest rates risks leaving an impression that any future change is unlikely. It might have been preferable to cut the policy rate more radically in 2004, but for a shorter period than was actually done.

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<sup>5</sup> See, for example, the press releases accompanying the December 2006 and January 2007 rate hikes, <http://www.norges-bank.no/front/pressemedling/en/2006/2006-12-13T12-56-20.fgen.html>, and <http://www.norges-bank.no/front/pressemedling/en/2007/2007-01-24T12-25-37.fgen.html>.

## 2.2 More on the Shocks

The many shocks that appear to have hit the Norwegian economy in recent years are not entirely observable, so to some extent we are left guessing at what actually has happened. However, we feel we reasonably can identify four different shocks:

1. Starting in the late 1990s, the relative prices of a number of imported consumer goods have dropped. This decline is naturally related to the emergence of new global competitors, such as China, India, and Eastern Europe and is sometimes referred to as the “China I” effect. This effect has been particularly strong for Norway because, as a non-EU member, Norway liberalized its trade with these competitors at an earlier stage than the EU members or, for that matter, the United States. This terms-of-trade shock has expanded the overall purchasing power of Norwegian consumers; but it has also implied substantial changes in relative prices between the relevant imports and other goods and services. As noted in Section 1 above, such idiosyncratic shocks can imply tradeoffs in monetary policy. However, we note again that the tradeoff perhaps could have been made easier if the price index for domestically-produced goods and services had been used as the inflation target.
2. While moderating somewhat recently, oil prices have risen significantly, with nominal dollar prices doubling since the beginning of 2003. Emerging-economy demand has been important for this rise, which has earned it the label “China II” for the case of Norway. A slower than expected expansion of global production capacity has added to the price pressures.<sup>6</sup> Oil production has proved lower than expected on the Norwegian shelf as well<sup>7</sup>; but natural-gas production is rising rapidly, and the price increase has much more than made up for the modest oil volume decline.

This shock is also a terms-of-trade shock, benefiting the population at large as recipients of oil revenues. But at the same time it is an idiosyncratic shock in that it has greatly improved profitability in the oil and gas sector. Furthermore,

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<sup>6</sup> Exploration has yielded fewer and smaller finds than expected, bringing new fields on line has proved slower than usual, and keeping up production in mature fields has proved demanding.

<sup>7</sup> For example, the Norwegian Petroleum Directorate recently revised down by 400,000 barrels per day its forecast of 2007 production of crude oil and other liquids. See [http://www.npd.no/English/Emner/Ressursforvaltning/Utbygging\\_og\\_drift/5.1.2007+sokkelåret+2006++petroleumsproduksjon.htm](http://www.npd.no/English/Emner/Ressursforvaltning/Utbygging_og_drift/5.1.2007+sokkelåret+2006++petroleumsproduksjon.htm).

as oil and gas production requires domestic labor, it puts pressure on the labor market. And the demand for domestic labor has increased further as the higher oil revenues have raised private and public demand for non-traded goods and services. This increase in labor demand would seem to warrant real wage increases over and above the growth in productivity. Part of the nominal wage growth that has been observed in the second half of 2006 may thus have been of this variety. However, we are quite open to the notion that part of it also may be inflationary as agents fail to realize the effective limits to potential growth. Separating out these effects has been a real challenge for Norwegian monetary policy in 2006.

3. The supply of labor seems to have expanded greatly for two reasons, one internal, and one external. The internal source was a rule change that cut sick leave by about 2.5% of the labor force from the middle of 2004. There has been a slight subsequent increase, but not a significant one. The external source is an influx of guest workers, mainly from the new EU members. The magnitude is a matter of some debate.<sup>8</sup> The government's issuance of work permits serves as the most important statistical source. However, it is perfectly legal for foreigners to work in Norway without a permit, for example, if they are residents of another Nordic country or if they are employed by a foreign company from within the EU delivering services in Norway. Subcontractors to Norwegian construction firms are an obvious example. In fact, it is commonly believed that a number of guest workers offer their services as one-man firms. Casual observation suggests that the total numbers could be large. We believe they significantly exceed the effects of the reduction in sick leave. However, although migration seems to have increased in general, both within Europe and on a global scale,<sup>9</sup> we would find it unlikely that migration should continue to raise Norwegian labor supply at the same rate as recently. A gradual slowdown seems more likely, and a reversal cannot be excluded.<sup>10</sup>

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<sup>8</sup> See, for example, Søvik and Mork (2006) for a discussion of the available data.

<sup>9</sup> This is described, for example, in a United Nations report (2006).

<sup>10</sup> A further surge in the domestic labor force in late 2006 appears to have been endogenously driven, i.e. by the labour-market tightness itself. We thus do not classify this as a supply shock.

A positive labor-supply shock unambiguously raises potential output. Thus, when output is expanded with the use of this additional labor, inflationary pressures should not arise, nor should there be a need for monetary tightening. However, as noted in Section 3 below, even Norges Bank has difficulty ascertaining the actual effect that this shock has had on potential GDP. Thus, we consider it plausible that private agents may find the situation even harder to judge; in particular, we suspect that optimism regarding future immigration easily can be exaggerated. If our reasoning is right, Norges Bank's policy of early easing followed by subsequent tightening should not be far off the mark.

4. Important productivity improvements have taken place in key sectors of the Norwegian economy. A major reorganization of the retail industry took place in parallel with the influx of cheap imports from emerging economies and seems to have exacerbated its effects. Advances in telecommunications and the structural changes in the airline industry have occurred in Norway on similar scales as in other countries. Here, again, we believe we observe idiosyncratic supply-shocks that raise similar challenges for monetary policy as the new influx of low-cost imports.

### **2.3 Structural Change in Wage-Price Dynamics?**

In Norway, as in other economies, the labor market serves as an important channel for the transmission of aggregate demand pressures into consumer inflation. This mechanism has always been somewhat sluggish, but we suspect that recent changes have made it even more so.

The traditional sluggishness can perhaps be traced to the institutional structure of the Norwegian labor market. Central wage negotiations normally take place only annually, with complete contract negotiations in even-numbered years and intermediate adjustments in odd-numbered years. If these agreements conflict significantly with the forces of supply and demand, wage drift typically acts as a corrective force, at least partially, and in the upward direction. However, wage drift does not seem to be equally effective in all sectors—public-sector and hotel employees are often mentioned as exceptions. These groups then seek to catch up with wage drift elsewhere in subsequent centralized talks, which typically take place several months, maybe over a year, after the wage drift has taken place.

The recent inflow of guest workers appears to have served as an additional buffer in the labor market and is widely credited with the remarkably slow wage growth in 2005.<sup>11</sup> We hesitate to refer to this additional delay as a separate structural change, however. Instead, we note a gradual change that has taken place over a number of years, namely, that a steadily declining share of the Norwegian labor force is engaged in the production of consumer goods and services for the domestic market. Industry is increasingly oriented towards oil and gas and other export sectors, as is much of the business-service sector. Domestic service production is certainly important; but most of these services are produced in the public sector and made available free of charge or at prices that cover only small fractions of the cost, with only a marginal effect on CPI inflation. This is the case for most of education, all but a small part of health care, and all of long-term nursing care. The other side of this coin is that a steadily increasing share of the goods and services that Norwegian consumers buy in the market are imported from abroad. This looks like a structural change that weakens the traditional link between labor costs and consumer prices.

This is not to say that wage inflation in the public sector has no influence on consumer-price inflation. However, it probably means that the mechanism is slower and more circumscribed. For example, public-sector wage increases translate into higher demand by public-sector workers for goods and services sold in the market, thus eventually driving up their prices via higher markups or private-sector wage increases.

We believe the drawn-out nature of this process serves as an additional argument in for the gradual approach taken by Norges Bank to monetary tightening in 2006. However, this gradualism also carries a risk of creating an illusion that wage inflation can be ignored altogether. It is thus important that it not be carried too far.

## 2.4 Communication of Policy

Previous Norges Bank Watch groups have commended Norges Bank for the way it communicates its decisions and analysis. An important addition this year is the publication of the Bank's own interest-rate forecast, on which we will comment more in Section 4 below.

While we feel the commendations by earlier Norges Bank Watch groups have been well deserved, we also feel that something is missing from the information we get from Norges Bank, namely the *ex ante* information needed to undertake the kind of evalua-

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<sup>11</sup> For example, Teknisk Beregningsutvalg (2006), Table 5.8.

tion we have been asked to make, i.e., the actual basis that Norges Bank used to reach its policy conclusions. Although the facts and considerations mentioned in the Bank's press releases fulfill part of this need, we miss a clearer exposition of the role and explanation of the Bank's use of models of various kinds in arriving at its assessment of current circumstances as well as the proper policy stance. We also miss the quantitative reasoning behind judgments made to amend or override the models. Although we agree with earlier Norges Bank Watch groups about the value of publishing the Strategy Notes as part of the Inflation Report, we do not feel this quite meets the need that we perceive.

Moreover, we miss a record of the discussion that has preceded the decisions. There are always two sides to a monetary policy decision. That is in the nature of the use of judgment, and no central bank should try to hide this point. In fact, we believe Norges Bank would benefit from the expanded debate with the government and other parties that could occur had this information been available. This kind of debate should be welcomed because it would either help persuade markets and the public of the appropriateness of the Bank's policy stance or help to improve policy over time and thus secure its credibility.

Making such information available would require minutes to be released from the policy meetings and would work best if all the members of the Board commented on monetary policy in public. We return to these institutional issues in Section 4. For now, we note a somewhat different—perhaps even contrasting—point. Even as we ask for more information than the Bank now makes available, we see a risk of information overload for some users, particularly those in financial markets. They often need to make quick decisions based on announcements of changes in the policy stance. Their need is thus to get the gist of the relevant information in a more succinct form. For their benefit, as well as that of the media, we recommend a brief summary at the beginning of each Inflation Report. The press releases, although certainly shorter, suffer from some of the same problems. Shorter releases, focusing only on the decisive issues, would be worth considering. A further improvement would be obtained by having the inflation reports relate the reasoning underlying the Board's decisions more closely to the Bank's models and judgment.

Lastly, we note the risk of misunderstanding involved in connection with the repeated use of special phrases describing current policy, such as “small and not too frequent steps” or “it is unlikely that rates will be raised at every monetary policy meet-

ing.” Such phrases frequently are interpreted as containing more exact information than intended. Readers, especially in financial markets, devote considerable energy to deciphering this information. Thus, in press conferences, Norges Bank has repeatedly been asked if so-and-so future decision could be consistent with such-and-such phrase.<sup>12</sup> Perhaps the greatest risk is that market participants will read the omission of such a phrase as a major change in the Bank’s policy stance when it is not intended. We furthermore feel the publication of the Bank’s own interest rate forecast greatly reduces the need for such phrases. We thus recommend that they be used sparingly.

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<sup>12</sup> See, for example, the press conference on December 13, 2006, <http://www.norges-bank.no/english/press/conferences/charts2006.html>, or on January 24, 2007, <http://www.norges-bank.no/english/press/conferences/>.

### 3. Analysis and Measurement

To enhance credibility, it is important to convince private agents that decisions are based on competent analysis of relevant data. As mentioned in Section 1, inflation targeting is demanding in terms of data and analysis. In this section we therefore review some issues related to analysis and measurement at Norges Bank: (i) the need for basic research, (ii) forecasting and judgment, and (iii) the need for statistical data to carry out these efforts. We defer the discussion of interest rate forecasts to Section 4.

#### 3.1 Need for Basic Research

Norges Bank has made great strides in recent years building up a research-based model apparatus. The Bank's research department participates actively in the international research community. Our review suggests that the following two areas should be important in future research.

First, because Norway is a rather small and extremely open economy, research on monetary policy in an open economy should receive special emphasis. As noted in Section 1.5, the benchmark model for monetary analysis was initially and most extensively developed for a closed economy. Open-economy extensions have certainly been made.<sup>13</sup> These extensions rely on important assumptions regarding key mechanisms, such as exchange-rate movements and the pricing of imported goods. Norges Bank should aim for a thoroughly tested, structural specification of the openness features of the Norwegian economy. A welcome addition in this respect is the Norwegian Economy Model (NEMO) currently being developed at the Bank.<sup>14</sup> This is an open-economy extension of the benchmark model discussed in Section 1, adapted to the Norwegian Economy.

Second, we would like to see some empirical research on wage and price stickiness and flexibility in Norway. As indicated in Section 1.3, such findings should provide information on which prices need to be included in the index targeted by monetary policy. Some well-known findings have been obtained from U.S. data.<sup>15</sup> However, we see several reasons to expect Norwegian wage and price setting to be different. For example, agricultural regulations make it likely that food prices are adjusted less frequently; and the high degree of unionization and legislative union protection makes us expect sig-

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<sup>13</sup> See, for instance, McCallum and Nelson (2000), Benigno and Benigno (2003), Corsetti and Pesenti (2004), or Galí and Monacelli (2005).

<sup>14</sup> See Brubakk, Husebø, Maih, Olsen, and Østnor (2006).

<sup>15</sup> See the survey by Taylor (1999). A more recent example is the study by Bils and Klenow (2004).

nificant differences in wage setting. Research on Norwegian data should therefore add significant value.

### 3.2 Forecasting and Judgment

Because monetary policy under inflation targeting is forward looking, it needs to be based on forecasts of how the course of the economy is likely to evolve in the future, including the effects of monetary policy changes. Good forecasts require good models as well as good judgment. The core forecasting model at Norges Bank is a four-equation open-economy model similar to models in the New Neoclassical Synthesis (New Keynesian) tradition, albeit without complete microfoundations.<sup>16</sup> Such a “structural” model is necessary to construct the conditional forecasts needed for monetary policy, for example, projections of the interest rate path that is required to bring inflation back to target within a reasonable time horizon. That is, the model ensures that the forecasts of inflation, the output gap, the interest rate, and the exchange rate are internally consistent, and that they are consistent with an “optimal” monetary policy. However, structural models do not always forecast well compared with pure forecasting models that are less constrained by economic theory. We would therefore recommend that these conditional forecasts (including the estimated confidence intervals) are compared with and supplemented by forecasts from pure forecasting models, such as Vector Auto-Regression (VAR) models or dynamic factor models, as discussed further below. When such models forecast better, Norges Bank should seek to decipher which features cause their superiority and, to the extent possible, include these features in the structural models. It is unclear to us what attention is currently given to such models in the forecasting procedure at Norges Bank.

Furthermore, the core model seems to ignore some potentially important features of the Norwegian economy:

- The exchange-rate forecast rests on the assumption of uncovered interest parity, an assumption that has very weak empirical support generally, not just for Norway.
- The model incorporates inflation in the import sector in a rather rudimentary fashion, so that the effects of foreign shocks are unlikely to be very well cap-

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<sup>16</sup> The general forecasting procedures are discussed briefly in Kloster and Solberg-Johansen (2006), and the core forecasting model is presented in Husebø, McCaw, Olsen, and Røisland (2004). Only minor adjustments to the model specification have been made since then.

tured. For example, the model has been unable to foresee the negative impact on inflation in the import sector.

- The model implicitly assumes a frictionless, atomistic labor market, while the Norwegian labor market is characterized by highly centralized wage formation, as mentioned above.
- There is no role for credit market frictions or asset prices.

These issues would be important to develop when building a model that could better reflect the current state of the Norwegian economy and its implications for monetary policy. While the NEMO model develops some of these issues, it is difficult (and often infeasible) to capture all relevant features in one particular model. Therefore we would recommend the Bank to use several alternative models, both structural and reduced-form models, to obtain more robust forecasts and policy advice.

### ***Inflation Forecasts***

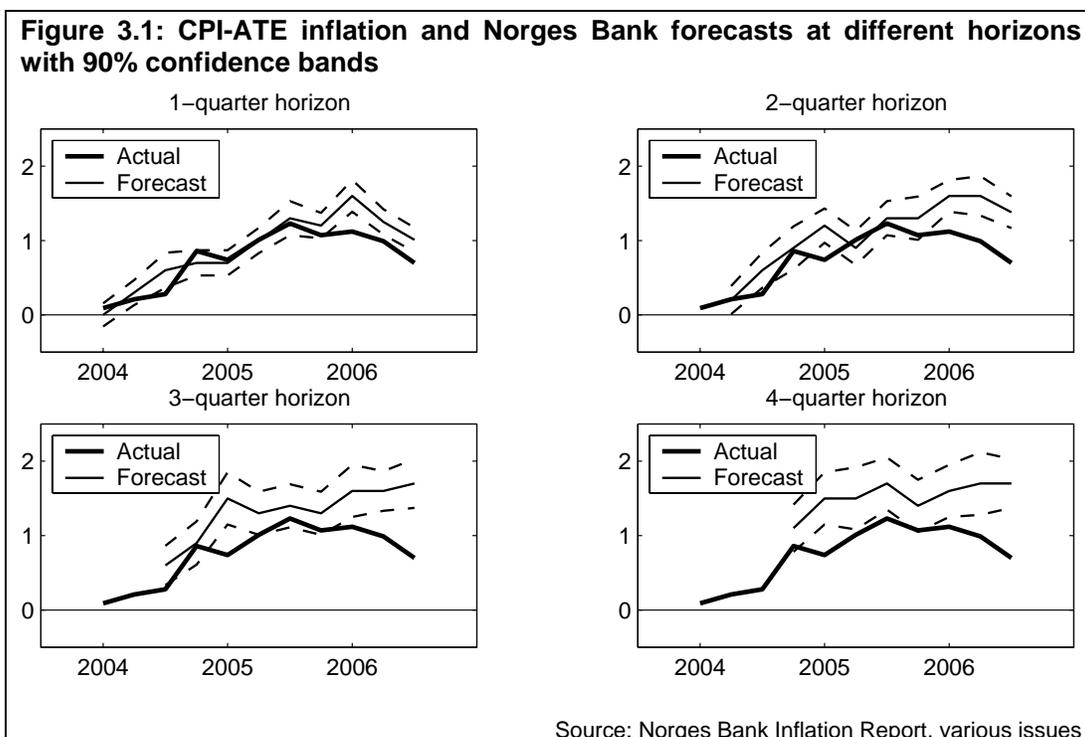
Norges Bank focuses on forecasts for CPI-ATE inflation, that is, CPI inflation adjusted for tax changes and excluding energy products. In recent years, there has been a strong tendency for CPI-ATE inflation to turn out lower than Norges Bank's forecasts. Figure 3.1 examines these forecasts as published in Inflation Reports 1/04 to 3/06. The figure shows the forecast of CPI-ATE inflation one to four quarters ahead with 90% confidence intervals, along with the realized path of CPI-ATE inflation.<sup>17</sup> Here, the mode forecasts (the thin solid lines) are almost always above the actual inflation rate (the thick solid lines). This in itself is not surprising, as the recent years have been characterized by unexpectedly low inflationary pressure from the import sector, and other central banks (for example, Sveriges Riksbank) have also consistently over-predicted inflation. However, Figure 3.1 also suggests that the Bank has consistently under-estimated the *uncertainty* surrounding the forecasts: the actual inflation rate has fallen outside the estimated 90% confidence intervals much more often than 10% of the time.

There could of course be many reasons why the Bank's forecasting model over-predicts the inflation level and under-predicts inflation uncertainty. To some extent it could be due to the small sample that is available for estimating the model and the serially correlated nature of price import shocks that we have seen recently. Thus, we suspect that forecasts of the inflation rate for domestically produced non-energy goods and services, if undertaken, would have looked better. Nevertheless, an important issue is

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<sup>17</sup> As the inflation report is published only three times a year but the forecasts are at a quarterly frequency, three forecasts in each panel have a horizon one quarter longer than the remaining forecasts.

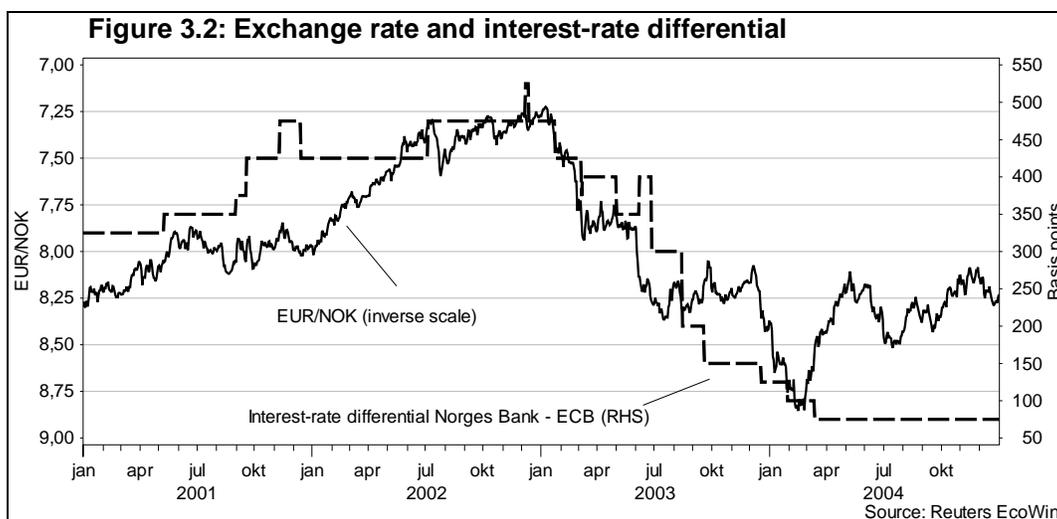
whether the Bank could have done better forecasting the CPI-ATE in real time. Nymoen (2005) argues that his “automatized” inflation forecasts outperform those of the Norges Bank in forecast precision and also imply wider confidence intervals. While Nymoen’s model is not structural, and therefore cannot be used to construct the conditional forecasts needed for monetary policy, it might give some indication of where the Bank’s model goes wrong.



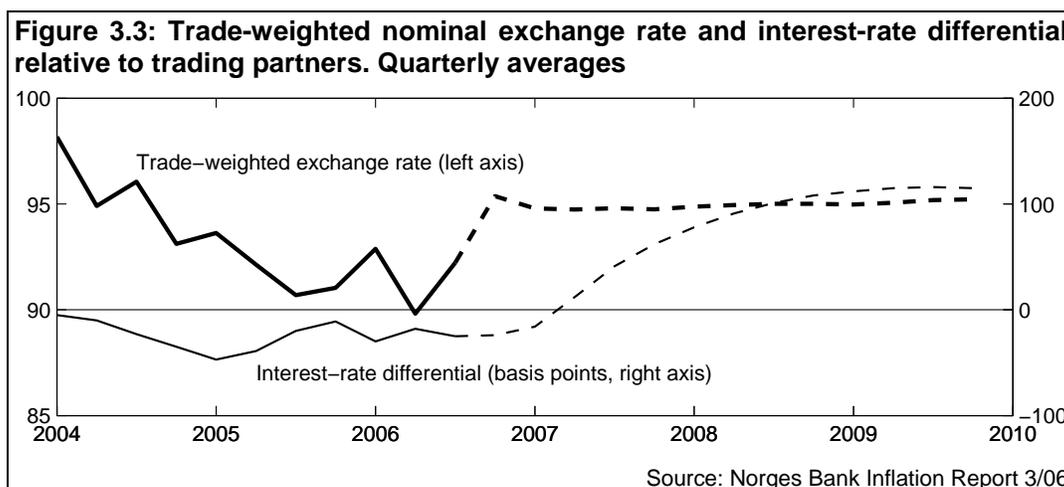
### **Exchange-Rate Forecasts**

We certainly appreciate the difficulties involved in forecasting exchange rates.<sup>18</sup> However, the emphasis that Norges Bank puts on its verbal communication on the exchange rate as a transmission mechanism for monetary policy calls for a solidly based specification of the link between interest rates and exchange rates. For a small open economy, this emphasis seems well placed. The experience of 2002–2003 certainly points in this direction, see Figure 3.2. During this period, monetary tightening led to a sizeable as well as protracted krone appreciation, as the figure shows.

<sup>18</sup> See, for example, the survey by Harrison and Mogford (2004).



Yet, in Inflation Report 3/06, Norges Bank’s forecast of the import-weighted exchange rate is essentially a horizontal line, at a level that is actually a little *weaker* than in 2006Q3. This forecast is especially puzzling considering that Norges Bank predicts Norwegian interest rates to rise faster than the weighted average of the corresponding rates of the trading partners. Figure 3.3 shows the interest-rate differential and exchange rate paths and forecasts reported in Inflation Report 3/06.<sup>19</sup> In 2004–2006 the average interest-rate differential was –47 basis points, while the exchange rate depreciated by around six per cent. For 2007–2009, Norges Bank forecasts (in the baseline scenario) a shift to a large positive interest-rate differential, but without any sizable effects on the exchange rate.



<sup>19</sup> The forecast for trading partners’ interest rates is based on implicit market expectations with a slight adjustment based on judgment.

Norges Bank's exchange-rate forecast is based on a specification of uncovered interest parity (UIP), supplemented by judgment.<sup>20</sup> The textbook UIP specification predicts that a higher interest rate in Norway than the average of those of the trading partners leads to an abrupt krone appreciation and an expected gradual depreciation so that investors in foreign currencies are compensated for the relative loss that they otherwise would have suffered from the difference in interest rates. Compared to the 2002–2003 experience (see again Figure 3.2), this prediction implies a much smaller exchange-rate movement and, after the initial appreciation, in the opposite direction of the protracted appreciation during that period. This discrepancy between UIP-based predictions and available data is hardly surprising in view of the work by Fama (1984) and many others on the so-called forward premium puzzle. This gives good reason for Norges Bank to use judgment to supplement the UIP benchmark.

However, we feel Norges Bank could be more forthcoming about its use of judgment. On the one hand, we are certainly well aware that judgment is a critical component of monetary policy making. While formal models are useful—indeed indispensable—tools in the policy-making process, they are by their very nature abstract and may thus omit factors that turn up as important at any given time. Therefore, the models need to be amended or overridden frequently to take account of such factors. That is the art of monetary policy. However, central banks should convey and explain the reasoning behind their judgments. Precisely because judgment is this important it is critical for transparency that a central bank clearly explain, in quantitative terms, the reasoning behind the non-model-based judgment calls that lie behind its decisions.

### **Output Gap**

Given Norges Bank's objective of flexible inflation targeting, forecasts of the output gap—and thus of potential output in addition to actual output—are almost as important as the inflation forecasts. The output gap forecasts published in the Inflation Report are generated by the core model, again supplemented by judgment. However, this model does not include a measure of potential output, nor of the uncertainty surrounding such measures, and Norges Bank does not publish any precise forecasts of either actual or potential output. Table 5 in Annex II of the Inflation Reports (on the very last page) shows that potential output is assumed to grow by 2.5 per cent each year from 2005 to

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<sup>20</sup> An exposition of Norges Bank's approach has been given by Berge (2006). Bernhardsen and Holmsen (2005) discuss some alternative exchange rate assumptions for economic modelling, while Qvigstad (2005) discusses the implications for Norwegian monetary policy.

2009, suggesting that potential output is a log-linear trend. As mentioned earlier and discussed in more detail below, there are reasons to be skeptical about such trend measures of potential output. Also, while we appreciate the difficulties in measuring and forecasting potential output, the conceptual discussion in Section 1 suggests that such measures of inflationary pressure can be useful to reduce the measurement errors and improve on the forecasts.

In general, greater openness about the methods used would help fostering a climate of constructive discussion within the Bank as well as with outside analysts. We furthermore doubt that one method can be deemed superior to all others, so that reasonable forecasts should be based on a set of different methods.

### **3.3 Measurement and Data**

Flexible inflation targeting is quite demanding in terms of economic data. Although Norway has a long and distinguished tradition of economic data production, we see important needs for improvement.

#### ***Output Gap Again***

Again, we focus first on potential output and the output gap. The discussion of the benchmark model in Section 1 makes clear that potential output must not, contrary to wide-spread beliefs, be assumed to follow a smooth trend over time. As discussed in Section 2, supply shocks that move potential output seem to be quite important for the Norwegian economy. That makes the measurement of potential output and the output gap so much more important.

From the published reports and conversations with Norges Bank's staff, it is not clear to us how these quantities are estimated by the Bank. A number of different estimation techniques are discussed in Bjørnland, Brubakk, and Jore (2005). But the Inflation Report publishes only one estimate of the output gap and no quarterly estimate of potential output (as discussed above), without explaining how the output gap estimate is constructed. We would recommend that several different methods are published and discussed in the Inflation Report.

Much of the data needed for such estimations are the same as are used for informal judgments of the tightness of the economy, such as:

- the unemployment rate,
- employment growth,
- capacity utilization,

- productivity,
- wage growth,
- unit labor cost,
- price markups.

Some of these data are currently available; others are not. Labor market statistics consist of registration data for unemployment, an ILO-compatible labor market survey, and firm based registration data. The latter are used in the national income accounts, but not in the labor market statistics. The ILO-compatible survey is carried out on such a small sample that the data are released only as three-month moving averages. Furthermore, and importantly, the population underlying the samples of this survey *ex ante* excludes guest workers—even legal ones—unless they have taken up domicile in Norway. Finally, the registration data for unemployment depend on workers' decisions to register at the government labor agency NAV. Wage statistics were formerly collected by the employers' association NHO, but this responsibility was recently moved to Statistics Norway, which publishes quarterly wage data. However, these data come with considerable delays and cover only selected industries. Complete wage statistics are published annually by a special commission ("*Teknisk beregningsutvalg*"), where the social partners are represented.

We would recommend that the ILO-compatible survey be expanded to a true monthly survey and that guest workers be included. Preferably, the survey should even include the workers of foreign subcontractors that deliver services in Norway. Furthermore, we recommend that Statistics Norway conduct a monthly—or, at least, quarterly—establishment survey patterned on the one by the same name in the United States. The wage statistics can then be consolidated into this survey.

Productivity statistics are not published on a regular basis. They can be constructed by the user, and this is done by Norges Bank. However, we recommend that Statistics Norway publish these series on a regular basis. The productivity and wage data can then be combined into estimates of unit labor costs and, in turn, price markups.

Capacity utilization is currently published indirectly as part of the Business Tendency Survey for manufacturing, mining, and quarrying, but curiously not for oil and gas extraction. Moreover, the figures are typically given as percentages of firms that find capacity to be a constraining factor for output growth, not as a percentage of capacity utilization itself. We recommend that such statistics be constructed.

### ***Current State of the Economy***

Forward-looking policy must be based not only on good forecasts, but also on a good assessment of the current state of the economy. This task is far from trivial. For example, Loungani (2001a,b) and Juhn and Loungani (2002) report that a substantial number of recessions go undetected until they are essentially over. Part of the reason is that statistics are published with lags, sometimes considerable, so that the actual state of the economy at a certain time cannot be known until later.

Norges Bank is obviously aware of this problem. There is, for example, some discussion of the uncertainty surrounding current estimates of the output gap, for example, in the box on pp. 48–49 of Inflation Report 3/06, although we also note that most discussions of the output gap do not take this uncertainty into account. Furthermore, the Regional Network of Norges Bank provides informal information from the business community in a timelier manner than official statistics. The Bank's current Nowcasting Project is intended to provide further insight.

International experience suggests that surveys often provide the best indications about the current state of the economy. On this background, we are struck by the paucity of such data in Norway. As mentioned above, Statistics Norway publishes the quarterly Business Cycle Tendencies for manufacturing, mining, and quarrying; but the form of this survey does not seem to serve actual needs. Private agencies have recently organized a monthly Purchasing Managers' survey and a quarterly survey of Consumer Confidence. Although these efforts are commendable, we do not feel they offer satisfactory substitutes for such surveys conducted by Statistics Norway according to international standards, such as those followed by EU member countries.

### ***Measures of Underlying Inflation***

Norges Bank publishes and discusses several different measures of "underlying" inflation. Historically, the Bank has focused on the rate of consumer price inflation after removing the direct effects of taxes and energy prices, that is, the CPI-ATE inflation rate. The main motivation to exclude taxes and energy prices has been that variations in these prices to a large extent are temporary and therefore do not affect the long-run rate of inflation. More recently, the Bank has noted that energy price variations have been more long-lived than expected, and it has therefore introduced other measures of underlying inflation, which exclude different components of the CPI over time depending on their

variability.<sup>21</sup> A second reason to reduce the focus on the CPI-ATE inflation rate seems to be that it has recently been lower than the inflation rate measured by both the CPI and the alternative measures of underlying inflation, see Inflation Report 3/06.

However, the role of these measures of underlying inflation in the analysis is unclear. One view is that although the inflation target is formulated in terms of CPI inflation, monetary policy should not respond to CPI inflation as it is affected by temporary disturbances, citing the experience in 2003–2004 with large fluctuations in energy prices. This view, which is also reflected in the mandate for monetary policy, would motivate the use of underlying inflation measures. But this view seems to confuse the target for monetary policy from the indicator role of inflation: even if the target is formulated in terms of CPI inflation, the current CPI inflation rate should not necessarily have a direct impact on monetary policy. If monetary policy affects the economy with a lag, there is no reason to respond to temporary movements in inflation that will disappear before the policy response has a chance to affect inflation.<sup>22</sup> This is of course why inflation targeting central banks typically make policy decisions based on a forecast of inflation, not the current inflation rate.

Measures of underlying inflation can then be used as indicators of the inflationary pressure, or where the headline inflation rate is heading.<sup>23</sup> But it must be clear which measure of inflation is the central bank's target and which measure is used as an indicator of future inflation. This is especially important because we find Norges Bank's formal mandate somewhat vague on this point, as discussed further in Section 4. Our advice is thus not to discontinue the publication of the alternative indices. Indeed, it would be desirable to make them more widely available by having Statistics Norway publish them on a monthly basis along with the CPI and the CPI-ATE. Our concern is rather that the alternative indicators should be viewed as a *support* for Norges Bank's forecasting efforts, rather than as targets to be aimed for.

Finally, note that this discussion is based on the premise that the target is defined in terms of CPI inflation. The benchmark model introduced in Section 1 suggests that the target inflation rate should be defined in terms of a core index of those prices that are sticky. In any case, there must never be any doubt about what is the target rate of inflation. A critical part of inflation targeting is the choice of a single inflation index that can

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<sup>21</sup> These measures are labelled trimmed means, weighted medians, volatility-weighted medians, and volatility-adjusted medians. See Jonassen and Nordbø (2006) for details.

<sup>22</sup> See also Nessén and Söderström (2001).

<sup>23</sup> See Bryan and Cecchetti (1994).

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serve as the nominal anchor. Then the central bank can explain errors in targeting the chosen measure after the fact. To do otherwise would undermine the central ideas of inflation targeting according to our conceptual discussion and run the risk of excessive discretion and loss of credibility for the whole enterprise.

## 4. Mandate, Institutions, and Credibility

Any evaluation of a central bank's performance needs to be based on the Bank's formal mandate. However, for such an evaluation to be meaningful, the mandate needs to be clear. We see some problems in this regard for the case of Norges Bank, and we discuss these problems in this section. We also comment on an important recent addition to Norges Bank's communication, namely the publication of the Bank's own interest-rate forecast. Finally, we discuss the institutional setup at Norges Bank.

### 4.1 An Inconsistent Mandate

The formal mandate for Norwegian monetary policy is given the Regulation on Monetary Policy, passed as a Royal Decree of March 29, 2001 (see Box 4.1, English translation taken from Norges Bank's web site). Since its formulation, this Regulation has been the subject of some debate because of its explicit reference to the exchange rate (the krone's international value) as well as the inflation target, which is specified as the operational target. Previous Norges Bank Watch reports have contributed to this debate, in some cases by arguing that the exchange-rate formulations be taken out<sup>24</sup> and in others by criticizing Norges Bank for not having taken their responsibility for the exchange rate sufficiently seriously.<sup>25</sup>

We support the former criticism. First of all, however, we want to point out an internal inconsistency in the mandate. For an economy subjected to terms-of-trade shocks, it is in general impossible to stabilize the currency's internal and external value at the same time. This inconsistency is fundamentally different from the tradeoff between output gap and inflation in flexible inflation targeting, which is implicit in the mandate's mention of output and employment stabilization. That tradeoff is a temporary one; for sufficiently long time horizons, stable inflation is the only target. In contrast, terms-of-trade shocks may well be permanent, so that the simultaneous stabilization of the exchange rate (external value) and the nominal price level (internal value) in general is impossible at all horizons. Although we are aware of the empirical evidence supporting purchasing-power parity for the Norwegian krone,<sup>26</sup> we do not find this evidence strong enough to warrant formulations in the mandate that are mutually consistent only if this evidence holds up in all circumstances. In fact, we are inclined to interpret some of the

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<sup>24</sup> Norges Bank Watch 2000, 2002, 2004.

<sup>25</sup> Norges Bank Watch 2005, 2006.

<sup>26</sup> Akram (2007).

recent shocks to the Norwegian economy as permanent, or at least rather long-lasting, disturbances to the real exchange rate. The surge in domestic demand resulting from the oil wealth is an important example,<sup>27</sup> but it is not the only one, as discussed in Section 2.

#### **Box 4.1: Regulation on Monetary Policy**

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.

We thus recommend that the explicit mention of the exchange rate and exchange-rate fluctuations be taken out of the Regulation. That is not to say that we ignore the for-

<sup>27</sup> Mork (2005).

foreign-exchange market as an important channel for the effects of monetary policy on inflation as well as the level of real activity. However, we believe it should be made clear that it is the effects of exchange-rate changes on these variables that are important for the evaluation of monetary policy, not those changes themselves.

#### 4.2 The 2.5% Operative Inflation Target

The level of the inflation target—2.5%—makes Norway stand out from most other economies with formal inflation targets. There may have been good reasons for choosing this level in 2001. At that time, the United Kingdom—an important trading partner—also had a 2.5% target. Furthermore, there was good reason to expect significant real appreciation as a result of the systematic fiscal expansion that was introduced on the same day in the form of the fiscal spending rule. Although hindsight might suggest that such real appreciation more suitably could have taken place via changes in the nominal exchange rate, the long tradition of nominal exchange-rate stabilization may have made it natural at the time to think in terms of differing inflation rates.

However, these arguments are much less convincing today. 2% inflation targets have become the *de facto* international standard, especially after the Bank of England changed to this figure in connection with the switch from the Retail Price Index (RPI) to the Consumer Price Index (CPI) for the United Kingdom.<sup>28</sup> The real-appreciation argument is weaker as well because we believe a good deal of this adjustment is likely to have taken place by the present time.

Much monetary theory suggests that the ideal inflation rate should be zero, in other words price stability. In practice, formal inflation targets are specified as positive numbers, first, because essentially all known price indices are believed to overestimate true inflation, and second, to avoid the zero bound on nominal interest rates. Estimates vary as to the magnitudes of the upward bias of the consumer price indices and of the inflation rate needed to insure against the zero bound. However, a 2.5% target seems higher than necessary.

A problem with lowering the target at this time is that actual inflation, especially as measured by the index CPI-ATE, has been significantly below target since early 2003. Thus, it is very important to avoid the impression that the target is changed as a matter of convenience just to make performance look better. It should nevertheless be possible

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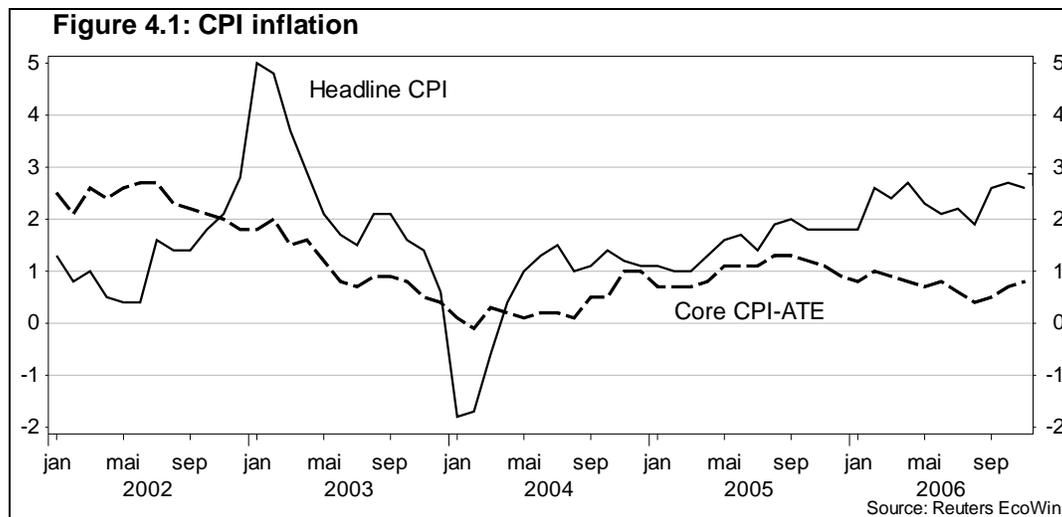
<sup>28</sup> The central banks of Canada, New Zealand, and Sweden all have inflation targets centered around 2%, while the Reserve Bank of Australia has a target of “2–3% on average, over the cycle,” and the European Central Bank has formulated their inflation target as “below, but close to, 2%.”

for the government to communicate clearly that the change is made as an adjustment toward the international standard, not for convenience. It would indeed be natural to introduce this change as part of the modification of the mandate that we recommend above.

### **4.3 Short-Term Volatility and Choice of Index**

While stipulating the inflation target as “annual consumer price inflation,” the mandate is not explicit on the exact index for inflation targeting. We consider this vagueness unfortunate because it can give rise to suspicions that Norges Bank may switch from one index to another so as to make its own record look better. Furthermore, although the central bank must have the flexibility to accept departures from the inflation target for the chosen index, e.g. when facing tradeoffs between inflation and employment, it should explain the reasons for any protracted departure. Without a specific inflation target as a long-run nominal anchor it is very difficult to have meaningful conversation between the central bank and the financial markets or the government about monetary policy. And without such communication, it is impossible to have meaningful transparency or accountability.

A practical example of the vagueness that we perceive is the question frequently asked as to whether Norges Bank targets the overall CPI or the CPI-ATE. Although Norges Bank repeatedly has emphasized that the ultimate target is the overall CPI, the mandate seems to give some support to targeting the CPI-ATE because it allows Norges Bank to ignore what it calls “extraordinary temporary disturbances.” Indirect tax changes are also mentioned explicitly. We consider this the formal background for the introduction of the index CPI-ATE, which ignores indirect tax changes and energy prices. Electricity prices were especially volatile in 2003–2004, raising headline inflation to almost 5% in early 2003, followed by deflation of close to 2% when they normalized a year later (see Figure 4.1).



The justification for ignoring such fluctuations seems to be that short-term fluctuations are due to forces other than those that monetary policy should deal with and thus can be ignored as a nuisance. However, we do not believe that the duration of a price change is the key issue. As argued in Section 1.3, we believe that the case for inflation targeting should be derived from nominal stickiness, so that targeting efforts should be aimed at those prices whose movements are most clearly hampered by stickiness. The 2003–2004 experience should be a clear indication that energy prices are not sticky. Thus, we recommend ignoring them even though their trend differs from that of other prices. In other words, we feel the issue should not be whether price movements are temporary or permanent, but whether or not they are hampered by nominal stickiness.

In fact, as indicated in Section 1.5, we recommend going even further by exploring the possibility of instead targeting an index consisting only of domestically produced, non-energy goods and services, adjusted for indirect tax changes. As mentioned in Section 1.5, we expect such an index to cover most of the markets where price stickiness is prevalent. Furthermore, monetary policy might be able to affect inflation in this kind of index more readily than in one including imported goods. For such a transition to be possible, Statistics Norway would need to publish such an index. That is not currently done; but it should be easy to do on the basis of the currently available underlying data.

Again, however, we hasten to add that such switches should not be undertaken lightly or frequently. It is very important to avoid an impression that the target is adjusted for reasons of convenience. Theory as well as practice indicates that the *robustness* of effective inflation targeting requires that absolute priority be given to the stabilization of inflation and the anchoring of inflation expectations. Norges Bank must at

all times have a clear sense of the specific index of inflation targeted, even if it has trouble returning that index to target. Although we recommend that provisions be made for infrequent revisions of the choice of index as described above, such revisions must be made only for good reason and not more frequently than every five years. Doing otherwise would risk compromising the spirit and integrity of inflation targeting, especially if the Bank were to rely too heavily on real indicators of inflation pressure such as the output gap instead of the gap between actual and targeted inflation, because excessive reliance on such real indicators can sometimes be highly misleading for inflation.

#### **4.4 Fluctuation Interval and Accountability**

The mandate only asks for consumer price inflation to be approximately 2.5% without specifying what “approximately” means in this context. The mandates of many other central banks, such as Sveriges Riksbank or the Reserve Bank of New Zealand, specify acceptable fluctuation ranges such as  $\pm 1$  percentage point. A similar constraint for Norges Bank is included in the Government White Paper<sup>29</sup> to Parliament of March 29, 2001 on the formal switch to inflation targeting mandated by Royal Resolution the same day. It is also found in the correspondence between Norges Bank and the Ministry preceding this White Paper.<sup>30</sup>

The formal mandate, like other rules and regulations, should be interpreted in light of this preparatory work. Thus, in this indirect sense, a  $\pm 1$  percentage point fluctuation interval can be said to be part of Norges Bank’s mandate. However, we feel it should be included in the Royal Decree. That would not only make it more explicit and better visible, but would also remove any questions of why it was not so included. It would then have been easier to use it as a criterion for formally evaluating Norges Bank’s performance. While Norges Bank should be commended for its efforts toward transparency, we believe that accountability is equally important for an inflation-targeting regime to be successful. That, in turn, requires clear criteria on which the outcome of monetary policy can be judged.

It is furthermore important that it be possible for criticism to be formulated incrementally, in other words, that the government be able to criticize the central bank without that criticism being read as a signal of total system failure or indeed an indication that the Governor should resign. The clearest example of actual government criticism

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<sup>29</sup> See <http://odin.dep.no/fin/norsk/dok/regpubl/stmeld/006061-040003/>. For an official English translation, see [http://www.regjeringen.no/Upload/FIN/Vedlegg/english/economic\\_policy/report\\_29\\_2001.pdf](http://www.regjeringen.no/Upload/FIN/Vedlegg/english/economic_policy/report_29_2001.pdf).

<sup>30</sup> This correspondence is included as annexes to the White Paper cited in the preceding footnote.

under the current regime seems to be the Finance Ministry's letter to the Bank of June 13, 2003,<sup>31</sup> where the Bank was asked to account for the performance of monetary policy in 2002 as well as the first eight months of 2003. This letter asks open-ended questions about the performance of the exchange rate as well as inflation and real activity. We'll get back to the issue of the exchange rate in subsection 4.5 below. Here, we note that this kind of letter could have looked less threatening if it had made explicit reference to an acceptable fluctuation interval. In the event, it could be read as questioning the very principle of inflation targeting rather than just the particular decisions made in the period in question.

#### **4.5 Publication of Interest-Rate Forecasts**

Since Inflation Report 3/05, released in November 2005, Norges Bank has published its own interest-rate forecast. The forecasted trajectory has furthermore been used as the basis for the Bank's overall macro forecasts. This process is iterated so that the final shape of the interest-rate trajectory results in the best attainable combination of inflation and output gap within the Bank's forecast horizon. In this sense, Norges Bank's interest-rate forecast can be interpreted as the optimal interest-rate trajectory (in the Bank's view), although the Bank itself hesitates to refer to it as such.

A number of observers have applauded the publication of this forecast as a major step forward in terms of transparency. We agree that increased transparency can be helpful to establish credibility for monetary policy, as discussed in Section 1. The publication of the interest-rate forecast serves two important purposes, namely, as guidance for the general public when making long-term plans, and as a benchmark for forward and future interest rates and bond yields in the market.

However, it also exposes the central bank to weaknesses that would have remained hidden if the Bank had not made its view of future interest rates public. The main potential weakness is that the central bank may be unable to manage expectations, and this weakness becomes apparent if the expectations of future interest rates implicit in market yields deviate significantly from the benchmark provided by the central bank.

#### ***Agreement and Disagreement with Market Expectations***

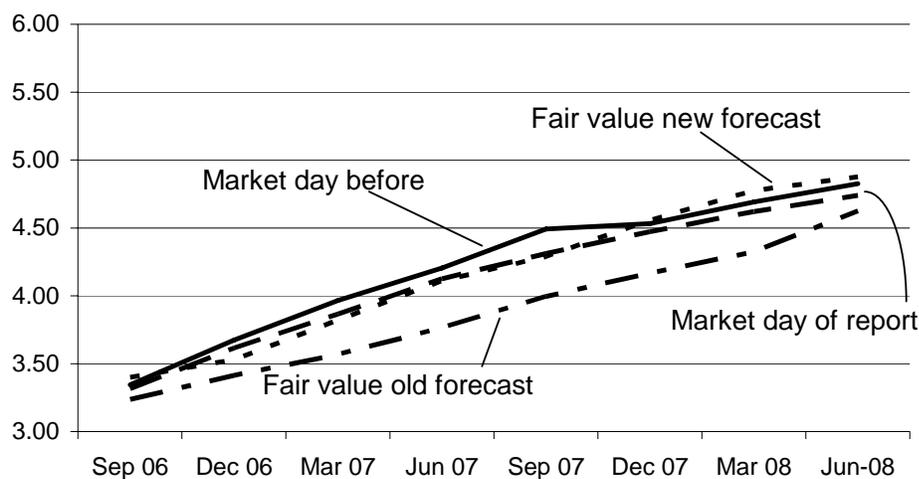
For Norges Bank's first three publications of interest-rate forecasts, this was clearly not a problem in that the Bank's forecasts on all three occasions corresponded very closely

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<sup>31</sup> [http://odin.dep.no/fin/norsk/dok/andre\\_dok/brev/Utvalgte/006071-110152/dok-bn.html](http://odin.dep.no/fin/norsk/dok/andre_dok/brev/Utvalgte/006071-110152/dok-bn.html).

to market expectations both before and after the publication of the forecast. Figure 4.2 illustrates this outcome for Inflation Report 2/06, published in June 2006. In this graph, the solid curve shows market expectations on the day before the report was published as the closing values for the 3-month Forward Rate Agreements (FRAs) with maturity dates at various future dates. The dashed curve shows the corresponding values for the following day, after the publication of the report. The dotted curve, labeled “Fair value new forecast,” shows the FRA rates for the same maturities that would have resulted if the market believed Norges Bank’s forecasts (the baseline scenario) in the June inflation report. Finally, the broken curve, labeled “Fair value old forecast,” shows the corresponding FRA rates implied by the interest-rate forecasts contained in the previous Inflation Report, published in March. The fair values are computed under the assumption of no term premium, but a constant 25 basis point premium relative to the policy rate for the bank risk involved in the interbank market.

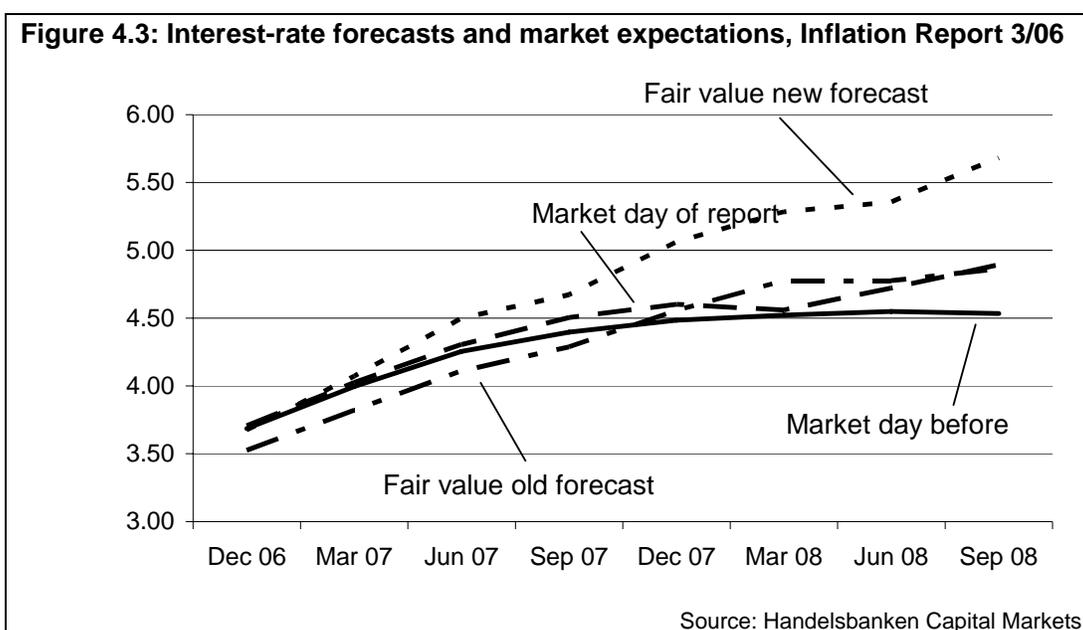
**Figure 4.2: Interest-rate forecasts and market expectations, Inflation Report 2/06**



Source: Handelsbanken Capital Markets

As can be seen, except for the broken curve, the remaining curves are almost identical. This can be taken as an indication that the forecast revision was well anticipated by the market and that Norges Bank’s interest-rate forecast enjoyed high credibility in June of 2006. That is, Norges Bank and market participants agreed on the interest-rate path that would bring inflation back to target. However, the adjustment in the Bank’s rate forecast announced was not large, so this test admittedly has low power, if we may borrow a familiar term from statistics.

The case of Inflation Report 3/06, published in November 2006, was quite different, however, as can be seen from Figure 4.3. In this case, the forecast revision was larger. Yet, despite intense discussion among analysts ahead of the report, the revision was apparently not anticipated by the market, as market rates from the day before the forecast release were not much different from those implied by the June forecast. Once the forecast was published, the market did react, and in the same direction as the forecast revision, but only partially. A fair interpretation is that market participants more or less believed Norges Bank's tightening plans through the end of summer 2007, but not the announced plans of continued tightening for yet another year.<sup>32</sup>



This case makes us somewhat uneasy. True, the deviation can be written off as a case of the market simply holding another view than Norges Bank of the shocks affecting the Norwegian economy a year forward in time or of the transmission mechanisms propagating the effects of such shocks. For example, market participants may believe that Norges Bank over-predicts inflation or underestimates the effect of tightening on the exchange rate, both of which would be consistent with the points we made in Section 3.2 above.

<sup>32</sup> In Figures 4.2 and 4.3 we do not take into account the uncertainty surrounding market expectations or Norges Bank's interest-rate forecast. According to the calculations presented in Inflation Report 3/06, the upper boundary of market expectations is close to the lower 50% confidence interval of the interest-rate forecast.

***Disagreement Reflecting Constraints?***

We suspect, however, that market participants may perceive certain political constraints on Norges Bank's policy that were not reflected in its interest-rate projections. Here, we are thinking mainly of the explicit mention of the exchange rate in Norges Bank's formal mandate. We are furthermore thinking of the special criticism that the government directed at Norges Bank after the 2002–2003 experience, when monetary tightening strengthened the krone to an extent that caused considerable political concern. This concern was reflected, for example, in the letter of June 13, 2003, referred to above, and also in two Government White Papers that year.<sup>33</sup> It would not be irrational for market participants to perceive these documents as defining a constraint on the extent of tightening that Norges Bank can undertake in the absence of similar tightening among the country's trading partners. However, we also consider such constraints alien to the spirit of inflation targeting and harmful to the general confidence in the system.

We consider it essential that any suspicion of constraints be dispelled. We see no better way of doing that than taking the exchange rate out of the Regulation. That does not mean, of course, that we believe the exchange rate should be ignored. In fact, our concern with respect to Norges Bank's exchange-rate forecast underscores that point. However, movements in the exchange rate should not be perceived as a constraint, but as a transmission mechanism for the effects of monetary policy on inflation and activity.

Market expectations seem to have changed in the weeks following the November inflation report, see Figure 4.4. For up to a year ahead, market expectations are now actually a little higher than Norges Bank's forecast. Beyond that horizon, market expectations level out relative to the forecast, but have risen from the levels right after the publication of the Inflation Report. Thus, Norges Bank's interest-rate forecast may have gained credibility over time. However, this period also saw the publication of surprisingly strong macroeconomic data, which seem likely to have raised market expectations even if Norges Bank had not issued its own forecast.

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<sup>33</sup> Specifically, the budget White Paper and "Kredittmeldinga."



### ***Risks and Advantages of Disagreements***

This kind of discrepancy between forecasts and market expectations is one of the risks associated with issuing interest-rate forecasts. In general, if such discrepancies disappear before too long, they might just reflect different assessments by the market and the Bank of current shocks and circumstances. That is to be expected and not an impediment to releasing the interest rate path. On the other hand, if the discrepancy persists it may create confusion and concern over where it comes from. This could eventually undermine credibility for low inflation if it reveals a hidden constraint for monetary policy. Alternatively, a long-lasting discrepancy could be due to a difference of opinion about the structure of the Norwegian economy. This might draw the Bank into a discussion of its structural view of the economy. Such a discussion can be healthy if based on a reasoned professional debate about modeling of the Norwegian economy for the purpose of implementing monetary policy, and might lead to an improvement in the Bank's structural model. But the Bank may want to prepare for such a discussion by carefully documenting its view.

### **4.6 Institutions and Credibility**

To maintain credibility for monetary policy, private agents need to be convinced that decisions and analysis are made in a competent manner. So, how should institutions be designed to enhance credibility? There is widespread agreement that central banks should be operationally independent from politics. But an operationally independent

central bank needs to be accountable for its actions, and accountability calls for transparency. Thus, monetary policy institution design typically rests on the notions of independence, transparency, and accountability. In addition to enhancing credibility, well-designed institutions will also increase the likelihood that transitions in the central bank leadership run smoothly.

We have already made the case for central bank independence in Section 1, and we have also discussed transparency and accountability. Here we return to these issues in relation to the institutional setup at Norges Bank.

### ***Independence***

Norges Bank's interpretation of the mandate for monetary policy rests on "flexible inflation targeting," that is, the Bank should stabilize the rate of inflation but also seek to avoid inefficient fluctuations in output and demand. However, Norges Bank has not been given full operational independence in the pursuit of these goals. First, before making decisions on particularly important matters (including interest-rate decisions), the Bank must inform the Minister of Finance. The Governor of Norges Bank thus meets the Minister on the day before each Executive Board meeting to discuss his suggestion for monetary policy. Second, the Government has the right to instruct Norges Bank. In such a case, the Minister makes a proposal to the cabinet, and the government decision must be made in a formal cabinet meeting presided over by the King, referred to as a decision by the King in Council. Also, Parliament must be notified as soon as possible, and Norges Bank is obliged to state its opinion.

While the right to instruct has so far never been exercised, it constitutes an unusual restriction on central bank independence which may strain the credibility of monetary policy. The government and other political parties have in the past openly criticized Norges Bank for its decisions (for example, in 2002–2003), and there is no guarantee that such criticism will not lead the government to override the Bank's decisions in the future. At the same time, the right to instruct may also reduce the accountability of Norges Bank, as the government takes partial responsibility for the decisions made by the Bank.

We therefore agree with several earlier Norges Bank Watch Reports that the right to instruct should be abolished and the meeting between the governor and the Ministry of Finance discontinued in order to safeguard the independence of Norges Bank and avoid suspicion that monetary policy decisions are politically motivated.

## **Transparency**

To enhance credibility, central banks need to convince the public that its decisions are well balanced and based on correct and relevant information. Central bank transparency is also important to ensure that the independent central bank can be made accountable for its actions. Finally, the publication of forecasts can help the central bank manage private sector expectations.

As mentioned earlier, Norges Bank is more transparent than most central banks in the sense that it now publishes not only forecasts of inflation and the output gap, but also its own forecast for its policy interest rate. However, Norges Bank is considerably less transparent when it comes to the decision-making process.

First, as indicated in Section 2, it needs to be more forthcoming regarding the *ex ante* information on which it bases its policy decisions. Ideally, immediately after each policy meeting, Norges Bank should release all the data it uses to make its decisions, including not only a comprehensive contemporaneous review of the Bank's assessment of current circumstances based on information then available, but also its use of formal models as well as the quantitative reasoning behind judgments made to amend or override these models. This would enable the Bank to be judged on the basis of *ex ante* decisions, which would help secure its credibility against potentially bad outcomes that it could not reasonably have been expected to foresee or avert. Admittedly, this goal is a long way off, but it is a goal nonetheless.

Second, the meeting between the governor and the Minister of Finance on the day before the Executive Board may reduce the influence of external members and give the impression that important decisions are made internally at the Bank and then rubber-stamped by the Executive Board.

Third, the Executive Board has decided against publishing minutes or voting records from its meetings. Furthermore, it has decided to speak with one voice to the public in the sense that only the Governor and Deputy Governor discuss monetary policy issues in public. We feel these stipulations may hurt credibility and public trust that policy decisions are well-balanced. As mentioned in Section 2, there are always two sides to a monetary policy decision, and the most informed people to speak about the respective sides of the decisions are the Board members themselves, so that letting them all speak would be the most efficient way for the Board to have their respective points of view aired in a reasoned way. They can handle the media effectively by understanding that

their own differences are within reason. Explaining them as such would help avoid being pushed into extreme positions by the media.

An important disadvantage of speaking with one voice is that suspicions may arise about serious internal division on the strategy of monetary policy or that the Bank is operating under a stealth constraint not stated in its mandate.

Finally, having external Board members who communicate individually with the financial markets is a way of sustaining credibility for its operations. Because credibility not only is essential for monetary policy to be effective, but also difficult to sustain over time, Norges Bank should use every means at its disposal to secure its credibility.

Norges Bank motivates the decisions not to publish minutes and votes or let external Board members speak in public with the argument that external members only work part time with monetary policy issues and therefore cannot be expected to possess the time and resources needed to make public comments and statements about policy. We do not find this motivation very convincing as it diminishes the importance of external members, which are useful both as a check on the Bank's internal analysis and to bring other experiences to the Board.

Some financial market participants appreciate the fact that Norges Bank speaks with one voice in public. However, without a transparent decision-making process, there is no guarantee that this official voice correctly balances the views of all Executive Board members. As already discussed above, an opaque process gives a false sense of the degree of agreement with which a central bank can assess current circumstances, the risk of deviation of inflation from target, the prospects for output to deviate from potential, and the appropriate interest-rate path required to deal with these risks. Evidence from a variety of implicit and explicit inflation-targeting experiences around the world suggests that if a central bank is perceived to target inflation credibly with solid institutional support, so that inflation expectations are firmly anchored, then a more open process that acknowledges the uncertainties involved would make the markets more forgiving of short-term misjudgments of the state of the economy and the path of interest rates, and thereby improve the robustness of the regime.

One possible explanation for the reluctance to publish minutes and voting records is that external members are in majority in the Executive Board, which consists of two internal members (the Governor and the Deputy Governor) and five external members. Making minutes and voting records public would then reveal situations where the internal members are in a minority, something which might cause embarrassment for Norges

Bank. We do not see this as a reasonable argument against transparency. Such fears should rather call for reforming the composition of the Executive Board by reducing the number of external members and increasing the number of internal members. This would also mitigate the problem that we perceive of identifying competent external members for the Executive Board from a relatively small population, an issue that we expect to become more pressing over time.

We therefore recommend that non-attributed minutes and attributed voting records are published, and that also external members explain their views in public. Again, these recommendations echo earlier editions of the Norges Bank Watch.

### **Accountability**

While central bank independence serves to enhance credibility, a democratic system needs to retain some control over the central bank. Therefore the central bank should be made accountable for its decisions. The Norges Bank Watch reports partly fill this role in that they provide an external evaluation of Norges Bank's performance and help the Ministry of Finance formulate their own annual evaluation in the annual White Paper on financial issues ("Kredittmeldinga").

However, the ambiguities in the official mandate, discussed at length above, make evaluation difficult. To make the Bank fully accountable for its decisions, we would therefore welcome a clarification and modification of the mandate for monetary policy along the lines we have discussed.

Similarly, as also discussed above, an effective evaluation requires more *ex ante* information on the basis that Norges Bank used for its policy decisions at the time they were made.

### **Continuity**

We lastly point to the obvious fact that inflation targeting in Norway so far has been practiced under only one Governor. In preparation for future succession, we therefore consider it important that the principles of flexible inflation targeting be well anchored institutionally. Considering Norges Bank's weak independence, it is especially important that this be well understood in political circles.

**Appendix: Meeting Schedule December 6–8, 2006**

Wednesday, Dec. 6	14.00–15.30	Ministry of Finance Nina Bjerkedal, director general
	16.00–17.00	Financial Supervisory Authority Bjørn Skogstad Aamo, director
Thursday, Dec. 7	08.00–09.30	First Securities Harald Magnus Andreassen, chief economist
	10.00–11.30	University of Oslo Steinar Holden, professor
	12.00–13.00	Norges Bank, lunch Jan Qvigstad, executive director
	13.00–14.00	Norges Bank Svein Gjedrem, governor Jarle Bergo, deputy governor
	14.00–17.00	Norges Bank, Monetary Policy Division Amund Holmsen, director
	19.00–	Dinner hosted by Norges Bank Svein Gjedrem, governor
	Friday, Dec. 8	09.00–10.30
11.00–13.00		DnB NOR Kyrre Aamdal, senior economist
13.30–14.30		Nordea Steinar Juel, chief economist
15.00–16.00		Norwegian Confederation of Trade Unions (LO) Stein Reegård, chief economist

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