

Monetary policy, forecasts and market communication

Speech by Central Bank Governor Svein Gjedrem. The Norwegian School of Management's Centre for Monetary Economics, Thursday, 7 June 2001

The long-term objective of monetary policy is to contribute to low and stable inflation. Price stability is the best contribution monetary policy can make to economic growth and prosperity. A nominal anchor is also a necessary precondition for stable financial markets and property markets. We cannot achieve higher employment in the long run by accepting higher inflation. On the contrary, the experience of our country and that of others in the 1970s, 1980s and 1990s is that periods of high inflation are followed by downturns with high unemployment. High and variable inflation also leads to an arbitrary redistribution of wealth and income.

This spring, the Government assigned a new operational mandate for monetary policy to Norges Bank. Norges Bank shall set the key rate with a view to maintaining low and stable inflation. The inflation target is set at 2½ per cent. I will use this occasion to elaborate on our interpretation of the mandate and to discuss how it will affect the conduct of monetary policy.

The inflation outlook is presented three times a year in Norges Bank's *Inflation Reports*, and forms a basis for the Bank's interest rate decisions. Further assessments are presented every six weeks in connection with the Executive Board's monetary policy meetings.

Mandate, interpretation and implementation

New Zealand was the first country to introduce an inflation target in 1989.¹ Chile followed in 1990, Canada in 1991, the UK in 1992, Sweden, Finland and Australia in 1993 (Finland until 1998), Spain in 1994 (until 1998) and Iceland and Norway in 2001. A number of emerging market economies like the Czech Republic and Poland, as well as Israel, South Africa and Brazil, have introduced inflation targets in the last few years.² The ECB shall direct its monetary policy instruments towards price stability, which the bank has defined as inflation of less than 2 per cent. The target of the Swiss central bank has a similar formulation. In the US, price and employment stability are equally important. Experience with inflation targets has generally been good. Low and stable inflation has underpinned economic growth and employment. The fact that conditions were favourable for low inflation and renewed growth in many countries following the downturn and high unemployment in the early 1990s may also have contributed positively.

Norway introduced an inflation target during a different phase of the economic cycle. We have experienced a prolonged upturn. The labour market is tight. High labour force participation and demographic conditions indicate that the possibility for further growth in the labour supply is limited. In addition, reforms that reduce the supply of labour were implemented. At the same time, because of our large petroleum revenues, the Norwegian

authorities do not face the same budget constraints on their fiscal policy as other countries faced when they introduced inflation targets. Several of the OECD countries have substantial budget surpluses now, however. Finland expects a budget surplus of 5.3 per cent of GDP this year.³ New Zealand and Ireland have introduced fund schemes where they invest their budget surpluses in anticipation of higher pension disbursements later in this century.

The new Regulation on Monetary Policy was adopted on 29 March 2001.

Section 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 2½ 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.

Storting Report no. 29 of 2001, "Guidelines for economic policy" states:

"Consumer price inflation is expected to remain within an interval of +/-1 percentage point around the target."

The inflation target of 2½ per cent over time is slightly higher than the targets in Sweden, Canada and the euro area, but corresponds to targets in the United Kingdom and Australia. In the US, consumer price inflation has been somewhat higher the last ten years. The target is approximately in line with the average inflation rate in Norway in the 1990s.

In our view, with its change in monetary policy, the Government has recognised low inflation as a benefit in itself. History has shown that high inflation does not result in either sustained economic growth or lower unemployment rates. A track record of low inflation since 1990 has provided Norges Bank with a good basis for implementing monetary policy even though, as I mentioned, the inflation target was introduced during an upturn.

Higher interest rates curb demand for goods and services and reduce inflation. Lower interest rates have the opposite effect. If evidence suggests that inflation will be higher than 2½ per cent with unchanged interest rates, the interest rate will be increased. If it appears that inflation will be lower than 2½ per cent with unchanged interest rates, the interest rate will be reduced. There is symmetry here. It is equally important to avoid an inflation rate that is too low, or deflation, as it is to avoid an inflation rate that is too high. When the annual use of petroleum revenues is managed according to a long-term action plan, a policy for which there is currently fairly general political consensus, we should normally be able to use the interest rate as a policy instrument to prevent high inflation. Normally, monetary

policy should also be a fairly effective means of countering a deflationary recession. Stagflation, ie stagnating output and rising unemployment combined with rapid inflation, which characterised economic developments in many countries in the 1970s and 1980s, originates in the supply and output side of the economy or in income determination. If the Norwegian economy should ever be threatened by stagflation tendencies, monetary policy must be directed towards maintaining low and stable inflation. At the same time, structural policy and incomes policy should contribute to improving the functioning of the economy, allowing economic growth and employment to pick up.

A change in interest rates is not expected to have an immediate effect on inflation. Our analyses indicate that a substantial share of the effects of an interest rate change occurs within two years. Two years is thus a reasonable time horizon for achieving the inflation target of 2½ per cent. Therefore, the inflation outlook in two years may be viewed as a derived objective in monetary policy.

In some situations, where unexpected events lead to an inflation rate that is too high, it may be appropriate to apply a longer time horizon than two years. For example, reducing inflation to 2½ per cent within this time horizon may be associated with unnecessary real economic costs. A precondition for applying a longer time horizon is that there is clear evidence of strong confidence in low and stable inflation over time on the part of economic agents. Gradually, as we gain experience with setting interest rates according to an inflation target, the possibilities for placing emphasis on stability in the real economy will probably increase.

Low and stable inflation is a necessary precondition for stability in the foreign exchange and financial market and the property market. However, there have also been episodes where bubbles have accumulated in these markets, in the form of sharp increases in asset prices, while inflation has been low. Price increases in property and financial markets may have a considerable impact on wage growth and consumer price inflation after a period. When the bubbles burst, the result may be an economic downturn. In this way, developments in financial and property markets may be a source of a more unstable inflation environment. In principle, it would be appropriate to use the interest rate to counter this. In practice, however, it is difficult to assess whether price trends in property and financial markets are sustainable.

When Norges Bank concludes that the key rate should be changed, the change will in most cases be made gradually. This is because there is normally uncertainty about the situation in the economy, potential disturbances to the economy and how fast an interest rate change will affect price inflation. But we will not always take a gradualist approach. A rapid and pronounced change in the interest rate is appropriate if, for example, heightening turbulence in financial markets or a cost-push shock resulting from negotiations indicates that confidence in monetary policy is in jeopardy. And should there be prospects of a deflationary recession, it would be appropriate to apply our instruments more firmly.

If special circumstances prompt Norges Bank to apply a different time horizon than two years, the Bank will provide an assessment of this. The same applies if special emphasis is placed on developments in financial markets or property markets.

In the long run, inflation is determined by developments in domestic costs, productivity growth and imported inflation. A special feature of wage formation in Norway has been that conditions for exposed industries have received considerable emphasis in the wage negotiations, including the negotiations for industries that do not face international competition. During the last few years, the sheltered sector has had greater influence on overall wage developments.

The centralised income settlements in Norway have been an arena of coordination, where macroeconomic considerations have at times received considerable emphasis. This has contributed to maintaining low unemployment. But we have also experienced that the income settlements may be a source of economic disturbances. The income settlements in the mid-1970s and 1986 had the strongest negative impact. The settlements in 1998 and 2000 also fuelled high cost inflation.

Retrospective evaluation of monetary policy

Today's inflation rate is partly the result of the interest rate that was set one to two years ago. Therefore, today's consumer price index figures provide a basis for assessing the results of the monetary policy conducted some years ago.

Monthly figures for the consumer price index are influenced by random or temporary factors that have little impact on developments in inflation over time. Electricity prices are affected by precipitation levels. Changes in indirect taxes have an immediate impact on the consumer price index. The direct effects of these factors on inflation will be non-existent after a year. Hence, they will not have any significance for the interest rate, which is normally set with a view to maintaining inflation at 2½ per cent two years ahead.

However, it is still interesting to adjust monthly inflation figures for temporary effects to determine whether developments are broadly in line with our projections. Norges Bank analyses and presents figures for consumer price inflation where the effects of some temporary factors are excluded. In April, the year-on-year rise in the consumer price index was 3.8 per cent. Figures were affected by sharp increases in both electricity and petrol prices and by higher indirect taxes. Excluding electricity and petrol prices and adjusting for changes in indirect taxes, price inflation was approximately 2½ per cent, which is in line with the current inflation target.

It should be pointed out, however, that our adjustment of the figures may overestimate these effects. We assume, for example, that increases in indirect taxes are passed on in their entirety to the consumer. In practice, changes in indirect taxes are often shared by manufacturers and consumers based on the intensity of the supply-and-demand reaction to price increases. In addition, increases in electricity prices are not only the result of last year's low precipitation levels in Western Norway and higher electricity taxes. Other, more permanent conditions may also have contributed. The increase in petrol prices leads to higher prices on other goods such as transport services and we have not adjusted for this. However, adjusting inflation figures for direct effects of one-off factors can also be associated with pitfalls. Higher indirect taxes and an increase in petrol and electricity prices may be a source of accelerating inflation, via spillover effects on other prices and wages.

Other countries with inflation targets adjust the consumer price index for temporary and random factors in a variety of ways. In the UK, changes in interest rates have a strong, direct impact on the consumer price index. The Bank of England aims at an inflation target that is adjusted for such effects.

In New Zealand, the inflation target is formulated as growth in the consumer price index, but the mandate specifies factors for which adjustments may be made. These factors include price changes due to substantial changes in commodity prices, changes in indirect taxes, considerable changes in economic policy which directly impact prices, as well as natural disasters. There are no continuous, fixed indicators that make adjustments for these factors, but adjustments are made if the effects are substantial.

In Sweden and Canada, the inflation target is formulated as growth in the consumer price index without special exclusions. However, in practice, indices for underlying inflation are used in the implementation and assessment of monetary policy. Sweden's Riksbank often refers to an indicator that adjusts for the direct effects of interest rates and net indirect taxes. The Bank of Canada has now defined a new indicator as the operational target of monetary policy. This indicator is the consumer price index excluding the eight most volatile components: fruit, vegetables, petrol, heating oil, natural gas, domestic air travel, tobacco products and interest rate costs. Adjustments are also made for the effect of indirect taxes.

The consumer price index is compiled to show developments in the cost of living. To some degree, the consumer price index overestimates developments in the cost of living. This is partly related to the fact that the measurement method does not adequately capture quality changes in the service industry. The Boskin Report (1996) discovered that the US CPI overestimated the actual cost of living increase by 0.8-1.6 percentage points annually. Statistics Norway has assessed the measurement error in the Norwegian consumer price index.⁴ The conclusion is that the Norwegian index also overestimates developments in the cost of living but that the deviation is probably well below one percentage point annually.

National consumer price indices are constructed in various ways. For example, there are differences in the goods and services included, the relative weights assigned to the goods and services included and the frequency with which the weights are adjusted. In addition, the method of weighting the various sub-indices - ie whether the arithmetic or geometric average is used - may also affect the growth rate. Eurostat's Harmonised Index of Consumer Prices (HICP) represents a standard that facilitates the comparison of countries.

The national index in the UK is calculated by using arithmetic averages, whereas geometric averages are used in the harmonised index. Several items in the national index are not included in the harmonised index, for example costs related to housing (house depreciation, council tax and building insurance). In contrast, air fares, university accommodation fees, foreign students' university tuition fees and payments by residents of nursing and retirement homes are excluded from the national index but included in the harmonised index. Year-on-year growth figures in April showed a difference of nearly one percentage point between the Bank of England's index (RIPX) and the HICP. This index tied to the inflation target showed 2 per cent growth in the last 12 months, whereas the harmonised index showed an increase of 1.1 percentage point. Different treatment of housing costs pushed the national index up by more than ½ percentage point compared with the harmonised index. Different weighting

methods accounted for a similar proportion of the increase. Different weights reduced growth in the national index by nearly $\frac{1}{4}$ percentage point compared with the harmonised index.⁵

Predictability, transparency and communication

Central banks control the volume of central bank liquidity or the interest rate on this liquidity. Most central banks use the interest rate on intra-day liquidity. In Norway, this is the interest rate on banks' sight deposits with Norges Bank, the sight deposit rate. Banks' net position vis-a-vis Norges Bank fluctuates around zero. By comparison, household and private sector domestic gross debt amounts to roughly NOK 1500 billion, whereas the total money supply is approximately NOK 750 billion. Our key rate has a direct influence on a very small portion of the total money and credit market. Monetary policy would not affect price inflation if our key rate only influenced the interest rate on the amount outstanding between the central bank and the banks. We are dependent on a spillover effect on interest rates on debt in the household and enterprise sectors.

The link between these variables and the key rate runs through market expectations and the yield curve. Long-term interest rates that are determined by the market reflect expected future short-term rates, uncertainty and risk premiums. Interest rates on money market investments with maturities of more than one day will be influenced by expectations about changes in Norges Bank's rates in the future. Interest on investments that mature in one week will be a weighted average of expected interest on one-day investments in the days up to maturity. Similarly, three-month rates reflect both prevailing and expected future overnight rates. If economic agents believe that Norges Bank will reduce interest rates in the next few weeks, three-month-rates will be lower than interest on krone-denominated assets with shorter maturities. Similarly, if economic agents believe that Norges Bank will raise interest rates in the next few weeks, three-month-rates will be higher than rates on krone-denominated assets with shorter maturities.

If there is confidence in monetary policy, changes in Norges Bank's rates will have little effect on long-term interest rates. These rates will then primarily be determined by the demand for real return on capital that originates in the international capital market. If confidence in economic policy deteriorates, for example because Norges Bank sets interest rates so low that inflation and unstable exchange rates are expected, long-term interest rates will rise. The cost of low confidence is thus high risk premiums and unnecessarily high long-term interest rates.

Transparency in our intentions, strategies and implementation of monetary policy may contribute to reducing uncertainty among economic agents. If monetary policy is predictable, an important source of risk is diminished. Thus, all else being equal, the interest rate that is necessary to achieve the inflation target will be lower. There will then be a better chance of achieving the inflation target without frequent and abrupt changes in the key rate. Predictability may contribute to ensuring more stable developments in demand and output.

Thus, a predictable monetary policy may contribute to improving the efficiency and impact of monetary policy. Predictability and transparency are often equated. However, increased

transparency does not necessarily imply a higher degree of predictability. Many cite the Bank of England as a very transparent central bank, because it presents its assessments of the economic outlook in its inflation reports and publishes the minutes of the Monetary Policy Committee meetings. A report⁶ prepared by Dr. Sushil Wadhvani, a member of the MPC, indicates, however, that the Bank of England's interest rate changes in the period 3 June 1997 -18 April 2001 have come as more of a surprise to market participants than interest rate changes in continental Europe and the US during the same period. The same study indicates that the element of surprise has waned over time.

In Norway, it appears that transparency in Norges Bank's interpretation of the mandate and in the implementation of monetary policy has contributed to making monetary policy somewhat more predictable. The chart shows that Norges Bank's changes in the key rate have less impact on money market rates now than earlier.

The academic literature on transparency and monetary policy is voluminous and growing. "How Do Central Banks Talk?"⁷, a report prepared by a number of well-known academics and presented recently at the Center for Economic Policy Research, specifies the objectives that central banks should bear in mind when developing their strategy on transparency. The report says the following: "Transparency should allow the public to understand, and possibly anticipate, the central bank's decisions, to see each of them as the logical conclusion of a chain of past and future decisions aimed at a clear set of targets,⁸")

This view of transparency and predictability contrasts sharply with the earlier practice of playing on the element of surprise. In monetary policy, this was associated especially with control of the exchange rate. Gradually, the economic policy met distrust and high premiums for uncertainty. The effects of changes in monetary policy instruments became increasingly uncertain. Nevertheless, a desire for predictability must not precede the demand for an interest rate setting that the central bank deems to be correct. The expectations of other economic agents must not control the setting of interest rates. There are a number of examples from countries with "transparent" monetary policies where interest rate changes have come as a surprise. This may be partly due to the fact that the central bank had a different view of the outlook for economic developments. The inflation outlook may also change rapidly and prompt rapid and possibly pronounced interest-rate adjustments.

Transparency may be discussed in relation to

- objective function
- reaction function
- analyses
- views on how interest rates affect price inflation
- assessment of the inflation outlook and the balance of risks

Norges Bank has sought to contribute to transparency by presenting its interpretation of the mandate and by explaining the implementation of monetary policy. In the *Inflation Report* 4/2000, we presented our view of how interest rates affect price inflation in Norway.

In principle, the more discretion and flexibility the monetary policy objective implies, the more complex and subtle communication must be. Monetary policy requires the continuous

exercise of discretion. The exercise of this discretion is limited, however, by Norges Bank's mandate and our interpretation of it. Furthermore, we have contributed to restricting the exercise of discretion by being transparent in our response pattern, our analyses of economic developments and our assessment of the results of the monetary policy that has been conducted.

Central bank communication varies from one country to another. The various solutions reflect different objectives and institutional parameters as well as different histories and cultures. Therefore, in my view, we should be cautious about recommending a specific country's choices and solutions as a norm.

The Reserve Bank of New Zealand is required by law to submit a Monetary Policy Statement at least twice a year, and these reports are published quarterly in the form of inflation reports. The reports include an account of an interest rate path that will contribute to keeping inflation consistent with the target. The official Cash Rate, New Zealand's key interest rate, is reviewed once between reports, at a pre-announced time. Decisions regarding the Cash Rate are published immediately, accompanied by a commentary. The Reserve Bank Governor is responsible for achieving the target, and for making decisions.

In the Bank of England, interest rate decisions are made by the Monetary Policy Committee, which has nine members. Four of the members are external economists appointed by the Chancellor of the Exchequer. In practice, they work full time for the central bank, but they are not part of line management. The Bank of England presents an inflation report four times a year. The report is prepared by the Bank's administration, but the work is directed by the Committee. The report provides projections of economic growth and inflation. The Bank of England has developed a method that illustrates the Committee's subjective view of the uncertainty associated with forecasts for GDP growth and inflation. Uncertainty increases with the time horizon, so that the illustration of uncertainty takes the form of a fan. This fan has gradually acquired a central role. The introduction to the report states: "Although not every member will agree with every assumption on which our projections are based, the fan charts represent the MPC's best collective judgement about the most likely paths for inflation and output and the uncertainties surrounding those central projections." The Bank's view of the outlook for the interest rate is not stated directly, but is implicit in the discussion of the fan around the inflation projection and an associated table. Twelve monetary policy meetings are held each year. Decisions taken are made public immediately, but without an explanation, and meetings are not followed by press conferences. Two weeks after each meeting, the Bank publishes minutes, which make it clear whether there was a lack of consensus in the Committee. Publication of the minutes is required by law. An account of the implementation of monetary policy is provided in the Annual Report. All committee members are free to express their personal views on economic issues and monetary policy.

In Sweden, too, interest rate decisions are made by a board of experts - the Executive Board. The members work full time, and participate in the daily operations of the central bank. An inflation report expressing the Executive Board's collective view of the inflation outlook is published four times a year. As in the UK, special emphasis is placed on the individual responsibility of the Executive Board members. The individual members' voting and

assessments are disclosed. Any lack of consensus regarding the inflation outlook and setting of interest rates emerges from the minutes that are published from two to four weeks after each monetary policy meeting. Grounds are given for decisions on interest rates, but no press conference is held immediately after monetary policy meetings. The Executive Board does not directly announce its stance regarding interest rate movements in the period ahead, but this is implicit from the uncertainty associated with the projection, which Sweden's Riksbank also illustrates by means of a fan surrounding the inflation projection. The Executive Board reports twice a year to the Swedish parliament, the Riksdagen. Sweden's Riksbank has chosen to use two of its four quarterly inflation reports for this purpose. Members of the Executive Board give lectures and express their personal views on economic questions and monetary policy.

In its December 2000 Bulletin, the ECB presented for the first time price inflation projections in the form of a broad range. Bank staff prepare the projections. In the ECB's two-pillar system, developments in the first pillar, the money supply (M3), and the second pillar, which comprises other factors that may influence price inflation, are equally important. According to the Maastricht Treaty, the Governing Council shall meet at least ten times a year. Since the implementation of a single monetary policy in January 1999, monetary policy meetings have been held fortnightly. Press conferences are held after every second meeting, but no explicit expression is given of the Bank's stance regarding interest rate movements in the future and the minutes of monetary policy meetings are not published. Members of the Governing Council make individual statements about monetary policy, but the actual interest rate decision is presented as a collective one.

In the US, the Federal Open Market Committee determines the interest rate. The Committee holds eight pre-announced meetings a year, but has also occasionally changed the interest rate between meetings. Decisions are announced after interest rate meetings. The future policy bias is expressed implicitly through the discussion of the balance of risks with respect to the economic outlook. In a separate press release, the committee explains how the formulations may be interpreted. The Federal Reserve does not publish a traditional inflation report like the Bank of England's with projections of future developments. However, in connection with the Chairman's semi-annual testimony to Congress, estimates are given of probable ranges for GDP growth, consumer price inflation and unemployment. The minutes of Committee meetings are published after six weeks, and disclose the way individual members have voted. A complete transcript of proceedings is released after five years. Members express individual views on monetary policy.

Norges Bank analyses the inflation outlook in separate inflation reports which are published three times a year. Further assessments regarding the inflation outlook are presented every six weeks in connection with the monetary policy meetings at which the Executive Board sets interest rates. Central aspects of the modelling tools and our view of the functioning of the economy are examined in detail in the *Inflation Report* and in articles in the journal *Penger og Kreditt* and its English counterpart *Economic Bulletin*. The minutes of monetary policy meetings are not published. The Executive Board functions as a unified group in relation to the public.

In Canada and New Zealand, responsibility lies with the central bank governor, and therefore only one view is expressed. In the ECB, Australia, Switzerland and Norway, the decision-making body speaks to the public with one voice. Like Norway, Australia includes external members in the body that makes decisions regarding the interest rate.

Forecasts as communication

Section 2 of the Monetary Policy Regulation states: "Norges Bank shall regularly publish the assessments that form the basis for the implementation of monetary policy." The projections and analyses in the *Inflation Report*, together with continuous assessment of the outlook for price and cost inflation and conditions in money and foreign exchange markets, provide a basis for interest rate decisions.

The *Inflation Report* contains analyses and projections for a number of macroeconomic variables. This has been the practice since the first report was published in December 1994. Most other central banks restrict themselves to forecasting price inflation and the output trend. Some also provide estimates of the main components of demand and of the labour market. Different practices reflect different histories and cultures. Some central banks place emphasis on the uncertainty of economic estimates, pointing out that this may make them more misleading than instructive. Institutional framework conditions also influence the forecasts at a detailed level. In countries where a decision-making body presents forecasts, each member may have his/her own individual forecast for both developments in the real economy and inflation. At the same time, the body must present a single estimate for price inflation - and developments in the real economy - based on the members' best collective evaluation. Such is the case with the Bank of England. If the members have very different views regarding economic developments, projections for economic variables will lose much of their informational content. Under framework conditions of this nature, it will not be very fruitful to provide detailed estimates of the various demand components in the economy. In some cases, the inflation projection itself may lose some of its informational value. In the UK, there is at times greater interest for the uncertainty surrounding the projection, illustrated by the fan charts, and in the minutes of the monetary policy meetings, than in the inflation report and the actual inflation projection.

Detailed projections may increase the possibility of checking the consistency of projections over time. They also provide a basis for evaluating whether short-term indicators are in line with the developments expected by the central bank. On the other hand, very detailed projections may suggest that the central bank is more certain about developments than there is actually reason to be. Norway has a long tradition of making detailed forecasts. Economic agents know from experience that point forecasts are very uncertain and presumably regard them with a healthy scepticism.

The analysis and projections in the *Inflation Report* are *conditional on* a number of economic variables such as fiscal policy, exchange rates and the interest rate. A different trend in these variables could also result in a different course for both the real economy and nominal developments. The assumptions on which the inflation forecast is based must be reasonable and fairly realistic if the forecasts are to function as a basis for decision-making.

The central bank directly influences the sight deposit rate, and thus faces an important question already at the stage of making projections: what interest rate scenario should provide the basis for inflation projections? Practice varies. Generally, more than one interest rate scenario may result in the same inflation projection. The Central Bank of New Zealand is the only central bank that presents its assessment of the optimal interest rate path and uses this as the basis for its inflation projections. The central banks of other countries base their projections on a stylised assumption about the interest rate. Thus, these interest rate scenarios are not necessarily consistent with the interest rate trend envisaged by the central bank. The Bank of England and Sweden's Riksbank base their estimates in the baseline scenario on the assumption that interest rates remain unchanged. Alternative projections based on market expectations regarding future interest rates are also shown.

A number of academics⁸ have argued for making the optimal interest rate scenario the basis for inflation projections. Their argument is as follows: If the central bank itself does not regard an unchanged interest rate during the forecast period as the most probable scenario, the price inflation projection will not be the most probable one either. Thus, the projection does not provide guidance as to what inflation the central bank actually expects.

In Norges Bank, we have used both an unchanged interest rate and an interest rate scenario based on market expectations in our inflation reports. If Norges Bank projects price inflation as higher or lower than 2½ per cent, it is an indication that the Bank envisages an interest rate path that is higher or lower than the path on which the projection is based.

There is uncertainty associated with all forecasts. This very uncertainty and the central bank's assessment of the various risk factors constitute important supplementary information. In our *Inflation Reports*, the uncertainty associated with the projections is discussed explicitly. An account is given of which variables Norges Bank regards as particularly uncertain, which way this uncertainty points, and how a different scenario could influence price projections. In addition, a fan chart illustrating the uncertainty of the projections is presented.

Calculations based on alternative assumptions are presented regularly. This illustrates the isolated effect on price inflation of changes in assumptions. It provides insight into the effect on price inflation of potential disturbances to the economy.

We base our analyses and assessments of the inflation outlook and balance of risks on models. The RIMINI macroeconomic model, developed in Norges Bank's Research Department, has been an important tool for the Bank's analyses since 1994. The model seeks to take account of many of the important relationships in the Norwegian economy. The model combines and takes account of empirical and theoretical knowledge of these relationships as they have functioned in the past, and contributes to a more consistent analysis of the interaction between them. It takes time for structural changes to be captured in the model. It may therefore be useful to analyse the effects of any structural changes in previously existing relationships. For example, it may be useful to ask whether the effects on consumer prices of changes in the exchange rate are different now that the exchange rate fluctuates more than it did in the past.

In our experience it is not possible to make forecasts that prove to be accurate in all respects. By revealing errors, we provide a basis for improving the analysis. Our projections are therefore evaluated regularly. Analyses of forecast errors have been presented four times in the journal *Economic Bulletin*. Excerpts from these evaluation articles are also presented in the *Inflation Report* once a year.

Concluding remarks

In all countries with which it is natural to compare Norway, the setting of interest rates, the most important monetary policy instrument, is delegated to the central bank. A number of factors help to explain why the exercise of this authority is delegated.

First, monetary policy can well be delegated, because over time there is no real conflict between the objectives of price stability, on the one hand, and economic growth and equitable distribution, on the other. The formulation of objectives and subsequent evaluation of practice make adequate provision for the more short-term considerations.

Second, it is possible to formulate fairly precise objectives for monetary policy and establish reporting routines that ensure that those who delegate authority can subsequently evaluate the implementation. Norges Bank provides an account of its actions in the Bank's Annual Report, and the evaluation of the Ministry of Finance, the Government and the Storting appears in and is based on annual reports to the Storting.

Finally, the need for transparency and communication argue in favour of delegation. As previously mentioned, each monetary policy decision must be consistent with previous and future decisions, and be directed towards a clearly defined target.

Thank you for your attention.

Endnotes:

¹⁾ From 1931-1933 Sweden had a regime defined as "*and with all existing means to preserve the domestic purchasing power of the Swedish krona*" (my translation). This must be interpreted as an inflation target. ²⁾ A. Schaechter, M. R. Stone og M. Zelmer: "Adopting Inflation Targeting: Practical Issues for Emerging Market Countries". IMF *Occasional Paper* 202. Washington 2000. ³⁾ OECD Economic Outlook no. 69 - table "General government financial balances" ⁴⁾B. Koth and L. Sandberg: "Kilder til målefeil i konsumprisindeksen" (Sources of measurement errors in the consumer price index) *Økonomiske analyser* 5/97. Statistics Norway Oslo 1997 ⁵⁾<http://www.statistics.gov.uk/pdfdir/cpi0501.pdf> ⁶⁾ Wadhvani, S.B: "*Some Reflections on the MPC*". Speech to the National Association for Business Economics. Washington 21 May 2001 ⁷⁾ Blinder, A., C. Goodhart, P. Hildebrand, D. Lipton, C. Wyplosz: "*How Do Central Banks Talk?*" Report to be presented at the Third Geneva Conference on the World Economy on May 4, 2001 ⁸⁾ See e.g. Alesina, A., O. Blanchard, J. Garli, F. Giavazzi and H. Uhlig: "*Defining a macroeconomic Framework for the Euro Area. Monitoring the European Central Bank 3*". CEPR London 2001 and Lars E. O. Svensson:

Independent Review of the Operation of Monetary Policy in New Zealand: Report to the Minister of Finance. February 2001.