Svein Gjedrem: Uncertainty, economic models and monetary policy

Address by Mr Svein Gjedrem, Governor of Norges Bank (Central Bank of Norway), at the Centre for Monetary Economics/Norwegian School of Management, Oslo, 17 September 2007.

Please note that the text below may differ slightly from the actual presentation. The address is based on the assessments presented at Norges Bank's press conference following the Executive Board's monetary policy meeting on 15 August, Monetary Policy Report 2/07 and on previous speeches.

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I welcome the opportunity this time to discuss with you at the Centre for Monetary Economics certain themes that are not related to the most newsworthy economic policy issues. I will discuss the following three themes:

- the role of monetary policy
- our view of economic models as a basis for interest rate setting
- and finally, measuring inflation and uncertainty linked to the rate of inflation at a given point in time

Let me start by discussing the role of monetary policy.

The primary objective of monetary policy is to ensure that inflation expectations are low and stable. Expectations of low and stable inflation provide a nominal anchor. Economic agents' inflation expectations influence the decisions they make today. Our experience – and the experience of other countries – shows that without a nominal anchor we cannot achieve stability in employment and output.

The aim of preventing inflation expectations from becoming entrenched below the operational target of 2.5 per cent was one of the main reasons that the interest rate was lowered to a very low level in 2003 and 2004, when inflation receded and approached zero. Low interest rates stimulated demand and output and have gradually led to prospects for higher inflation, to which we have responded by increasing the interest rate. Consumer price inflation is still fairly low, but capacity utilisation is now at such a high level that inflation is projected to move up gradually to 2.5 per cent. Higher interest rates will contribute to a gradual decline in capacity utilisation so that inflation will not become too high.

In spite of several years of fairly low inflation, inflation expectations, as for example these – and not necessarily precisely – are measured by TNS Gallup's expectations survey, have held up around the inflation target. Even if there has been a longer period of low and relatively stable inflation expectations, we must be alert to developments that may change this.

Norway's and other countries' economic history show that inflation and inflation expectations can become unhinged. There are many self-regulating mechanisms in the economy, but inflation does not regulate itself.

Through history, monetary policy has in various ways been geared towards providing the economy with a nominal anchor. From the mid-1800s, many countries decided to peg the value of money to gold. Norway switched from the silver standard to the gold standard in 1874. The latter system provided the economy and prices with a fixed nominal anchor. Inflation was determined by growth in output on the one hand the supply of gold on the other. This was a system we had in common with our trading partners. Furthermore, we participated in the Scandinavian currency union as from 1875.

The gold standard was suspended during World War I when the British government largely financed the war by printing money. Parity policy in the interwar years was unsuccessful in many countries. After World War II, countries made a joint effort to stabilise price

developments by establishing the Bretton Woods system. The US dollar was pegged to gold and the other currencies to the dollar. In this way, we chose – with the value of gold as the basis – a fixed exchange rate and indirect inflation in other countries as our nominal anchor.

The Bretton Woods system collapsed in 1971. In the absence of gold as an anchor, the real value of banknotes and coins and bank deposits was now dependent on confidence that the central banks would not inject so much cash into the economic system that the value of money declined. The various countries chose different solutions. In Norway, we looked to other countries for both confidence and our inflation level, by tying our exchange rate in various ways to other countries' currencies.

In the ten years from 1976 to 1986, confidence in this policy was severely eroded. In this period, there were a total of ten devaluations or "technical adjustments" that entailed devaluation, often with the aim of bringing costs back under control. The objective of keeping inflation stable was set aside. Repeated devaluations eventually led to expectations that the authorities would not in the future stand by their promise of a fixed exchange rate, and that if price and cost inflation became too high, it was expected that the krone would be devalued again. The social partners began to take higher inflation into account in wage demands and price setting.

The last devaluation came in 1986. Subsequently, the interest rate was used to maintain a fixed krone exchange rate in order to bring price and cost inflation under control. We again chose a fixed exchange rate and other countries' inflation as a nominal anchor. Economic policy was influenced by the experiences of other countries that had dealt with the problem of inflation earlier, such as the US and Germany. The decline in inflation in Norway thus came in the wake of the fall in inflation abroad.

Historical data seem to suggest that after turbulent periods, inflation gradually reverts to a low and stable level and that over time domestic inflation is determined by external inflation. However, inflation in a country with its own national currency is not something that just drifts in with the wind from abroad. It is the monetary policy choices we make in Norway that determine price developments here.

We had to abandon our fixed exchange rate policy in December 1992. One important reason for this was the inherent weaknesses in the fixed exchange rate system in an environment of free capital flows and deep financial markets. When the fixed exchange rate policy was formally abandoned, there was a risk that the Norwegian economy could again lose its nominal anchor. However, the krone exchange rate showed little movement and soon found a new range. Fiscal policy had a stabilising effect.

The exchange rate remained stable until autumn 1996. This was partly due to low wage growth and a level of total demand that did not generate pressures in the economy. After a period, the krone began to show wider fluctuations. The experience of the latter half of the 1990s demonstrated that monetary policy cannot fine-tune the exchange rate. Developments in the international financial markets led to greater fluctuations. And more fundamentally – exchange rate developments no longer sent signals back to wage formation and fiscal policy when labour market pressures mounted and incomes policy failed. High petroleum revenues, fiscal slippage and expectations of increased use of petroleum revenues contributed to this. The exchange rate was therefore no longer suitable as a nominal anchor.

As a result, Norges Bank gradually placed increasing emphasis on low and stable inflation. In 2001, the Norwegian authorities decided that monetary policy in Norway was to be oriented towards low and stable inflation through a numerical target for inflation, as was the case in many other countries later in the 1990s. As under the gold standard or the fixed exchange rate regimes, it is again our own choice of nominal anchor that determines the rate of inflation in Norway over time.

Future studies will probably find that inflation reverts to the inflation target over time. This is an indication that monetary policy is working and not that there is a natural inflation rate or a natural, self-regulating mechanism.

Inflation is still influenced by exogenous conditions. Increased globalisation, particularly China's growing importance in world trade, has in the past ten years for example resulted in low imported inflation measured in a foreign currency. At the same time, productivity growth has been high in many countries. These positive supply-side features have for a period contributed to a favourable development in the short-term trade-off between economic growth and inflation. As a result, many countries where inflation was a little too high at the outset have been able to bring down inflation at virtually no cost. In this respect, we can probably talk about some degree of endogeneity in inflation.[1] However, it is still up to the authorities through the orientation of monetary policy to choose whether inflation is to remain low and stable on a more permanent basis.

Over time, interest rate setting is aimed at keeping inflation close to target. In the process, interest rates will have short-term direct or indirect effects on a number of other economic variables. In the short to medium term, we weigh the aim of stability in output and employment on the one hand against stability in inflation on the other hand. This does not mean that this is one instrument and two separate objectives, but that we weigh the two objectives against each other.

It might be tempting to give weight to other objectives beyond the effects they might have on inflation. This would entail taking risks and making compromises with regard to the inflation target. There are in particular two other such objectives that have been singled out:

- sustaining employment at a high level,
- stabilise property prices and credit.

High demand for labour can encourage more people, who would otherwise have remained stuck in the welfare system, to enter the labour market. A period of high demand for labour may thus increase the effective labour force on a more permanent basis. Conversely, a period of low demand for labour can increase flows into benefit schemes and lead to a permanent reduction in the labour force. If the central bank were to attempt to use such labour market mechanisms, it would have contributed to amplifying demand for labour in an upturn through lower interest rates, while countering a fall in demand in a downturn by keeping interest rates low. Such a policy can be reminiscent of the low interest rate policy of the 1970s and the 1980s and will fairly rapidly be factored into economic agents' inflation expectations. Over time, such a monetary policy will lead to higher inflation, not higher employment.

Unemployment has declined markedly and is now very low. At the same time, wage earners' share of corporate earnings has declined. Historically, there has been a clearly negative relationship between unemployment and wage shares. Developments in recent years have paved the way for strong growth in employment, also today when the cyclical upturn is in a mature phase.

Developments in the past years must be seen against the background of the effects of a number of positive supply-side conditions on the Norwegian economy. High export prices and low import prices have led to a low rate of increase in consumer prices and an increase in household real wage income, but also to high corporate earnings and solid growth in employment.

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[1] See, inter alia, Rogoff, K. (2003), "Globalization and Global Disinflation," Federal Reserve Bank of Kansas City Economic Review, Fourth Quarter, 45-78.

At the same time, productivity growth has been unusually high. The effects of this are more complex. In the early phase of the recovery, this delayed a pick-up in employment growth, but also contributed to low inflation. Increased productivity means that demand can remain high without rising inflation. The interest rate was set at a low level to bring inflation back to target. At the same time, this also enabled enterprises to make use of a higher growth potential. Eventually this also resulted in higher demand for labour.

Improved efficiency is another factor that explains the high level of profitability in the Norwegian business sector. At the same time, there has been an ample supply of foreign labour, which has probably had a dampening impact on wage growth. In addition, increased globalisation in general may have broadened the scope for Norwegian enterprises to relocate production to other countries if labour costs become too high. Such a development probably places some restraint on wage demands among workers in sectors where enterprises have such opportunities.

Is it possible to sustain the combination of low employment and low wage shares?

First, it partly depends on whether the positive supply-side conditions are sustained. There is probably symmetry here. Should the terms of trade deteriorate, productivity growth slacken and foreign workers return to their home country, the wage share will increase, profits fall and unemployment increase.

Second, even without a reversal profits may fall and unemployment rise. The implications of this will depend on how far businesses, in their search for qualified labour, will stretch themselves in bidding up wages. This will also depend on how employees react and their adaptability as well as developments in benefit schemes and other social schemes.

Long periods of rapidly rising property prices and debt can be a source of future instability in the real economy. Should monetary policy give weight to developments in property and credit markets beyond their impact on inflation?

Low interest rates have fuelled the rise in property prices and debt accumulation. Large volumes of lending are being used to finance consumption and investment, among other things in housing. At the same time, the many positive supply-side conditions – with strong growth in real income in the household sector and in private and public enterprises – have probably made a more direct contribution to the sharp rise in house prices and debt accumulation. When capital – and increasingly labour as well – flows more freely across borders, prices for these factors of production will to a greater extent reflect global growth and competitive conditions. On the other hand, the price of fixed capital, such as property, will be influenced by expected future income in different countries.

Even if construction costs have increased somewhat – and accelerated to some extent this year – it is primarily the price of land that has increased in Norway. Land is valued at a considerably higher level, while the price of the dwelling itself has not increased to the same extent.

Norway is now reaping the gains of the strong expansion of Asian countries and changes in the division of labour between countries. The improvement in Norway's term of trade, coupled with high growth in productivity, has delivered very strong, positive income shocks to the Norwegian economy. It follows that land prices will rise at a faster pace than other prices. This is a real economic effect, which monetary policy cannot eliminate. In addition, both house prices and debt accumulation are affected by structural changes in capital and credit markets and by changes in lending willingness, demographic trends and migration patterns.

It is difficult to determine to what extent house prices have risen as a result of structural changes and wealth gains and to what extent house prices have been pushed up by expectations of a continued high rise in house prices. Developments since the beginning of the 1990s may have engendered expectations that house prices will only continue to rise. This may have increased house purchases for pure investment purposes and induced younger buyers to enter the housing market earlier than otherwise. The pronounced fall in

saving over the past few years indicates that households take greater chances. The housing market may have been in a state of euphoria.

We can influence house prices through the interest rate, but if the interest rate had been increased to a markedly higher level in order to curb house price inflation, the krone would have been significantly stronger and CPI inflation significantly lower. Yet it is low and stable inflation that is the operational target of monetary policy.

There is symmetry here as well. Should house prices fall sharply, we will in interest rate setting concentrate on dampening the effects on inflation and overall activity in the economy.

Nevertheless, through our communication, we have sought to take account of the possibility that debt and asset price developments may be a potential source of subsequent instability, but it is neither our ambition nor our conviction that monetary policy can control developments in these variables. Moreover, we have stated in clear terms that the interest rate has been unusually low and that it would have to increase gradually to a more normal level. Since 2005, this has been reflected in our own interest rate forecast. Since inflation expectations have been firmly anchored, we have also been able to increase the interest rate gradually even though actual inflation has been below target. The time horizon for reaching the target in our forecasts has been stretched.

Let me now turn to economic models and their use.

Even though monetary policy cannot operate with objectives for developments in the labour market, asset prices or debt accumulation, these and other economic variables can provide information about future price developments, which is included in the basis for interest rate setting. In order to glean as much information as possible about future inflation and to gain insight into how the interest rate is affecting the economy, Norges Bank – like other central banks – uses economic models as an analytical tool. What makes a good model depends on the intended purpose of the model. The models' purpose must thus be given decisive weight in the choice and design of modelling tools.

The model must provide some indication of how the interest rate is working. We assume that Norway with its own national currency can determine inflation over time. One of our model requirements is therefore that monetary policy anchors inflation expectations. We must also take into account that economic agents look ahead when they make decisions concerning consumption, investment, wages and prices and base these decisions not only on today's economic policy, but also their expectations as to future policy. In addition, we build on theory and experience of the 1970s and 1980s indicating that in the medium and long term unemployment could not be reduced if we were only willing to accept somewhat higher inflation.

At a given point in time, we can on the basis of current statistics and anecdotal information provide some indication of how the economy has evolved up to a few months ago. But even this basis is uncertain. Statistics are prone to substantial revisions and data from different sources can provide different profiles for the same variable. For example, financial market statistics and national accounts statistics now show, as on many previous occasions, different profiles for household net lending.

In order to obtain a more accurate picture of today’s situation and developments over the next few quarters, we rely to a large extent on various statistical forecasting techniques. Such techniques and models can capture time series properties in data and correlations that in many cases feature a fairly high degree of accuracy without the model relationships following from economic theory. Norges Bank now devotes considerable resources to improving and developing our model apparatus for such “nowcasting”. We engage in extensive cooperation with researchers in Norway and abroad and with other central banks. Results and documentation of this work will be published in coming monetary policy reports and articles by researchers at Norges Bank.

In order to forecast somewhat further ahead, we must gain more insight into the forces at work and how they are affecting the economy. Statistical forecasting models, or models largely based on previous experiences, will be of limited help. For example, previous experience provides limited guidance in explaining the driving forces behind this cyclical upturn because of the many differences in relation to earlier periods.

A solid basis in economic theory is required to shed light on causal relationships. Norges Bank's work on models in recent years has aimed at constructing a theoretical macro model that can enhance our understanding of economic developments. By looking at households' and firms' behaviour, we can analyse the effect of changes of a more structural nature on the economy. In the model that has been given the name NEMO (Norwegian Economy Model), developments in the Norwegian economy can be explained among other things by changes in business technology, market structure in the product and labour market, household preferences with regard to work and leisure and monetary policy. A model will never be able to provide an exhaustive description of reality, but a good macro model can and should be a framework for ratiocination. In this way, the model plays an important role in the analytical basis for interest rate setting.

At the same time, there are many questions and conditions about which we are uncertain and where models cannot help us. For example, we do not know whether the high rate of growth in productivity is a permanent phenomenon or whether it will gradually fall back. We have little precise knowledge about what is driving productivity growth. It may be that we are seeing a period of equilibrium with higher employment, lower unemployment and lower wage shares than earlier. But we are uncertain how long this period will last.

Even if we use different models and anecdotal information, we cannot escape the need for a healthy portion of qualified judgement when making forecasts and setting the interest rate. My experience from as far back as the 1970s is that in the event of major disturbances and structural changes in the economy, one essentially has to rely on general insights about the functioning of the economy. Models that rely heavily on regressions easily break down. As Mervyn King, the Governor of the Bank of England, stated explicitly to the point[2]:

"..that's what we have to do with every variable that we look at, work out why it's growing faster or slower than it was before and not to use some rather mindless regression.…The secret of good policy is to try and think trough what are the economics of the shocks hitting the economy at present. That in a nutshell is my philosophy of how you should do policy. Don't rely on regressions from the past."

Having discussed the role of monetary policy and rather complex economic models, I will move on to the final theme which may seem more prosaic, notably measuring current inflation. In general, the production level of economic statistics is probably very high in Norway, as shown in international comparisons by the IMF among others. It would also seem that it is very cost-effective.

Improvements are frequently made to the methodology and the compilation of CPI statistics. In August this year, the indices for electricity, books and air travel were revised. Last year, Statistics Norway changed the method for the treatment of rents in the housing market, and the previous year the food index was revised.

A general view is that changes in statistics production should be well documented and should place particular emphasis on identifying the effects such changes might have on measured inflation. Furthermore, the statistics should be comparable, but not necessarily

[2] See Mervyn King, Governor, Bank of England on the occasion of the tenth anniversary of the central bank's independence: (see Financial Times, Thursday, 3 May).

identical, across countries. It is positive that others are interested in and debate statistics production.[3]

With an inflation target for monetary policy, measuring inflation is of particular importance. CPI inflation is used as a reference in the wage negotiations each spring. Many financial contracts are linked to CPI inflation. A number of international studies have concluded that there are considerable measurement errors in official consumer price indices.[4] The main criticism is that official indices are not sufficiently adjusted for changes in quality and that they do not capture consumers' possibilities for shifting consumption away from the goods that show the fastest rise in prices. Many of the studies have concluded that consumer price indices overestimate the actual rise in prices. That is one reason why inflation-targeting countries set the target higher than zero. But there are also studies that point out that consumer price indices can underestimate the rate of increase for some components.

Against this backdrop, I will now discuss two particular notional concepts used in estimating the consumer price index in Norway to illustrate the uncertainty; how to impute rent for owner-occupied dwellings and how to measure clothing prices.

A common method for imputing rent for owner-occupied housing is to apply the rent for a dwelling of an equivalent type, which is often referred to as rental equivalence. In addition to Norway, statistical agencies in Denmark, the US and Germany, among others, use imputed rent to calculate owner occupants' housing costs in the consumer price index.

The consumer price index is designed to measure price developments for a stream of goods and services. It is the service the dwelling provides that the consumer price index is to capture. House prices are more like asset prices, such as share prices or bond prices. It may nevertheless be interesting to look at the relationship between house price and rents, at least in theory.

Let us assume that the rental market and home ownership market are in equilibrium. In this case, home rental prices will reflect the cost of owning a home.

What is included in the cost of owning a dwelling? The cost of acquiring a home must obviously be included and the financing cost is determined by the interest rate. Norwegian households primarily finance home purchases with floating-rate mortgages. Long-term interest rates are still important because they provide information about developments in short-term interest rates over time. The long-term interest rate is therefore the most relevant rate. Housing depreciation also has a bearing on user costs. Moreover, the expected increase in the price of a dwelling represents a gain that must be deducted from costs. If we now add and subtract expectations about the general rise in prices in the economy, we are left with the following four variables that have a bearing on user costs: house prices, long-term real interest rates, capital depreciation and expected real rise in house prices.[5]

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[3] As did, for example, Knut Anton Mork, chief economist in Handelsbanken Norge, in the Norwegian financial daily Finansavisen on 25 August.

[4] See for example Lebow, David E. and Jeremy B. Rudd (2003): "Measurement Error in the Consumer Price Index: Where Do We Stand?" Journal of Economic Literature, vol. XLI, pages 159-201, or Boskin, Michael J., Ellen R. Dulberger, Robert J. Gordon, Zvi Griliches og Dale Jorgenson (1996): "Toward A More Accurate Measure Of The Cost Of Living." Final report to the Senate Finance Committee, Advisory Commission to Study the Consumer Price Index, 4 December 1996 or Gordon, R. J. (2005): Apparel price 1914-93 and the Hulten/Brueghel paradox, NBER Working Paper 11548.

[5] For purposes of simplification, capital gains tax of 28 per cent is disregarded. Interest rate expenses are tax deductible, while capital gains on the sale of a dwelling are not liable to tax if the dwelling has been owned for more than 12 months and the dwelling has been occupied by the owner for at least 12 of the 24 months prior to sale. Any losses are tax deductible only if any capital gains are liable to tax.

Let us assume that capital depreciation is fairly constant. We can then expect parallel movements in house prices and rents and in user costs, if expectations concerning long-term interest rates and real house price inflation are stable.

But actual house prices have doubled since the latter half of the 1990s in relation to the rise in house rents in the consumer price index. Between 50 and 70 per cent of this change is probably ascribable to a fall in the expected level of real interest rates. Viewed over the past 5-10 years, the expectation as to what a neutral real interest rate is may have fallen by close to 2 percentage points. This may be because expectations concerning future inflation in our economy and the world economy have become far more stable, with a smaller inflation premium on the real interest rate, and because we are in a period with unusually ample flows of savings from Asian and oil-producing countries, which have driven down interest rates.

At the same time, house price inflation expectations have been high in recent years. Such expectations will push down user costs, and hence rents.

As a result, we must expect some difference between developments in house rents and house prices in periods. Rents can lag behind to a fairly large extent during an upturn, and only pick up when house price inflation expectations stagnate or fall.

In Norway, the number of rental properties is small in relation to the total stock of housing. The rental market in outlying areas, which now indirectly has a larger weight in the CPI, is thin. Hence, the rental market does not necessarily provide a representative expression of owner-occupants' housing costs.

It is difficult to estimate the cost of owner-occupied housing. The harmonised index of consumer prices for the euro area, which the ECB uses as its measure of inflation, has not included owner-occupied housing so far. Nor do many of the national consumer price indices in the EU include this component.

This is clearly not a good solution because housing costs normally account for a large portion of households' total cost of living. Eurostat, the European statistical agency, has therefore initiated a pilot study where they use the net acquisition approach.[6] This approach is different from our method in that the treatment of purchasing a house for owner occupation is the same as for all other goods in the consumer price index. Only the household sector's net acquisition of dwellings is included. In other words, purchases of dwellings bought from other private households are excluded. In addition, expenditures related to major repairs and conversions of a dwelling, and other expenditures such as estate agent fees, indirect taxes and insurance are also included in the acquisition approach. Land is treated as an asset and excluded.

If European countries switch to including housing costs estimated using the acquisition approach, it will be natural for Norway to publish a comparable index for consumer prices, cf. figures based on Eurostat's current method are also presented in Norway. In practice, housing costs for owner occupants based on the acquisition approach will move closely in line with construction and maintenance costs. They would probably be given a somewhat lower weight in an overall index over time than imputed rent in the CPI in Norway today.

The chart shows developments in the construction cost index and developments in imputed rent in the CPI, which is based on developments in the rental market. The two indices have risen at about the same rate in recent years, but have diverged since summer 2006. Higher prices for both labour and building materials have pushed up the rise in construction costs. In August 2007, the 12-month rate of increase in construction costs was 7.9 per cent, while the 12-month rate of increase in imputed rent was 1.5 per cent.

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[6] See Eiglsperger, M. (2006) The treatment of owner-occupied housing in the harmonised index of consumer prices. IFC Bulletin 24, 68-79.

A change from imputed rent to the acquisition approach may change the path for the CPI over the business cycle. While rents probably react with a lag, movements in the rate of increase in construction costs will be more coincident with cyclical developments.

Prices for clothing can also be difficult to calculate. As measured by the CPI, clothing prices in Norway have fallen markedly over the past few years. This may reflect the removal of import quotas, reduced tariff rates, a shift in imports towards Chinese goods and improved efficiency in retail industry. These changes have also had an impact in other countries. Clothing price developments in Norway have nonetheless followed a different path compared with Sweden and other European countries, with the exception of the UK.

Trade in clothing in Sweden and Norway has many features in common. We have many of the same shop chains, and trade in both countries is increasingly concentrated on chain stores. Even though Norway has gone somewhat further in removing trade barriers, and even though the price level in Norway was initially relatively high, the question may still be raised as to whether there is reason to expect such wide differences in clothing prices in the two countries year after year.

It is difficult to measure changes in clothing price. Although a clothing article often has a high introductory price, the price falls after a relatively short period. Sales activity is high. The range of goods changes frequently. A large share of the assortment in a shop is typically replaced in the course of 3-4 months. Changes in quality are difficult to define and identify.

In Norway, it is the shops themselves that report clothing prices and changes in quality, which are used as a basis for the clothing price index in the CPI. In Sweden and many other countries (Denmark, Ireland, the UK), price inspectors perform this task. In Sweden, statistical methods are also used to calculate changes in quality.

It may be that some of the difference in the rise in clothing prices in the two countries is due to the way prices are measured and interpreted rather than to actual price developments. This is also supported by Eurostat's price level survey.

Eurostat compares different countries' prices for identical goods and finds that the level of clothing prices in Norway has in fact risen somewhat compared with clothing prices in Sweden in recent years. According to the CPI in the two countries, clothing prices in Norway have fallen by 30 per cent relative to clothing prices in Sweden in the period 1999-2005. The goods measured in Eurostat's survey are probably not representative of the basket of consumer goods in Norway. The survey nonetheless illustrates the uncertainty surrounding actual developments in clothing prices.

Allow me to conclude.

Inflation in a country with its own national currency is not something that just drifts in with the wind from abroad. It is monetary policy that over time determines the nominal path. In the short and medium term, we can weigh the variability in inflation against the variability in output and employment. Nevertheless, the overriding objective is to anchor expectations of low and stable inflation. We must never lose sight of this.

There is considerable uncertainty surrounding the economic situation and economic developments ahead. Statistical forecasting techniques and macroeconomic models can help us gain further insights into and a better understanding of the driving forces, but can obviously not eliminate risk and uncertainty.

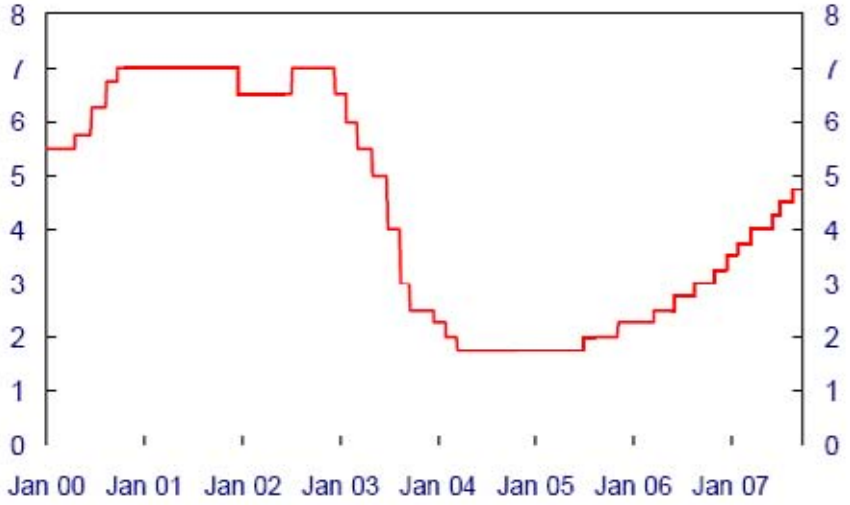
Measuring inflation is no trivial matter and should, like monetary policy, be reviewed and discussed and be open and transparent. Measured as a ten-year average, inflation is now 2.0 per cent. Given the uncertainty surrounding the economic situation, the projections and the measurement of inflation, this is quite close to the target of 2.5 per cent.

Thank you for your attention.

Norges Bank

Key policy rate

Per cent



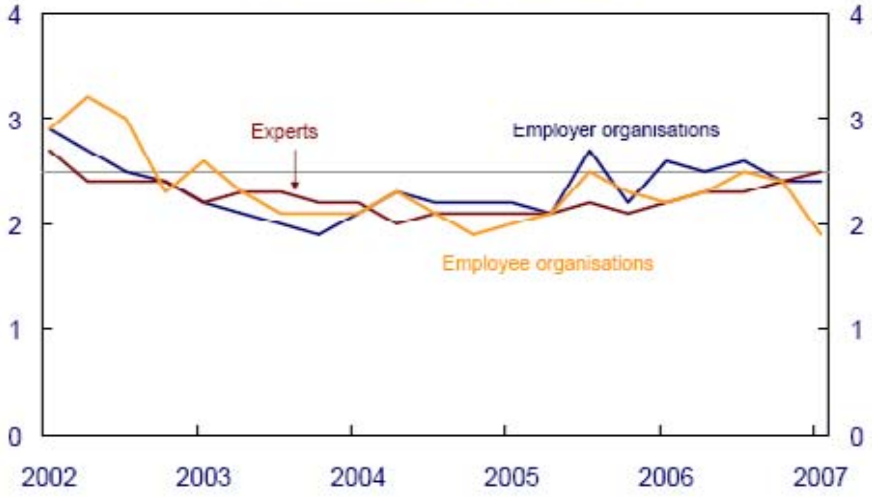
Source: Norges Bank 2

Norges Bank

Expected consumer price inflation 2 years ahead

Employer/employee organisations and experts[1)]

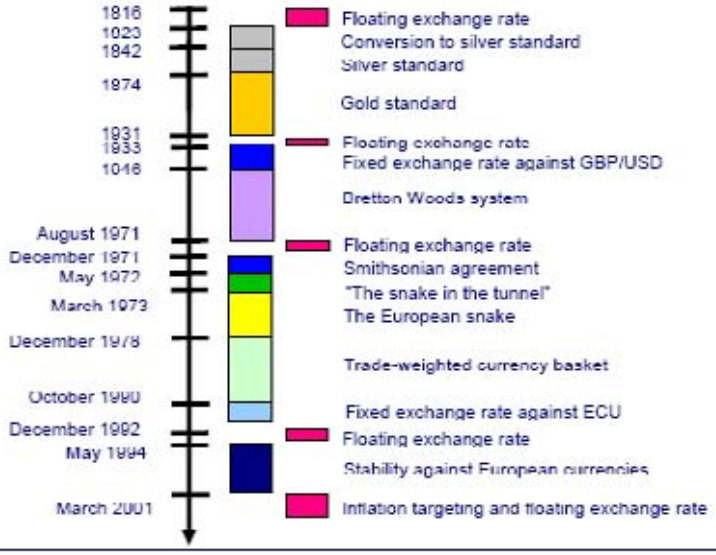
Per cent. 2002 Q2 – 2007 Q2



[1)] Employees in financial industry, macroanalysts and academics.

Source: TNS Gallup 3

Monetary policy regimes i Norway since 1816



4

CPI in Norway, Germany and US

12-month change. Per cent. January 1980 – August 2007

Sources: OECD and Statistics Norway

5

Wage share[1)] and registered unemployment

Per cent. 1985 – 2006

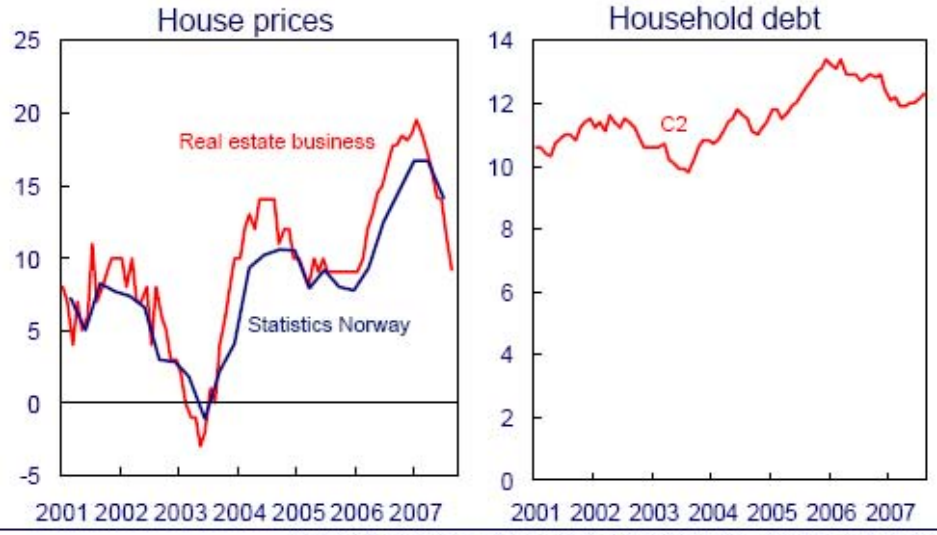
1) Labour costs as share of factor income. Market-oriented enterprises in mainland Norway.

Sources: Statistics Norway, Norwegian Labour and Welfare Organisation (NAV) and Norges Bank

House prices and household debt

Change on same month/quarter previous year. Per cent

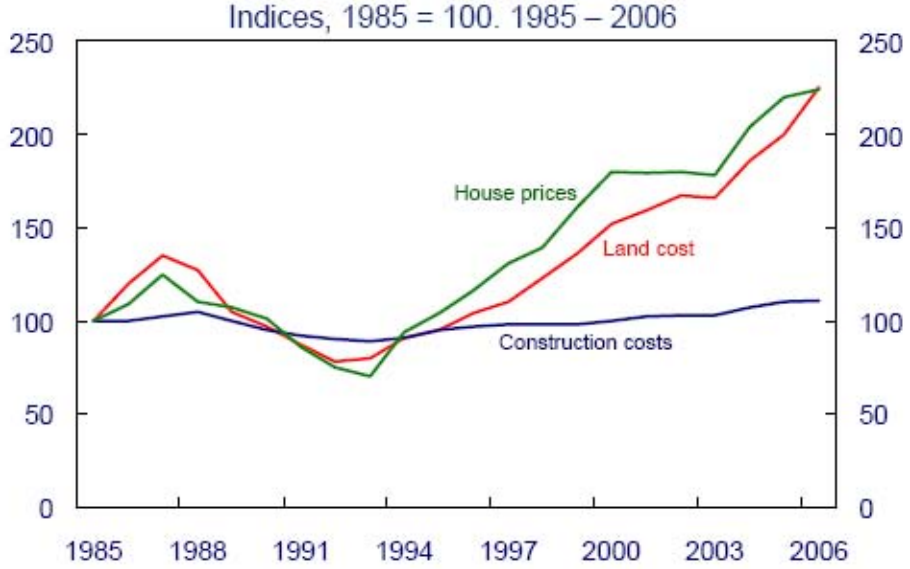
January 2001 – August 2007



Sources: Norwegian Association of Real Estate Agents, Association of Real Estate Agency Firms, Finn.no, ECON, Statistics Norway and Norges Bank

Real house prices, construction costs and land costs[1)]

Indices, 1985 = 100. 1985 – 2006

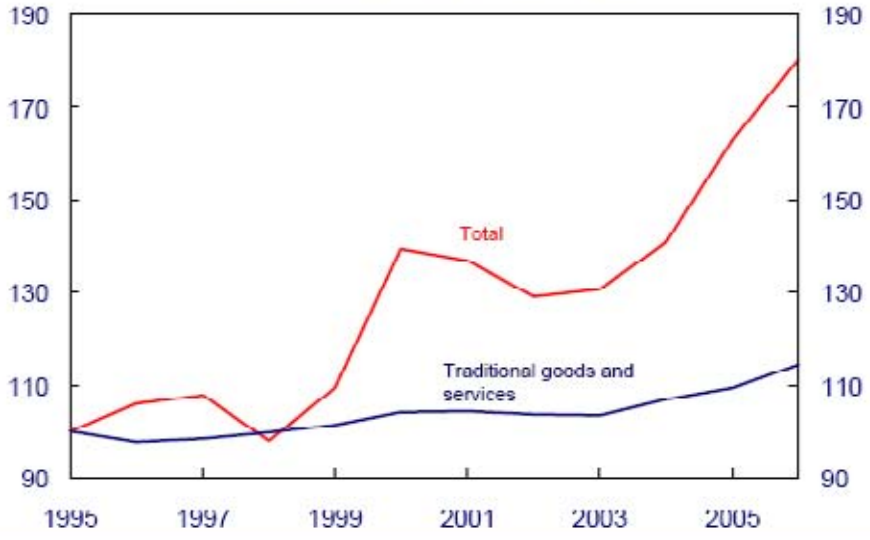


1) The series is based on Statistics Norway's transfer of properties index and includes unbuilt property for free market sale. The series is not adjusted for location or site development.

Sources: Norwegian Association of Real Estate Agents, Association of Real Estate Agency Firms, Finn.no, ECON, Statistics Norway and Norges Bank

Terms of trade

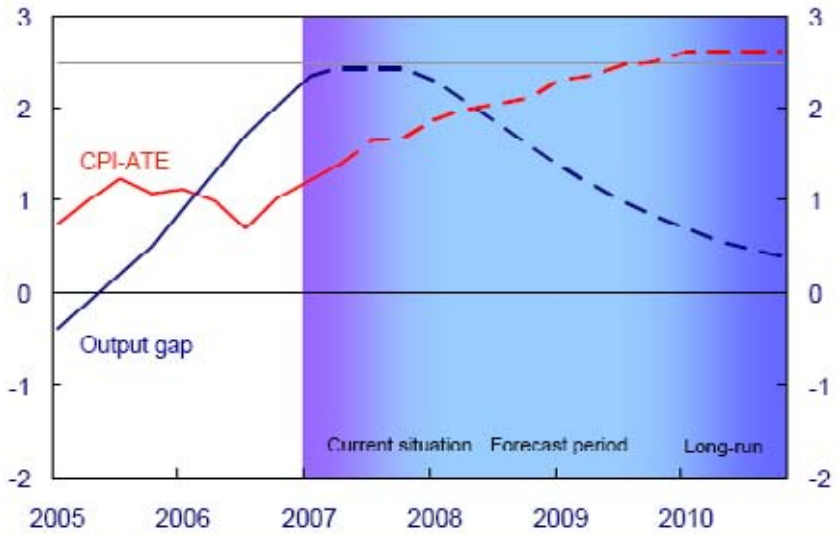
Index, 1995 = 100. 1995 – 2006



Sources: Statistics Norway and Norges Bank

9

Different time horizons – different methods



Sources: Statistics Norway and Norges Bank

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"..that's what we have to do with every variable that we look at, work out why it's growing faster or slower than it was before and not to use some rather mindless regression....The secret of good policy is to try and think trough what are the economics of the shocks hitting the economy at present. That in a nutshell is my philosophy of how you should do policy. Don't rely on regressions from the past." Mervin King

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The relation between house prices and user cost

(1) rent = user cost

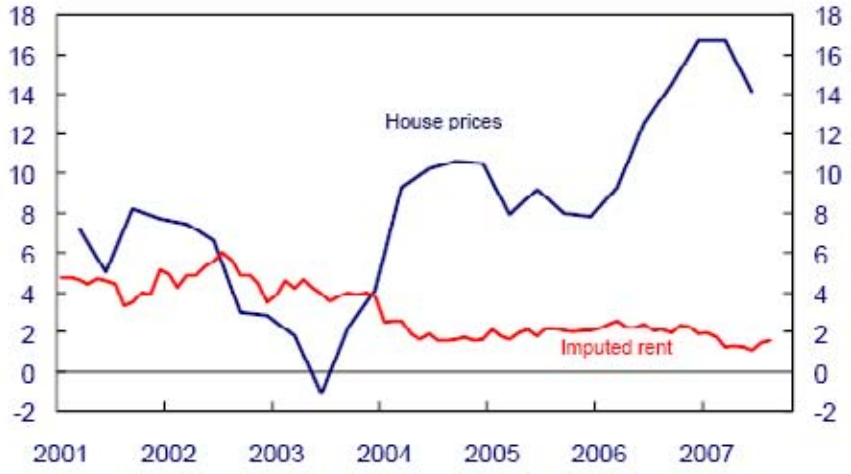
(2) User cost = house price x $[(i + \delta - \pi^{e}_{house}]$

= house price x $[(i - \pi^{e}) + \delta - (\pi^{e}_{house} - \pi^{e})$

Real rate; Depreciation; Expected real house price inflation

House prices and imputed rent

Change on same month/quarter previous year. Per cent
January 2001 – August 2007



Source: Statistics Norway

Construction cost index and imputed rent

12-month change. Per cent
January 2001 – August 2007

Source: Statistics Norway

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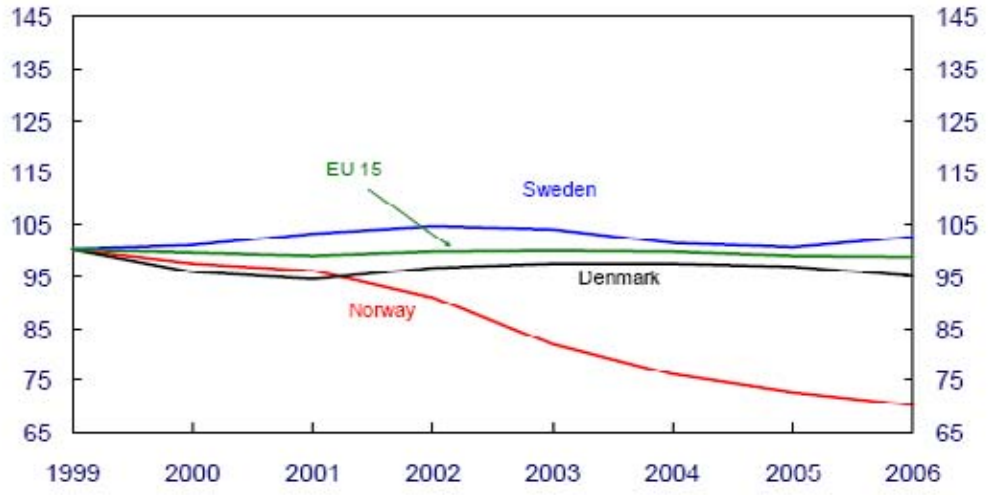
Clothing and footwear in the CPI

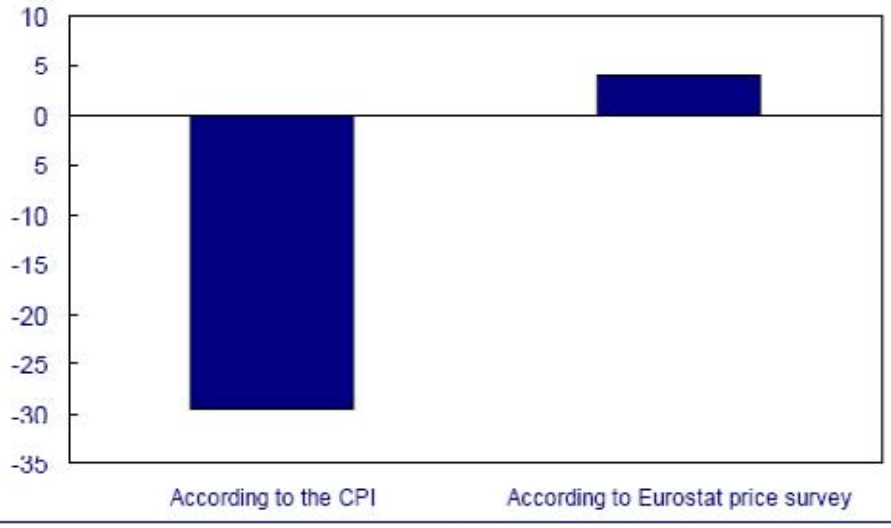
EU15, Norway, Sweden and Denmark
Index, 1999 = 100. 1999 – 2006



Sources: Statistics Norway and Eurostat 13

Change in relative clothing prices in Norway vs Sweden

Per cent. 1999 – 2005



Source: Statistics Norway, Eurostat and Norges Bank 16