Report to the Executive Board of the Norges Bank

On the Decision-Making Process and the Strategy Document

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1. Introduction: Mandate, Strategy Document, and Context

We were asked to evaluate the decision-making process of the Norges Bank and the quality and relevance of the Strategy Document and other material that is put forward to the Executive Board.

The Strategy Document is the main background paper for a discussion on monetary policy strategy that takes places in the Executive Board of Norges Bank three times a year. The purpose of these Board meetings is to have a broader and deeper discussion of monetary policy than in the meetings where interest rates are actually set. The discussion leads to a decision on the strategy for interest rate setting in the coming months. This is formulated as an interval for the interest rate. The interval is contingent on economic developments turning out as outlined in the Strategy Document. The decision also specifies how certain future events should influence the interest rate. These events are related to the major risks that are identified in the Document. The first time the strategy was formulated in this way was in 1999, and the first deviation from the interval was in January 2003. The Bank's explanation cited conditions that were discussed in the October 2003 Strategy Document, and that had changed since then.[1]

The three Strategy Documents from 2002 follow roughly the same outline: background (previous policy statements), recent developments in the economy in general and in inflation in particular, the outlook for the future, major uncertainties, policy discussion (need for change, alternatives, more on risks), and strategy (conclusion). Within this structure, the contents and the emphasis on the different parts vary from one Document to another. The Document itself is brief, only six to seven pages plus a small number of charts. However, it is accompanied with appendices that vary from time to time. Some of them focus on current developments and risks (exchange rate, oil price, and financial stability). Others discuss more general questions with relevance beyond the current strategy discussion (implications of inflation targeting for wage formation, the effects of a change in the interest rate, the choice of time horizon, alternative rules for monetary policy, and different equilibrium concepts). These appendices seem in part to be based on ongoing research in the bank. All Strategy Documents from 2002 have appendices showing what interest rates Taylor rules would imply.

The Strategy Document is only one part of the background material for the strategy discussion. Other important inputs are an oral presentation of economic developments by the governor, supported by an extensive package of graphs and tables. The brief summary in the Strategy Document serves to make clear the main assumptions about economic developments on which the Bank's strategy relies.

2. Our Approach

Our approach to evaluating the Strategy Document and the processes surrounding it is to look at the broad scope of related analysis, to consider the four branches of analysis employed, and to establish several criteria for evaluation.

[1] See Inflation Report 1 2003.

Scope

We examine three aspects of the processes and analysis related to the Strategy Document. The first is the breadth and quality of analysis, carried out by the Norges Bank staff, which ultimately can affect the briefing of the Executive Board. The second is the complete range of material that is provided to the Executive Board, which includes the Chart Package. The third is the Strategy Document itself.

Branches of analysis

The analysis undertaken by the staff--and indeed the analysis presented in the Strategy Note--can be divided into four branches. These are current analysis, forecasting and economic projections, policy analysis, and research.

By current analysis, we mean the analysis of where the economy currently is. This includes, but is not limited to, an analysis of current underlying inflation, current capacity pressures in both product and labour markets, and the current growth rate of the economy.

Economic projections and forecasts are either conditional on assumptions about interest rates and exchange rates or unconditional (i.e., based only on the reasonable assumption that the central bank focuses on achieving its inflation target over its declared horizon).

By policy analysis, we mean two things. The first is the examination of the appropriate interest rate path for the "base case" economic projection that brings inflation back to its target over the desired horizon. The second is the examination of risks around the base case projection. This includes the appropriate policy response to differences in the paths of other variables from those hypothesised in the "base case" economic projection. These other variables could include both financial variables, such as the exchange rate, and non-financial variables, such as wages or foreign demand.

Finally, by research we mean the background work that is used to construct the models, theories, measures, and methods of analysis that are used in the other three branches of analysis.

The next four major sections of our report will examine these branches of analysis one by one. The last two sections of the report set out our views on publication of the Strategy Document and our major conclusions.

Evaluation criteria

We focus on three criteria in our evaluation of the Strategy Note and the surrounding processes.

The first criterion is the extent to which the quality of each of the four branches of analysis meets international norms. We derive these norms by looking at the practices of four other inflation-targeting central banks: the Reserve Bank of New Zealand, the Bank of Canada, the Bank of England, and the Swedish Riksbank. In this regard, we also looked at examinations of the procedures of foreign central banks carried out by central bankers and academics, including those undertaken by Donald Kohn, Lars Svensson, and Adrian Pagan.[2]

[2] See Donald Kohn, "Report to the Non-Executive Directors of the Court of the Bank of England," *Bank of England Quarterly Bulletin*, Spring 2001; Lars Svensson, *Independent Review of the Operation of Monetary*

The second criterion is the focus and selection of the information that is discussed with the Executive Board (this includes both the second and third areas within the scope of the study). Of considerable importance here is the consistency of the presentations in the Inflation Reports and Strategy Documents with the Norges Bank's view of the transmission of monetary policy.

The third criterion is the effectiveness of the presentation of material in the Strategy Document. This includes the following: simplicity, conciseness, flexibility of format from Document to Document, and whether it meets the needs of the Executive Board.

3. Current Analysis

Current analysis is the analysis of where the economy currently is. Effective current analysis involves: (1) identifying the appropriate data to examine; (2) identifying news, as opposed to important facts that have not changed; and (3) making use of appropriate indicators and data constructs to identify underlying inflation and capacity pressures and the current real growth rate in the economy. This latter procedure involves taking into account the uncertainty in national accounts and other data, while analysing the likely persistence of recent shocks to economic and financial variables.

Identifying the appropriate data

The Chart Package and the Inflation Report contain data on and, in the case of the Report, analysis regarding: the international economy, international financial markets, domestic financial markets, credit growth, demand and production, the labour market, and prices. In addition, the Report contains information from the Bank's regional network. The breadth of the data covered in these two documents is broadly consistent with best international practice.

Because of their shorter length, the Strategy Documents of necessity deal with only a subset of the data concepts covered in the other two documents. All the main areas of data listed above are, however, covered.

There are a few indicators that are noticeably absent from the discussion in the Strategy Documents. These include measures of capacity pressures in labour markets such as the unemployment rate (except in the January 2002 Document), unit labour costs, traditional exports (except in the January 2002 Document), GDP growth, and the output gap. We will return to these below.

Identifying news

The last two Strategy Documents in 2002 concisely identified the important developments since the previous strategy discussion. With hindsight one may wish that the Document from May had contained more discussion on how to interpret the outcome of wage bargaining that spring.

Policy in New Zealand: Report to the Minister of Finance, February 2001; and Adrian Pagan, "Report on modelling and forecasting at the Bank of England," *Bank of England Quarterly Bulletin*, Spring 2003.

Making use of appropriate indicators and data constructs

Our reading of Inflation Reports and Strategy Documents is that the Norges Bank's view is that there are a number of important channels through which monetary policy changes currently affect inflation. First, interest rate changes and their induced effects on exchange rates both affect output, which affects employment, which affects capacity pressures in labour markets, which affects wages, which affects unit labour costs, which affects the price of domestically produced goods and services. Second, the exchange rate (together with foreign prices) determines the price of imported consumer goods.

A third channel, which is typically not given much prominence, starts as does the first channel, but then goes from output to capacity pressures in the output market (the output gap) to prices directly.

A fourth possible channel would be from monetary policy credibility and past inflation to inflation expectations and then to inflation. This channel is also typically not given much prominence.

The first channel suggests that it would be helpful in describing the current situation to discuss some additional indicators. These could include one or more measures of capacity pressures in the labour market (perhaps including the unemployment rate relative to some norm, and information from the regional network), as well as the growth in unit labour costs (perhaps both in the manufacturing sector and for the total mainland economy). In this first channel, wage inflation is crucial for price inflation. It appears to us that the information the Bank gets on wage inflation may be lacking in several respects. Updated information appears relatively seldom and with a lag. It may also be important to know how much of the measured wage increase is due to changes in the composition of the labour force, something that is not readily available in Norwegian statistics.

The indicators implied by the second channel are well treated in the Inflation Reports and Strategy Documents. A measure of the equilibrium exchange rate, however, would be useful so that pressures for changes in the current exchange rate would be identified.

The third channel suggests that some attention be given to discussing indicators that are relevant for the current demand situation, including total output growth and measures of capacity pressures in product markets. Household, investment, and government demand are typically well covered in the Strategy Documents. An add-up of the demand components to give the growth in GDP in the current or past calendar quarter would be helpful. When compared with the assumed growth in potential output, this would indicate in which direction the output gap has been moving. Finally, it would be useful to mention the current level of the output gap (is the economy in excess supply or excess demand?), as well as other measures of capacity pressures in product markets (including information gleaned from the regional network).

We would note in passing that measurement of the output gap is very difficult. Most central banks that use a measure have gone beyond Hodrick-Prescott filters to use filters that take into account the movement of some measure of inflation in response to the estimated output gap. The Norges Bank should give serious consideration to using as its featured measure of the output gap one that is more sophisticated that the Hodrick-Prescott filter or the simple

production function than has been used in the past. These could include multivariate filters, Kalman filters, and band-pass filters.[3]

The fourth potential channel suggests that the Norges Bank should perhaps seek out and publish measures of inflation expectations, whether from surveys of businesses and households, from surveys of forecasters, or from the use of bond yields. We understand that the Bank started a survey of inflation expectations about a year ago.

Given the uncertainty in economic data--which is often revised--and in various constructed measures of capacity pressures and inflation expectations, the use of a number of measures would be appropriate. Various measures could be presented in the Chart Package and the Inflation Report, with the Report and the Strategy Document summarising the conclusions that have been drawn by looking at the various measures.

4. Forecasting

Forecasts are based on a combination of models and judgement. Another important source of information is forecasts by international institutions. Our visit to the Bank in January and the material we were given then convinced us that the work in the Bank has a high professional standard in this area. There are also good routines for subjecting the initial forecasts to internal criticism, for making comparisons with external forecasts and for assessing the quality of the forecasts after the fact. There was no document describing the whole set of methods and procedures, but our questions on these points were convincingly answered.

The usual way of presenting a forecast is to start with listing all the major assumptions and end with the forecast. We wonder whether the link from the assumptions to the forecast could be made clearer. The Strategy Document gives just a brief summary of the presentation that will eventually appear in the Inflation Report and, after the fact, the two can be read in concert. Still, one might consider using the Strategy Document to present the forecast in the opposite manner to the usual: Start with the current inflation rate, and then explain its projected path through time first by its immediate causes and then by the assumptions about its more distant causes. The immediate causes would be things like wage increases, imported inflation and changes in profit margins. More distant causes would be output and employment gaps, conditions in the foreign exchange market, etc. This might provide a better sense of the causes of the projected dynamics of inflation.

Constant interest rate forecasts

The inflation forecast in the Strategy Document is usually based on a constant interest rate. Rational policy discussions have to start from a forecast that is conditional on the time path of the policy variable (the interest rate). A natural starting point then is a forecast with "unchanged policy", which is usually interpreted as an unchanged interest rate. Alternative interpretations of "unchanged policy" are possible. If the previous Strategy Document contained a plan for the future time path of the interest rate, one might make forecasts

[3] References in this area would include Leo Butler, *The Bank of Canada's New Quarterly Projection Model (QPM), Part 4. A Semi-Structural Method to Estimate Potential Output: Combining Economic Theory with a Time-Series Filter,* Bank of Canada Technical Report 77, 2002; Maral Kichian, "Measuring Potential Output within a State-Space Framework," Bank of Canada Working Paper No. 99-9; and Lars Svensson and Michael Woodford, "Indicator Variables for Optimal Policy," European Central Bank Working Paper Series No. 12.

conditional on this path. The plan might even be contingent on outside events, and new information on the conditioning variables might be taken account of. However, we believe that the simplest approach, a constant interest rate, is also a reasonable approach.

The use of constant interest rate forecasts has been criticized on the grounds that the Bank is not actually going to keep interest rates constant. Forecasts should rather be based on the interest rate path that the bank is expected to set in order to meet the target. With respect to the Strategy Document, we find that this criticism is misplaced. The proposed alternative means that one starts the policy discussion by assuming that one has the answer already. This is not the easiest way to start in presenting information to the Executive Board. There is still some use for the other type of forecast, but as an end product from the strategy discussion. It would then be a check on the strategy that is formulated, and for the benefit of public information.

There is a subtle difficulty with constant interest rate forecasts. Suppose the economic situation demands strong interest rate action in order to meet the inflation target. If the Bank were to sit still, its credibility would be harmed. Such credibility effects, which could have a strong impact on inflation, are not taken account of in the forecasts. This presents no problem for the discussion in the Board. Indeed, including some guesswork on credibility effects would only obscure matters. It is important, however, to be aware of the hypothetical nature of the forecasts. Not raising interest rates when it is warranted could have much larger effects on future inflation than is indicated by the constant interest rate forecast. (The same applies to the estimated effects of interest rate changes, which often do not include credibility effects).

The exchange rate assumption

In addition to a constant interest rate, the inflation forecast also assumes a constant exchange rate. These are called “technical assumptions” in the Strategy Document. The assumptions are very different in nature, however, since the interest rate is under direct central bank control, while the exchange rate is market determined. The Bank can define “constant policy” in whatever way it finds convenient, but the assumption of a constant exchange rate is not merely a matter of definition.

Exchange rates are known to be notoriously hard to predict. In the short run, they often behave in apparent defiance of theories of exchange rate determination. There is fairly wide consensus that it is often hard to find a better predictor for tomorrow’s exchange rate than today's exchange rate. Even with a horizon of two years, it is often difficult to do better, although there is evidence for some reversion towards purchasing power parity, perhaps modified by other fundamental factors driving the real exchange rate. Hence, the assumption of a constant exchange rate has an empirical justification.

However, unexpected movements in interest rates affect exchange rates. This view also seems to be shared by the Bank. If interest rates affect exchange rates, however, then there must be cases where a constant exchange rate is inconsistent with a constant interest rate. There is no reason to believe that this led to significant policy errors in 2002, but the Bank would benefit from working out a more coherent way of treating exchange rates in the forecasts. We appreciate that, given present knowledge, this may be a difficult task. The distinction between expected and unexpected movements in interest rates should be emphasised.

Forecasts based on market expectations

An alternative to a constant interest rate forecast would be to start the discussion from a prediction based on market expectations of interest rates and exchange rates. One would then ask what the outcome for inflation will be if we do what the markets expect us to do. The first problem with this method is how to measure market expectations. If investors act only on the basis of expected returns, expectations can be derived from interest rate differentials in a standard way. Predictions made by this method are presented in the Inflation Report. If one believes that concerns such as risk and liquidity are important for investment decisions, then this method fails. Then one has to resort to survey measures of expectations. However, little is known about the reliability of these and how to aggregate survey responses into a useful measure of aggregate market sentiments.

One question is what kind of decision biases the two methods will lead to. Suppose decisions were biased towards the alternative that is taken as a starting point. Using market expectations could then be criticized for given market participants undue influence. A final consideration is how the forecasts and the policy decision can best be communicated to the public.

On the whole, we favour the current practice of taking a constant interest rate forecast as the staring point for the policy discussion. However, more attention should be paid to the consequences of changes in interest rates that have not been anticipated.

The treatment of uncertainty

Norges Bank's forecasts are said to be *mode* forecasts ("the most likely alternative")[4]. It has been claimed that *mean* forecasts would be better, since they minimise the mean squared error of the forecast errors. The mean forecast weighs each possible outcome with its probability and then takes the average. The difference matters only when risks are asymmetric. Then mode forecasts would tend to give on average larger forecast errors, and if the distribution of outcomes is always skewed in the same direction, they will also give a systematic bias. Hence, there are some good reasons to prefer mean forecasts.

In the three Strategy Documents from 2002, risks were considered balanced (symmetric), which means that the distinction between mean and mode forecasts did not matter. The bank should give some thought to how it will handle asymmetries in the distribution of possible outcomes in the future.

Fan charts based on previous forecast errors are used in the Inflation Report to illustrate the uncertainty. These are useful reminders of fallibility. Except for that, they really do not provide much useful information for the policy discussion.

[4] Inflation Report 3/2002.

Forecast horizon[5]

The forecast horizon in the Strategy Document is two years. Sometimes a policy that meets the target after two years may lead to difficulties later. Hence, forecasts should be presented for a somewhat longer period, e.g., three years. If inflation deviates from target in the third year, this will usually be a sign that something has to be done with interest rates before that. The need for looking further ahead is highest when inflation deviates strongly from the target or will do so in the first part of the forecast period. Hence, the matter was not urgent in 2002.

Another reason for looking further ahead than two years is the two-year cycle of wage bargaining.

5. Policy Analysis

Policy analysis consists of: (i) using the results of the economic projection referred to in section 4 to draw out the implications for the appropriate interest rate setting; (ii) examining the risks surrounding the economic projection; and (iii) establishing an appropriate strategy, including an appropriate band for the interest rate four months hence.

The interest rate and the base case projection

As noted above, the economic projection is carried out at a constant interest rate. The Strategy Document also looks at alternative paths for the interest rate to illustrate why they may or (more likely) may not be appropriate. These alternative paths have been chosen more and more imaginatively (in a good sense) over time to examine whether more variable paths for interest rate would produce more or less volatility through time in the projected paths for inflation and output. Typically the volatility of output is only discussed in the text or shown as a deviation from the baseline. It might be more instructive to show the actual paths of the output gap (or actual output or output growth) under the alternative interest rate scenarios. This would visually display what would be expected to occur in terms of the volatility in projected output through time.

Examining the risks surrounding the projection

In constructing an economic projection, there are always a number of risks, which are more difficult to deal with than others. In many cases, this is because a balanced "base case" assumption is difficult to decide upon. There are a number of ways to deal with uncertainty that can be employed by central banks.[6] Two that are particularly relevant at the policy analysis stage are: (i) the use of benchmark policy rules, such as the Taylor rule and (ii) an examination of the effects of alternative assumptions about key variables.

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[5] The horizon is also discussed in appendix 1 in the Strategy Document from October. The point there, namely that concern for other policy objectives than the inflation target may mean that one should effectively lengthen the horizon, is somewhat different from the one that we make here. To what extent one can pursue more than one target and still maintain credibility is a controversial issue, which is not within our assignment. However, if one wants to pursue such targets, this means not only a longer horizon, but also that one should present forecasts for these other target variables.

[6] See, for example, Paul Jenkins and David Longworth, "Monetary Policy and Uncertainty," *Bank of Canada Review*, Summer 2002.

The Strategy Documents make good use of the Taylor rule (see the May and October 2002 Documents, which mention results from a rule in the text and contain an annex giving greater detail). Such a benchmark rule is important because it requires policymakers to think carefully if they are contemplating an interest rate that is significantly different from that suggested by the rule. Of course, at times there are good reasons for such significant deviations, as in the case of the U.S. economy post September 11, 2001 for example. If such deviations are contemplated, they should be well articulated and explained to the Executive Board and ultimately to the public. Thus far, significant deviations have not occurred in Norway.

The Strategy Documents deal with specific risks in three ways. First, they list some of the key risks. Many of these are described as balanced. Some of them, particularly those in 2002 regarding the wage situation and the fiscal situation, are discussed thoroughly. Second, particular emphasis is given to risks regarding the exchange rate because the base case makes the assumption that it will be constant in the future. The Strategy Notes regularly give scenarios for inflation based on alternative assumptions about the exchange rates. Third, alternative paths are considered for the policy interest rate. The focus and selection of the specific risks is excellent.

With the exception of exchange rate risk there is no indication of the quantitative importance of the different risk factors (their likely range of variation and their influence on inflation). Where uncertainty is high, the element of judgement in the forecast is usually also strong. Hence, the most important risk factors are areas where the Board may want to have extensive discussion of the appropriate judgement.

The Norges Bank is to be commended in the flexibility that it has used in presenting the various risks and alternative scenarios. This flexibility should continue. At times, the Bank may wish to examine an alternative in which it assumes an alternative path for wages or for foreign demand, for example, and then shows which path for interest rates would be appropriate to bring inflation back to target over the desired horizon.

Establishing an appropriate strategy

Using the information from the economic projection and the analysis of risks, the Strategy Notes provide a summary assessment of the situation and establish a strategy that has two key elements: (i) the appropriate interval for the sight deposit rate over the subsequent four months, which is typically one percentage point wide and (ii) the appropriate response over that period in response to possible key shocks (especially to the exchange rate). Because the recommended interval for the sight deposit rate is not always symmetric around the current rate, there is substantive content to the recommended strategy that goes beyond the current recommended rate. This approach seems to us to be a useful one in which to lay out the strategy for a four-month period. As well, the strategy is summarised in point form in a simple and concise manner.

Finally, a discussion that one of us had with members of the Executive Board suggested that the Strategy Document was meeting their needs.

6. Research

As in other central banks, research in Norges Bank is centred on a number of quantitative models. There is one relatively large econometric model (RIMINI), a smaller calibrated theory-based macro model and several small (mostly single- equation) models that focus on a particular relationship in the economy. As we understand it, RIMINI is used as the main tool

for both policy analysis and prediction. Results are checked against the smaller models. The smaller theory-based macro model is mainly used for policy analysis.

We find it reassuring that several models are used as checks against each other. To the extent that the smaller models have proved useful, one should consider revising the main model. Some of the smaller models may then become superfluous. On the other hand, one should continuously look for weak spots in the main model, and develop new supplementary models to challenge it. At the time of the interviews in January there was no clear medium-term plan for future model developments. We understand that now an internal Norges Bank commission has been established to make recommendations as to how to proceed in this area.

RIMINI has been criticized by Norges Bank Watch[7] and others. We find the criticism has at times been exaggerated, but there are some important points to consider.

For a model to be useful in policy discussions, it is important to be able to interpret the different relationships in relation to economic theory. This means that for each relation one should be able to tell whose behaviour is described (e.g., suppliers or demanders). In most cases this is possible in RIMINI, but there are some exceptions where interpretation is difficult. A focus on economic theory should also guarantee long-run neutrality--with no long-run trade-off between inflation and unemployment (or output).[8] The use of explicit output gaps and labour-market gaps might help in this regard.

The main model should also identify explicitly the variables that are central to the discussion of policy effects. It is then unfortunate that expectations do not enter explicitly as variables in the model. Expectations are, of course, taken account of, but only implicitly. This will create difficulties in policy discussion if part of the argument is that expectations do not relate to the state of the economy in the same way as before.

In developing RIMINI there has been a commendable emphasis on the empirical validity of the model relative to historical Norwegian data. It is important to keep up a strong empirical orientation. This is a defence against prejudice and wishful thinking. However, one may ask whether a wider information set should be used when quantifying the models. The number of observations from one country will always be low relative to the number of parameters that are of potential interest. One should consider whether estimates from other countries or from micro data might be useful in calibrating the model, and whether more theory-based constraints should be used to keep coefficients within reasonable bounds.[9]

In our opinion, there are some criticisms of RIMINI that are less to the point. One is the theoretical possibility that the relations are not invariant with respect to the policy interventions that are considered, or that the relations have changed fundamentally since the official guidelines for monetary policy were changed. If this is a real problem, it should show

[7] See Norges Bank Watch 2002, Handelshøyskolen BI, Research Report 17 2002.
[8] We recognise that the international literature contains some arguments for non-neutrality in the vicinity of zero inflation.
[9] Today's practice means that coefficients that are not statistically significant are often set to zero. This induces a bias towards ignoring effects that may be economically important, but are difficult to detect in the particular data set. In such cases a better alternative may be to use estimates from other sources (or simple calibrations) until they are proven wrong by Norwegian data. In practice this could mean changing the null hypothesis from being that a particular variable has zero effect to that it has an effect at roughly the same level as is found in studies from other countries. In the same spirit, one should perhaps consider using distributed lags more often in cases where now only some lags are included, while others in between them are excluded.

up in the track record of the model. The stability of the equations is an empirical question. There is no practical alternative to trying to find as stable relations as possible. Another criticism is that the model is too large. If many equations are needed in order to get empirical success, then so be it. What is important, however, is the overall properties of the model; sometimes a large model inhibits achieving the desired properties.

7. Publication

The Norges Bank is to be commended for publishing the Strategy Document at the end of the period to which it applies.

Within the next year, the Bank might give serious consideration to publishing most of the Strategy Document in the Inflation Report that is issued near the beginning of the period to which the Document applies. The part that would not be published would be the recommended interval for the sight deposit rate (the policy interest rate) and any elements of the section "Monetary policy in the period ahead" that were felt to be too closely linked to the recommended interval. The reason that we do not suggest that the recommended interval for the sight deposit rate be published is that the net benefits of such a move are not at all clear. Central banks do not know enough about the behaviour of financial markets to know how they would react to such publication. Only two central banks publish variable interest rate projections and one of these, the Reserve Bank of New Zealand, has slowly been reducing the amount of detail that it provides on such projections.

The Document could appear either as an annex, or as a type of summary. In this regard and in terms of its use in setting out a strategy for the Executive Board, it would be useful to sharpen the presentation by adopting the suggestion made in the second paragraph of section 4.

8. Major recommendations

In section 2, three criteria for our evaluation were set out. We find that the work of Norges Bank meets international norms and compares well with the practice of other central banks. The selection of information is sensible and the presentation is clear. The Strategy Document could, however, still be improved by tying the presentation more closely to the major determinants of inflation as described earlier.

From an academic or research point of view, there is naturally always more to be desired. The main areas where further research and development may lead to improvements are exchange rate forecasts, the use of equilibrium concepts that would allow the construction of measures of labour-market gaps and output gaps, and the development of a new macroeconomic model building on the strengths of the previous Norges Bank work. Particular attention should be paid to ensuring that the model has reasonable long-run properties, an appropriate representation of expectations regarding inflation, interest rates, and real variables, and the appropriate use of measures of gaps. Most of these are difficult matters with which all central banks struggle.