

Evaluation of Norges Bank's projections for 2008

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Inflation in 2008 was significantly higher than Norges Bank projected in autumn 2007. This was to a large extent due to an unexpected slowdown in productivity growth and to the rise in prices for commodities and manufactured goods abroad being unexpectedly high through to last autumn. In addition, capacity utilisation was higher than expected up until the summer. The global financial crisis led to weaker exports and private demand in mainland Norway than projected. Capacity utilisation was therefore lower than expected at the end of the year. Norges Bank's projections of developments in 2008 were broadly in line with those of other forecasters.

1. Introduction

Norges Bank's projections of economic developments are an important part of the basis for the conduct of monetary policy. We therefore strive continuously to improve the basis for these projections. An important element in this work is evaluating projections in the light of subsequently observed developments in the Norwegian economy. These evaluations can improve our insight into the workings of the economy and any structural changes. We can use this insight when preparing forecasts and when improving our forecasting tools.

Our projections are based on an overall assessment of the economic situation and our understanding of how the economy works. They are liable to several types of uncertainty, which can result in deviations between projected and subsequently observed developments:

- *Uncertainty about the current situation.* Our information about the state of the global and Norwegian economy is incomplete. This uncertainty reflects both the time lag before many important data are published and the difficulty of distinguishing between genuinely new information and noise. Data for output and demand are often revised significantly in retrospect.
- *Uncertainty about the functioning of the economy.* Our understanding of how the economy works is based on judgment, theory, empirical analyses and experience of previous business cycles. This understanding is uncertain, and mechanisms in the economy can change in ways that are difficult to foresee.
- *Uncertainty about the nature and significance of potential shocks to the economy.* The economy may be exposed to shocks that are impossible or very difficult to predict. In addition, it may be difficult to

gauge the impact of these shocks once they have occurred. This applies particularly if the shocks result in major shifts in corporate and household expectations. Examples of such shocks include the terrorist attacks of September 2001 and the financial crisis that erupted in autumn 2008.

This article evaluates the projections for 2008 published in the Bank's *Monetary Policy Report* in 2007 and 2008, with the main emphasis on the projections in *Monetary Policy Report 3/07*. The article starts with a brief look at interest rates and the interest rate path (section 2.1) before analysing forecast errors for prices (section 2.2), output and demand (section 2.3) and the labour market (section 2.4). The evaluation also covers projections of other forecasters published around the same time. A comparison of this kind can help to shed light on whether our understanding of the current situation, the workings of the economy and the impact of shocks was better or worse than that of other forecasters. Finally, the appendix compares Norges Bank's projections with those of other forecasters over the past five years.

2. Actual and projected developments in 2008

Table 1 shows the projections for 2008 published in the *Monetary Policy Report* in 2007 and 2008.² The final column in the table shows the actual outcome according to the statistics available at the end of the first quarter of 2009. The figures for the output gap, trading partners' GDP and external price impulses in that column are estimates from *Monetary Policy Report 1/09*. Both these

¹ I would like to thank Ingvild Svendsen, Kåre Hagelund, Kristine Høegh-Omdal and Per Espen Lilleås for valuable comments and suggestions. Thanks also to Marie Norum Lerbak and Agnes Marie Simensen for help with producing the charts.

² Revisions of the projections from report to report are explained in a separate box in each report.

Table 1 Projections of key macroeconomic variables for 2008. From Monetary Policy Report 1/07 to Monetary Policy Report 3/08. Percentage change from 2007 unless otherwise stated

	MPR 1/07	MPR 2/07	MPR 3/07	MPR 1/08	MPR 2/08	MPR 3/08	Preliminary accounts
CPI	2½	3	3¼	3	4	3¾	3.8
CPI-ATE	2	2	1¾	2¼	2½	2½	2.6
Annual wage growth	5¼	5½	5¾	6	6	6	6.0
GDP	3¼	3½	3¾	3	2¾	2	2.0
GDP, mainland Norway	2¼	2½	2¾	3½	3¼	2½	2.4
Output gap, mainland Norway (level) ¹⁾	1¾	2	2¼	2½	2½	2¼	2
Employment, persons	¼	1	1¼	2¼	2¾	2¾	3.2
Labour force, LFS	½	1	1¼	2¼	2¾	2¾	3.4
LFS unemployment rate (level)	3	2¾	2½	2½	2½	2½	2.6
Mainland demand	2¾	3	3¼	3¾	3¼	2¼	2.1
- Private consumption	3	3¼	3½	3½	2¾	1½	1.5
- Public consumption	3	3	2¾	2¾	3¼	3¾	3.7
- Fixed investment, mainland Norway	1¼	2¾	3¼	5¼	4¾	2¼	1.9
Petroleum investment	0	0	7½	7½	7½	7½	7.1
Mainland exports	3½	5¼	4	5	5	5½	4.3
Imports	3¼	4½	4¾	5¼	5¼	4	4.2
Key policy rate (level)	5¼	5¾	5¼	5½	5½	5¼	5.3
Import-weighted exchange rate (I-44) (level)	92¼	92	88¼	87	87½	90¼	90.8
GDP, trading partners ¹⁾	2¾	2¾	2½	2	2¼	1¾	0.9
External price impulses ^{1) 2)}	-¼	0	-¼	0	½	¾	0.5
Oil price, USD/bbl (level)	66	73	84	101	122	100	97

¹⁾ Norges Bank's estimate.

²⁾ Indicator of external price impulses for imported consumer goods measured in foreign currency.

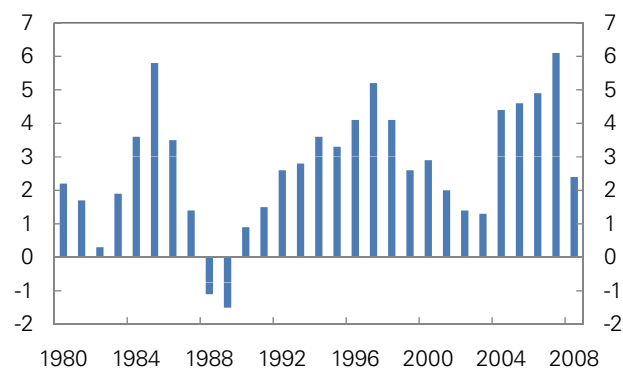
figures and the figures in the final column from the national accounts are preliminary.

2.1 Interest rates and the interest rate path

Activity in the Norwegian economy showed unusually strong growth from 2003 to 2007 (see Chart 1). Low interest rates, high income growth, strong economic growth abroad and improved terms of trade led to marked increases in exports, investment and private consumption. Falling prices for imported goods and strong growth in productivity and labour immigration enabled the Norwegian economy to grow rapidly for several years without inflation picking up significantly. The key policy rate was raised gradually from summer 2005, which helped to curb growth in demand.

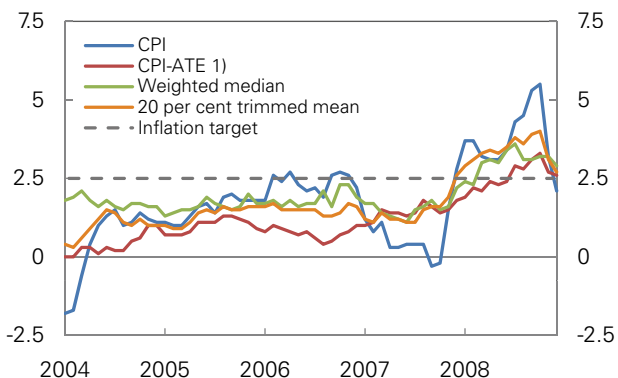
In *Monetary Policy Report 3/07*, we estimated that capacity utilisation had peaked and would fall gradually

Chart 1 Mainland GDP. Annual volume growth. Per cent. 1980 – 2008



Sources: Statistics Norway and Norges Bank

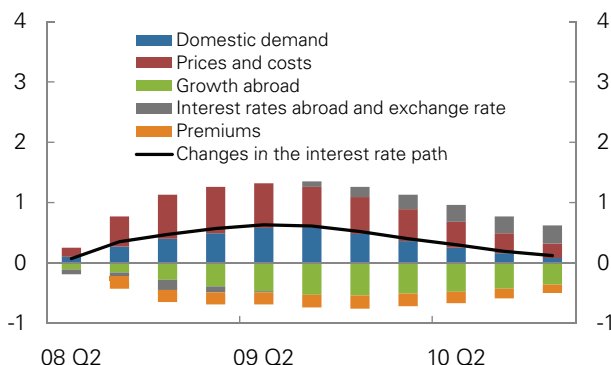
Chart 2 Consumer prices. 12-month change. Per cent. January 2004 – December 2008



¹⁾ CPI adjusted for tax changes and excluding energy products.

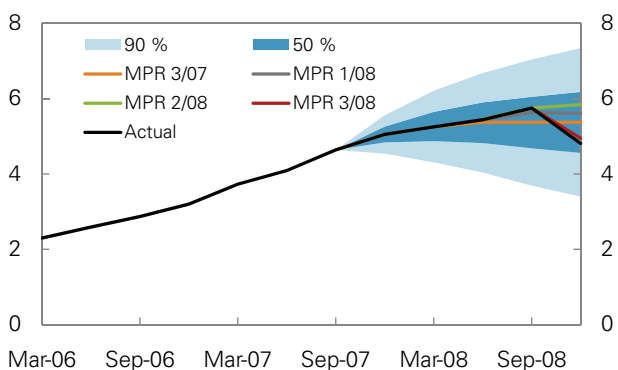
Sources: Statistics Norway and Norges Bank

Chart 3 Factors behind changes in the interest rate path from MPR 3/07 to MPR 2/08 (1st half of 2008). Percentage points. 2008 Q2 – 2010 Q4



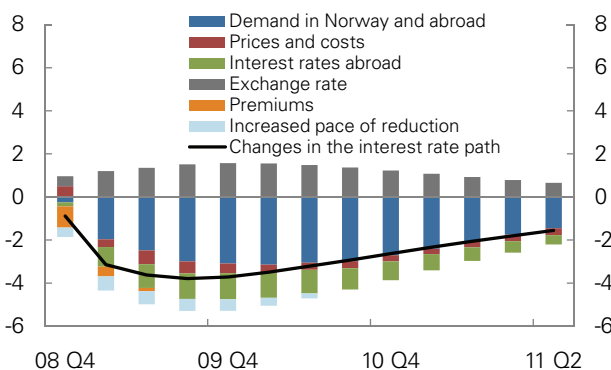
Source: Norges Bank

Chart 4 Key policy rate. Projections from different reports and actual developments. Fan chart from MPR 3/07. Per cent. 2006 Q1 – 2008 Q4



Source: Norges Bank

Chart 5 Factors behind changes in the interest rate path from MPR 2/08 to the monetary policy meeting in December 2008 (2nd half of 2008). Percentage points. 2008 Q4 – 2011 Q4



Source: Norges Bank

towards a normal level through to the end of 2010. Underlying inflation had increased during the autumn (see Chart 2). We projected that the annual rise in the consumer price index adjusted for tax changes and excluding energy products (CPI-ATE) would pick up gradually towards 2½ per cent in 2010. The interest rate path indicated that the key policy rate would be somewhat above 5 per cent for the next three years.

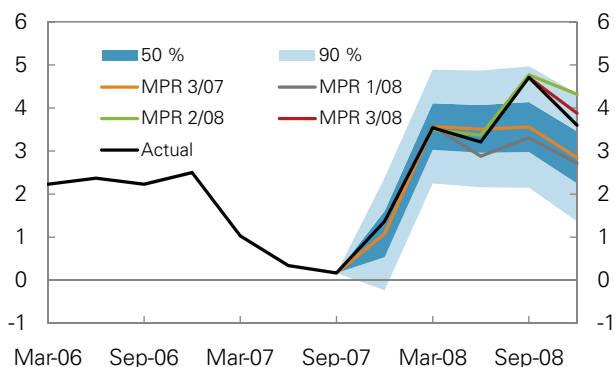
Underlying inflation and activity in the mainland economy were higher towards the end of 2007 and through to the summer of 2008 than projected in *Monetary Policy Report 3/07*. The interest rate path was therefore revised up in *Monetary Policy Report 1/08* and *2/08* (see Chart 3).³ In addition, the key policy rate at the end of the first half of 2008 was slightly higher than assumed (see Chart 4).

The global economy entered a sharp downturn in autumn 2008. The outlook for the Norwegian economy deteriorated, and there were prospects that inflation would be weaker than previously projected. This led to a 1 percentage point reduction in the key policy rate during the course of October and a 1.75 percentage point reduction at the monetary policy meeting on 17 December. The interest rate path was revised down significantly in both *Monetary Policy Report 3/08* and in new projections that were released following the monetary policy meeting on 17 December (see Chart 5).⁴ Monetary policy in 2008 is discussed further in Norges Bank's *Annual Report* for 2008, in explanatory boxes in the *Monetary Policy Report* during the year, and in the document "New interest rate projections" published on 17 December 2008.

³ The calculations in Charts 3 and 5 were made on the basis of a small calibrated model for the Norwegian economy (see *Staff Memo 2004/3*).

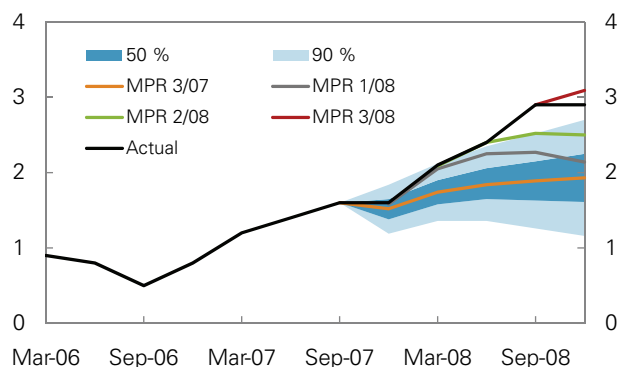
⁴ The contribution from "increased pace of reduction" in Chart 5 represents the desire to pursue a more active monetary policy than usual in order to reduce uncertainty and forestall a particularly unfavourable outcome for the economy.

Chart 6 CPI. Projections from different reports and actual developments. Fan chart from MPR 3/07. Four-quarter growth. Per cent. 2006 Q1 – 2008 Q4



Sources: Statistics Norway and Norges Bank

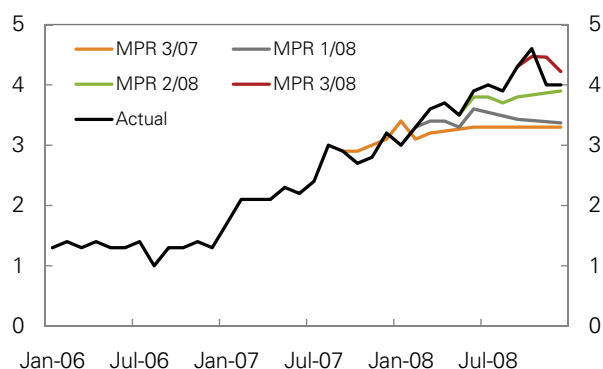
Chart 7 CPI-ATE¹⁾. Projections from different reports and actual developments. Fan chart from MPR 3/07. Four-quarter growth. Per cent. 2006 Q1 – 2008 Q4



¹⁾ CPI adjusted for tax changes and excluding energy products.

Sources: Statistics Norway and Norges Bank

Chart 8 Domestically produced goods and services in CPI-ATE^{1) 2)}. Projections from different reports and actual developments. 12-month change. Per cent. January 2006 – December 2008

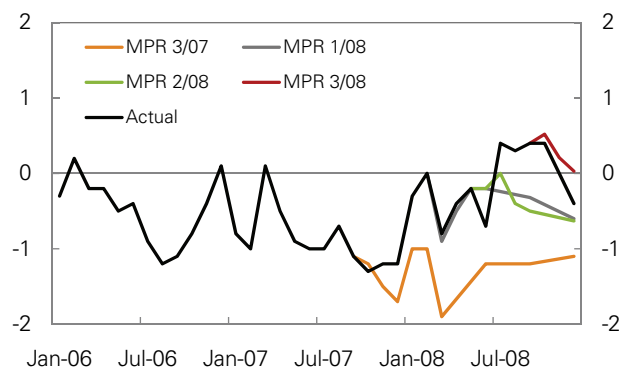


¹⁾ CPI adjusted for tax changes and excluding energy products.

²⁾ Norges Bank's estimates

Sources: Statistics Norway and Norges Bank

Chart 9 Imported consumer goods in CPI-ATE¹⁾. Projections from different reports and actual developments. 12-month change. Per cent. January 2006 – December 2008



¹⁾ CPI adjusted for tax changes and excluding energy products.

Sources: Statistics Norway and Norges Bank

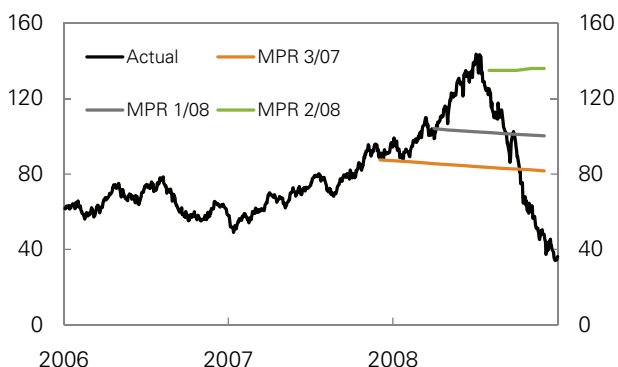
2.2 Prices

In *Monetary Policy Report 3/07*, Norges Bank projected that annual CPI-ATE inflation would move up from 1½ per cent in 2007 to 1¾ per cent in 2008. Norges Bank forecast that the rise in prices of domestically produced goods and services would pick up due to higher cost inflation and the increase in capacity utilisation in 2007. Prices for imported consumer goods were also expected to be affected by the increased price pressure in the Norwegian economy. However, we expected international prices for Norway's imported consumer goods to be largely unchanged from 2007 to 2008. The krone had also appreciated markedly during 2007. Against this background, Norges Bank projected that prices for imported goods in the CPI-ATE would continue to fall. Forward electricity prices indicated that electricity prices would rise signifi-

cantly in the coming months. We also expected fuel prices to grow strongly due to a surge in oil prices. Norges Bank forecast that the consumer price index (CPI) would grow by 3¼ per cent from 2007 to 2008.

Both the CPI and the CPI-ATE rose further in 2008 than projected in *Monetary Policy Report 3/07* (see Table 1 and Charts 6 and 7). The annual rate of CPI-ATE inflation climbed from 1.4 per cent in 2007 to 2.6 per cent in 2008. The price growth for domestically produced goods and services increased significantly and more than expected (see Chart 8). Prices for imported consumer goods were more or less unchanged from 2007 to 2008, whereas we had projected a decrease (see Chart 9). The annual rate of CPI inflation climbed from 0.8 per cent in 2007 to 3.8 per cent in 2008, the highest rate since 1990. The gap between CPI and CPI-ATE inflation reflects the sharp increase in fuel and electricity prices from 2007

Chart 10 Oil price (Brent Blend) in USD per barrel. Projections from different reports¹⁾ and actual developments. 3 January 2006 – 31 December 2008



¹⁾ Future prices

Sources: Thomson Reuters and Norges Bank

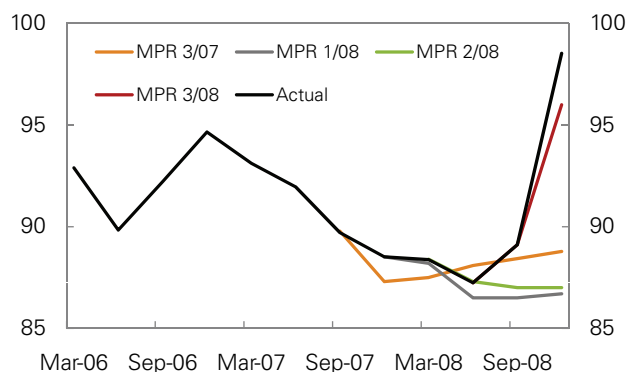
to 2008. Energy prices were nevertheless lower than projected in *Monetary Policy Report 3/07*. The forecast error was therefore smaller for the CPI than for the CPI-ATE. Electricity prices showed a markedly slower rise than expected. The oil price was higher than expected towards the end of the year (see Chart 10), and hence fuel prices rose further than projected.

The increased growth in prices for domestically produced goods and services reflected the strong growth in the Norwegian economy from 2004 to 2007. High capacity utilisation gradually led to a shortage of labour. Wage growth therefore increased markedly from 2006 to 2008. Growth in labour productivity slowed towards the end of the economic upswing and came to a halt last year. Wage growth was largely as projected in *Monetary Policy Report 3/07*, but productivity growth was considerably weaker than anticipated. Unit labour costs therefore grew more than expected from 2007 to 2008. Capacity utilisation was also higher than expected through to last summer. This may have made it easier to raise margins and pass higher costs on to prices than previously assumed.

Enterprises' costs also increased as a result of the rise in energy prices and higher prices for commodities and manufactured goods abroad. External price impulses were stronger than expected. The rapid rise in food prices in the world market and the sharp increase in target prices agreed in the Norwegian agricultural settlement in spring 2008 resulted in a faster-than-expected rise in food prices during 2008. The appreciation of the krone in 2007 and the first part of 2008 helped to soften the impact of higher international prices on enterprises' costs.

Rents climbed strongly from 2007 to 2008. The rise in energy prices and higher interest expenses for landlords may have contributed to this. Growing expectations of a fall in house prices may also have made it more attractive to rent. The rise in rents was stronger than anticipated.

Chart 11 Import-weighted exchange rate (I-44)¹⁾. Projections from different reports and actual developments. Index. 1995 = 100. 2006 Q1 – 2008 Q4



¹⁾ Increasing curve means weaker krone

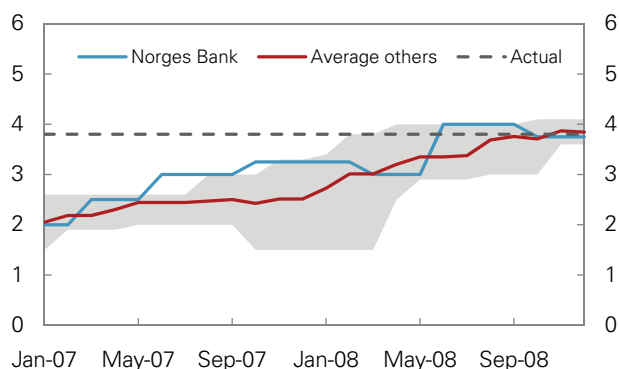
Source: Norges Bank

The price movements and forecast errors for imported consumer goods in 2008 are largely a reflection of an unexpectedly strong increase in prices for manufactured goods abroad through to the autumn. This in turn was related to the surge in the price of oil and other commodity prices. The unexpectedly high cost inflation and resource utilisation in Norway also contributed to the under-prediction. In isolation, the appreciation of the krone during 2007 and through to summer 2008 reduced prices for imported goods. However, the krone strengthened slightly less than we had assumed (see Chart 11). This also contributed to prices for imported consumer goods being higher than projected. The forecast error for imported consumer goods is also related to the sharp increase in the price of telecommunications equipment from June to July, which is estimated to have pushed up the annual rate of CPI-ATE inflation by 0.1 percentage point. There was no corresponding increase in the price of telecommunications equipment in other countries.

Consumer price inflation fell towards the end of 2008. Household demand was weak, and this led to increased price-discounting. In addition, prices for energy goods and foreign goods decelerated. A steep fall in the price of oil during the autumn led to a marked drop in fuel prices in the CPI. Electricity prices rose from the third to the fourth quarter, but year-on-year growth fell because electricity prices had risen even more sharply towards the end of 2007. The krone depreciated markedly in the second half of last year. This had little impact on inflation in 2008, however, as changes in the krone exchange rate feeds through to prices with a time lag.

The forecast error for the CPI-ATE is considerably smaller in the projections in *Monetary Policy Report 1/08* than in the projections from autumn 2007 (see Chart 7). The CPI-ATE forecast was revised up from *Monetary Policy Report 3/07* to 1/08. Inflation and capacity utilisation

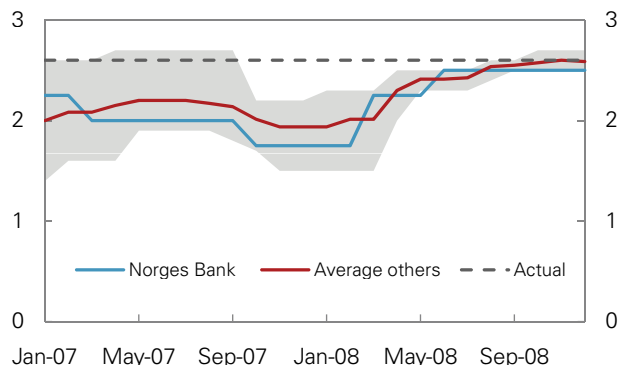
Chart 12 CPI. Projections of annual growth in 2008 published at different times¹⁾. Per cent. January 2007 – December 2008



¹⁾ The highest and lowest projections from forecasters other than Norges Bank are indicated by the grey interval. The red line is an average of the other forecasters' projections.

Sources: Norges Bank and reports from the different forecasters

Chart 13 CPI-ATE. Projections of annual growth in 2008 published at different times.¹⁾ Per cent. January 2007 – December 2008



¹⁾ The highest and lowest projections from forecasters other than Norges Bank are indicated by the grey interval. The red line is an average of the other forecasters' projections.

Sources: Norges Bank and reports from the different forecasters

tion had risen further than expected. At the same time, the krone was weaker than assumed, and it seemed that international prices for imported goods would rise further than projected in *Monetary Policy Report 3/07*. These conditions were expected to push up inflation.

Charts 12 and 13 present the projections from Norges Bank and other forecasters for the annual rate of CPI and CPI-ATE inflation published in 2007 and 2008. Norges Bank's projections for 2008 are compared with the mean, highest and lowest of the forecasts from Nordea, DnB NOR, Handelsbanken, Danske Bank, the Ministry of Finance, Statistics Norway, the Confederation of Norwegian Enterprise (NHO) and Skandinaviska Enskilda Banken (SEB) published at around the same time.

The charts show that most forecasters underestimated inflation for 2008 both in 2007 and in the first part of last year. Norges Bank's CPI projections were, as a whole, more accurate than the mean projection of other forecasters. In particular, our projections from the summer and autumn of 2007 were closer to the mark than the other forecasts. However, Norges Bank's projections of CPI-ATE inflation at that time were slightly less accurate than the mean of the other projections. During 2008, Norges Bank's CPI-ATE projections were broadly in line with the mean projection of other forecasters.

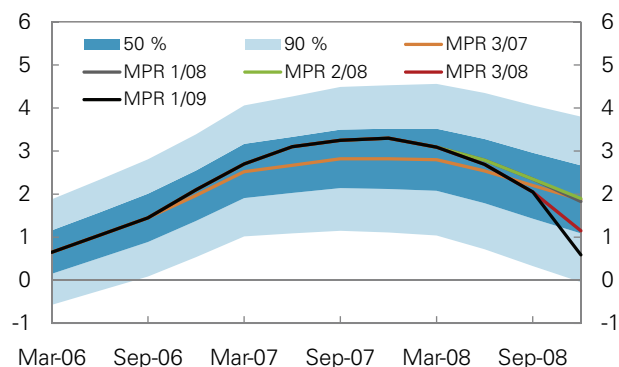
2.3 Output and demand

In *Monetary Policy Report 3/07*, Norges Bank projected that the Norwegian economy was facing a moderate slowdown. Mainland GDP growth was projected to slow from 5¼ per cent in 2007 to 2¾ per cent in 2008. These projections meant that capacity utilisation would peak at the beginning of 2008 and then fall gradually during the

year. Growth in household demand was expected to slow as a result of higher interest rates, higher inflation and several years of rapid accumulation of debt and housing capital. Housing investment and house prices had been falling since autumn 2007 and were expected to fall further in 2008. We also expected that growth in traditional (mainland) exports and business investment in mainland Norway would decline as a result of higher interest rates, higher cost inflation, a stronger krone and weaker economic growth both at home and abroad. At the same time, growth in petroleum investment and public demand was expected to hold up.

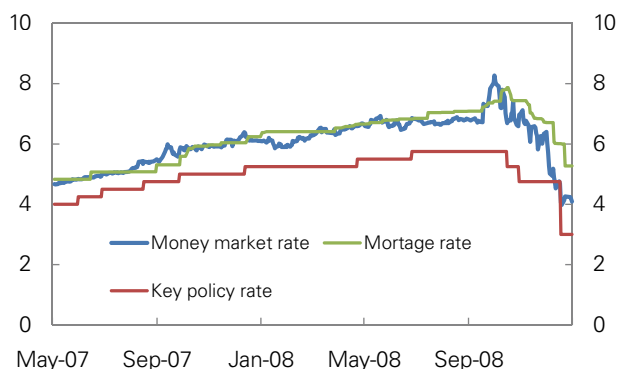
Preliminary national accounts data indicate that mainland GDP growth slowed from 6.1 per cent in 2007 to 2.4 per cent in 2008. The change from 2007 to 2008 was therefore largely as projected in *Monetary Policy Report 3/07*, but developments in the latter part of 2007 and in

Chart 14 The output gap. Projections from different reports. Fan chart from MPR 3/07. Per cent. 2006 Q1 – 2008 Q4



Sources: Statistics Norway and Norges Bank

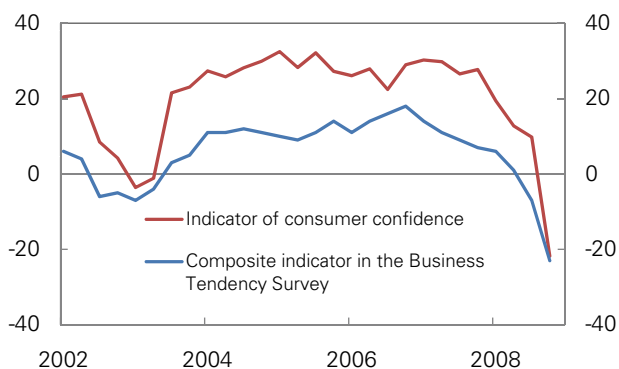
Chart 15 Key policy rate, money market rate¹⁾ and banks' lending rate on new loans²⁾. Per cent. 3 May 2007 – 31 December 2008



¹⁾ 3-month NIBOR (effective).
²⁾ Interest rate on new mortgage loans of NOK 1 million within 60% of purchase price with floating interest rate. Figures for the 20 largest banks, weighted according to market share.

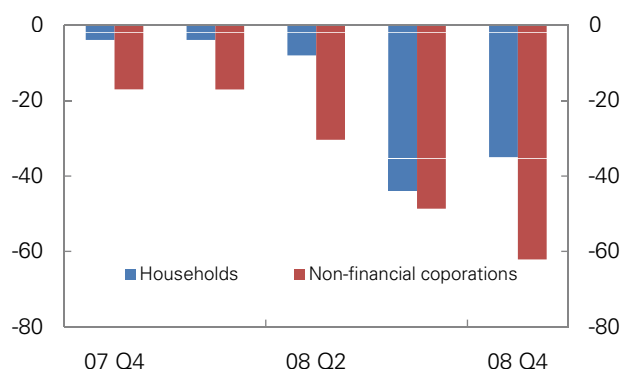
Sources: Norsk familieøkonomi AS and Norges Bank

Chart 17 Indicators of consumer and business confidence. Net figures. Seasonally adjusted. 2002 Q1 – 2008 Q4



Sources: Statistics Norway and TNS Gallup

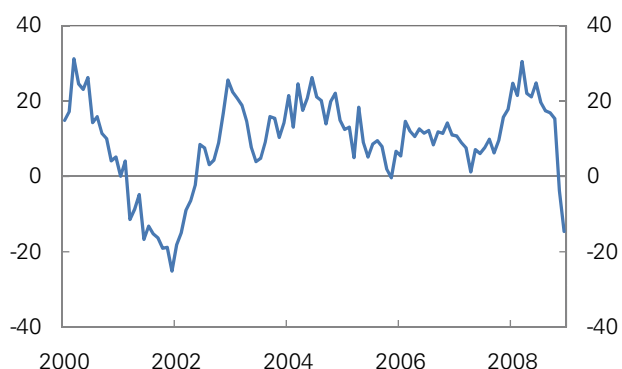
Chart 16 Changes in the banks' credit standards towards households and non-financial corporations. Net figures¹⁾. Per cent. 2007 Q4 – 2008 Q4



¹⁾ Negative numbers means tighter standards compared to last quarter. See the box in "Norges Banks survey of bank lending" in Financial stability report 1/08 for more information.

Source: Norges Bank

Chart 18 Indicator for world trade. Sum of exports and imports in the US, Japan, Germany and China in USD. 12-month change. Per cent. January 2000 – December 2008



Sources: Thomson Reuters and Norges Bank

2008 differed from our projections. Economic growth increased more than expected towards the end of 2007, and capacity utilisation thus reached a higher level at the beginning of 2008 than projected (see Chart 14). Growth in the Norwegian economy through 2008 was also considerably lower than expected, resulting in markedly lower capacity utilisation at the end of the year than forecast in autumn 2007.

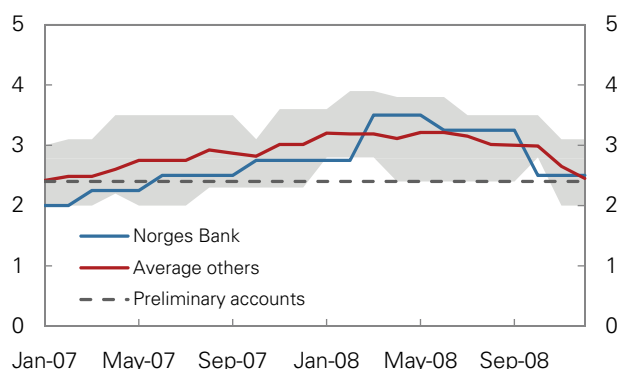
During the first half of 2008, growth was pulled down by a drop in housing investment and weak growth in private consumption. Traditional exports and business investment in mainland Norway also grew relatively weakly in the first half of the year, but were still at high levels owing to the strong growth rate in 2007.

The situation changed dramatically during the autumn. Confidence in the financial system and the economic outlook deteriorated sharply following the Lehman Brothers bankruptcy on 15 September. Banks worldwide became

more reluctant to lend to one another, and risk premiums in the money market increased significantly. Developments in the money market and the weaker outlook prompted banks to raise their lending rates, and they became more reluctant to provide credit to businesses and households (see Charts 15 and 16). Share prices and prices for oil and other commodities fell markedly. Indicators of corporate and household expectations also fell significantly (see Chart 17). House prices dropped sharply in Norway and many other countries. The problems in financial markets and weaker expectations rapidly translated into reduced output and demand. World trade declined sharply towards the end of the year (see Chart 18).

Growth in the Norwegian economy slowed towards the end of 2008, but not to the same degree as among our trading partners. Seasonally-adjusted mainland GDP continued to grow in the third quarter and contracted by just 0.2 per cent in the fourth quarter. Private consump-

Chart 19 Mainland GDP. Projections of annual growth in 2008 published at different times.¹⁾ Per cent. January 2007 – December 2008



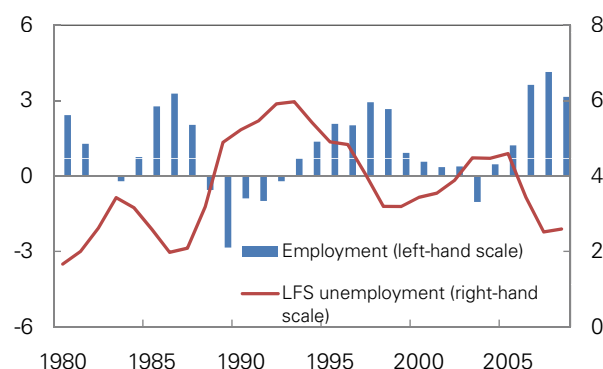
¹⁾ The highest and lowest projections from forecasters other than Norges Bank are indicated by the grey interval. The red line is an average of the other forecasters' projections.

Sources: Norges Bank and reports from the different forecasters

tion and private investment in mainland Norway fell markedly from the first to the second half of the year. Increased uncertainty, weaker growth prospects, higher interest expenses and tighter credit standards reduced demand from enterprises and households more than expected before the financial crisis erupted. The reductions in the key policy rate during the autumn helped to restrain the drop in demand somewhat. The downturn in the global economy resulted in a pronounced contraction in exports of traditional goods and services from the first to the final half of the year. As a result of solid growth in petroleum investment and public demand, growth in the Norwegian economy was substantially higher than among our trading partners in the second half of the year.

Both private consumption and housing investment were weaker than expected in 2008 after exhibiting unusually strong growth in the preceding years. The saving ratio had fallen to very low levels during the period 2004–2007. The rapid decline in consumption growth and housing investment once the key policy rate had moved back up to a more normal level suggests that the debt burden had been pushed to the limit in parts of the household sector. Household demand was also eroded by a faster-than-expected increase in bank lending rates through to last autumn. The key policy rate had risen further than assumed, and risk premiums in the money market had increased more than expected. As inflation was also higher than projected, growth in household real disposable income was lower than expected, which further dragged down demand. The rise in interest rates also pulled down house prices and pushed up the cost of investing in housing and other consumer durables. The decrease in house prices reduced households' wealth and their potential to borrow against their homes. The finan-

Chart 20 Change in employment (QNA) on previous year (per cent) and the level of unemployment (LFS) as a percentage of the labour force. 1980 – 2008



Source: Statistics Norway

cial crisis caused consumption and housing investment towards the end of 2008 to deviate further from the forecasts published a year earlier.

Traditional exports and business investment in mainland Norway grew largely as projected from 2007 to 2008, but developments in the latter part of 2007 and in 2008 differed from the projections in *Monetary Policy Report 3/07*. Both exports and investment increased considerably more than expected towards the end of 2007, but growth was weaker than expected through 2008. The gap between actual and projected growth was particularly wide in the second half of the year. The unexpectedly steep fall in exports and investment towards the end of 2008 reflects the fall in global trade, the weaker outlook and the limited and expensive supply of credit resulting from the financial crisis.

Petroleum investment grew largely as projected from 2007 to 2008, while public consumption and public investment increased further than expected. Developments in the petroleum sector and the public sector therefore reduced the forecast error for mainland GDP.

In *Monetary Policy Report 1/08*, we revised up the projections for annual growth in exports, business investment and mainland GDP, because growth in these variables had been surprisingly strong towards the end of 2007. The projections for annual growth in output and demand in *Monetary Policy Report 1/08* were therefore less accurate than those in *Monetary Policy Report 3/07*.

Chart 19 compares our projections for mainland GDP growth with those of other forecasters. The chart shows that most forecasters overestimated growth in 2008 in their economic reports published in late 2007 and the first three quarters of 2008. Our projections in 2007 and the final report of 2008 were relatively accurate compared

Table 2 Population and labour force growth. Projected and actual. Percentage change from 2007 to 2008

	MPR 3/07	MPR 1/08	MPR 1/09
Growth in population aged 15–74	1	1½	1¾
Contribution from changes in population composition	–¼	–¼	–¼
Cyclical contribution (changes in participation rates)	½	1	1¾
Growth in labour force	1¼	2¼	3.4

Sources: Statistics Norway and Norges Bank

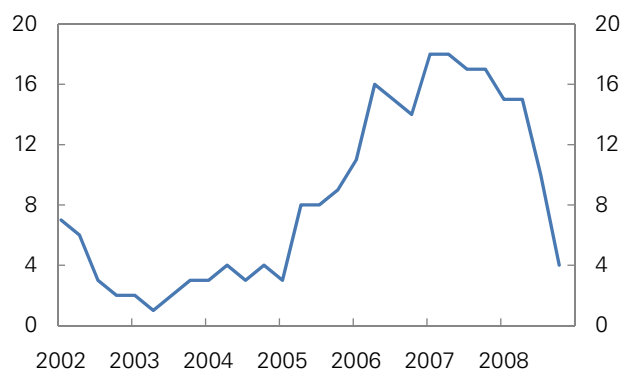
to the other forecasts, but the projections in *Monetary Policy Report 1/08* were somewhat less accurate than the mean for the other forecasters.

2.4 The labour market

Employment grew strongly in 2006 and 2007. The increased demand for labour was met with an increased supply of labour, both from the existing population and through labour immigration from new EU member states. Unemployment nevertheless fell rapidly in 2006 and through to the summer of 2007 to a very low level (see Chart 20). This caused wage growth to pick up in 2006 and 2007. In *Monetary Policy Report 3/07*, we projected that weaker growth in the Norwegian economy would reduce employment growth from 3½ per cent in 2007 to 1¼ per cent in 2008. It was assumed that the whole of this growth in employment would come from an increased labour supply, with an attendant unchanged unemployment rate. It was also assumed that productivity growth would be relatively low and in line with growth in 2007. Annual wage growth was expected to rise to 5¾ per cent due to the drop in unemployment, higher corporate profitability and the prospect of higher inflation.

Unemployment and wage growth in 2008 were largely as projected in *Monetary Policy Report 3/07*. Employment, however, increased significantly more than forecast. Preliminary national accounts data indicate that employment growth fell from 4.1 per cent in 2007 to 3.2 per cent in 2008. The growth in employment was made possible by a significant increase in labour supply. The unexpectedly strong demand for labour meant that participation rates and labour immigration rose further than projected (see Table 2).

Chart 21 The share of industrial managers that expect production to be limited by the supply of labour.¹⁾ Per cent. 2000 Q1 – 2008 Q4



¹⁾ From the Business Tendency Survey

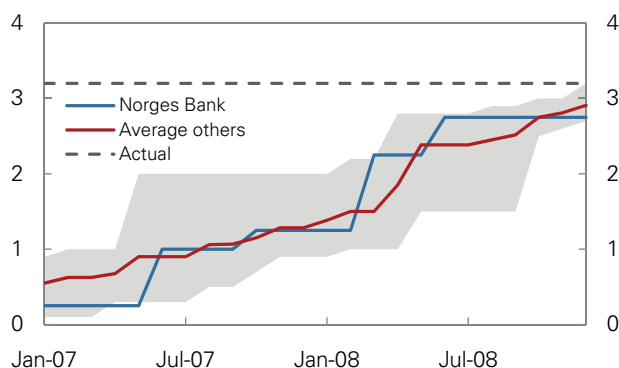
Source: Statistics Norway

Employment grew relatively strongly during the first three quarters of 2008 despite growth in the mainland economy grinding to a halt. This resulted in an unexpectedly steep fall in productivity growth from 2007 to 2008. The growth in employment probably reflected the economy's strong growth in 2007, combined with the time it normally takes enterprises to adjust employment to lower growth in production. In addition, most forecasters – and probably also enterprises – anticipated significantly higher output growth in 2008 than what turned out to be the case (see above). The growth in employment in 2008 must also be seen in the light of a tight labour market through to last autumn. Production in parts of the business sector was limited by the supply of labour. Many business leaders expected production to continue to be limited by the supply of labour (see Chart 21). They therefore chose to continue to recruit even though the economy had stopped growing. We underestimated this effect. Employment did not begin to fall until the end of the year once the financial crisis had undermined expectations. Meanwhile, the labour force continued to grow. This pushed up unemployment.

Charts 22–24 compare our projections for employment, unemployment and wage growth with those of the other forecasters listed above.⁵ All forecasters underestimated the strong growth in employment from 2007 to 2008, but most nevertheless predicted an unemployment rate close to the actual outcome. Norges Bank's projections for employment and unemployment were broadly in line with the mean for the other forecasters from summer 2007 onwards. Our projections of wage growth published in late 2007 and early 2008 were somewhat better than the mean for the other forecasters.

⁵ NHO does not publish forecasts of wage growth. SEB and Nordea do not publish forecasts of employment.

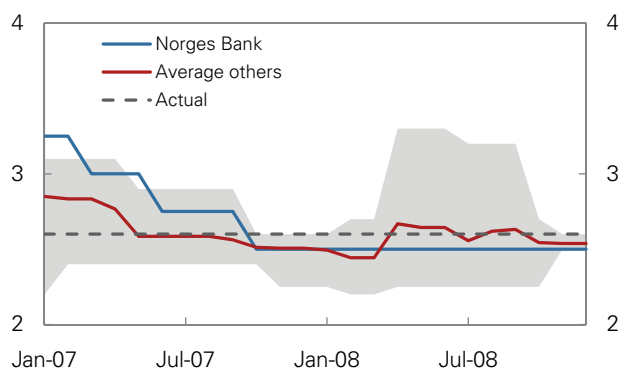
Chart 22 Employment. Projections of annual growth in 2008 published at different times.¹⁾ Per cent. January 2007 – December 2008



¹⁾ The highest and lowest projections from forecasters other than Norges Bank are indicated by the grey interval. The red line is an average of the other forecasters' projections.

Sources: Norges Bank and reports from the different forecasters

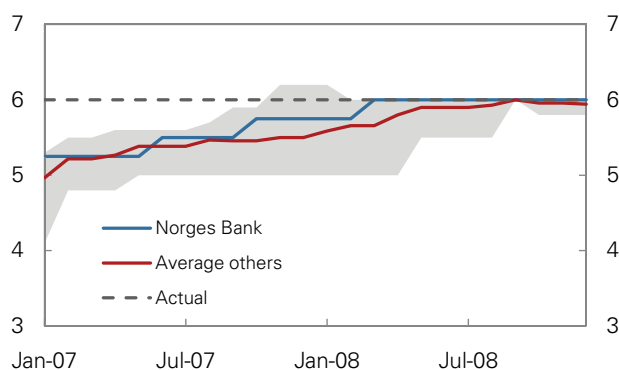
Chart 23 LFS unemployment. Projections for 2008 published at different times.¹⁾ Percentage of the labour force. January 2007 – December 2008



¹⁾ The highest and lowest projections from forecasters other than Norges Bank are indicated by the grey interval. The red line is an average of the other forecasters' projections.

Sources: Norges Bank and reports from the different forecasters

Chart 24 Annual wages. Projections of annual growth in 2008 published at different times.¹⁾ Per cent. January 2007 – December 2008



¹⁾ The highest and lowest projections from forecasters other than Norges Bank are indicated by the grey interval. The red line is an average of the other forecasters' projections.

Sources: Norges Bank and reports from the different forecasters

3. Conclusion

Inflation in 2008 was considerably higher than projected in *Monetary Policy Report 3/07*. Productivity growth fell further than expected when the economy turned in early 2008. As a result, unit labour costs rose further than projected. Foreign price impulses were also stronger than assumed. In addition, capacity utilisation was higher than expected until summer last year. This probably amplified the impact on prices of the unexpectedly high rise in labour costs and international prices.

Activity in the mainland economy grew less than expected in 2008. Against the background of the global

financial crisis, world trade declined sharply, banks tightened their credit standards, and enterprises and households became more pessimistic about the future. Exports and private demand in the mainland economy therefore fell significantly – and further than expected – towards the end of 2008. Owing to solid growth in petroleum investment and public demand, growth in the Norwegian economy held up better than growth among our trading partners in the second half of 2008.

Employment continued to grow strongly until the autumn despite the halt in growth in the Norwegian economy. Both employment and the labour force grew considerably more than projected. We probably underestimated enterprises' willingness to increase or maintain employment when output stops growing if there is also a shortage of labour. Enterprises may also have overestimated future production.

In recent years, Norges Bank has used new model tools to predict developments in the Norwegian economy. The macro model NEMO (Norwegian Economy Model) is used in the preparation of the interest rate forecast and to project developments in the medium term (see box in *Monetary Policy Report 3/07*). The short-term projections are based on a general assessment of incoming information, partly from our regional network, and forecasts from a number of statistical and econometric models. The model system SAM (System of Averaging Models) weights the projections from different models for inflation and mainland GDP (see box in *Monetary Policy Report 2/08*). SAM was first used for *Monetary Policy Report 2/08*. Work on improving our analysis of the Norwegian economy and further developing our models is a continuous process. Evaluations of projections form part of this work.

Appendix: Comparison of projections from Norges Bank and other forecasters for 2004–2008

This appendix compares projections from Norges Bank with those from Statistics Norway, NHO, SEB, DnB NOR, Nordea, Handelsbanken, Danske Bank and the Ministry of Finance for the period 2004–2008. We look at projections for LFS unemployment, CPI and CPI-ATE inflation, mainland GDP, employment and wage growth. For each variable and forecaster, we have calculated the mean forecast error (see Table 3) and mean absolute forecast error (Table 4) for the period 2004–2008. Mean

forecast error is a measure of bias in the projections, while mean absolute forecast error is a measure of their accuracy. We have measured the forecast error for a particular year as the mean forecast error for all projections published during that year and the preceding year.⁶ The projections for employment and mainland GDP have been evaluated relative to the first annual figures published for the year in question (preliminary national accounts).

Table 3 Mean forecast error for Norges Bank and other forecasters. 2004–2008

	CPI	CPI-ATE	Mainland GDP	Employment (QNA) ¹⁾	LFS unemployment	Annual wages ²⁾
Norges Bank	0.00	-0.29	0.82	0.79	-0.11	-0.13
Statistics Norway	0.03	-0.29	0.90	0.93	-0.11	0.07
Ministry of Finance	0.00	-0.35	0.90	0.85	-0.02	0.17
NHO	0.09	-0.37	0.58	0.43	0.09	
DnB NOR	-0.02	-0.37	0.99	0.97	-0.12	-0.20
Nordea	-0.02	-0.40	1.13		-0.01	-0.18
SEB	-0.18	-0.36	0.94		-0.10	-0.13
Handelsbanken	-0.03	-0.41	0.91	1.05	-0.15	-0.08
Danske Bank	-0.01	-0.39	0.74	1.01	-0.07	-0.15
Mean, other forecasters	-0.02	-0.36	0.89	0.93	-0.07	-0.10

¹⁾ Handelsbanken projects employment as per the Labour Force Survey (LFS) rather than the quarterly national accounts (QNA). This is taken into account in the calculation of forecast errors.

²⁾ Statistics Norway projects wages per full-time equivalent person. This is taken into account in the calculation of forecast errors.

Table 4 Mean absolute forecast error for Norges Bank and other forecasters. 2004–2008

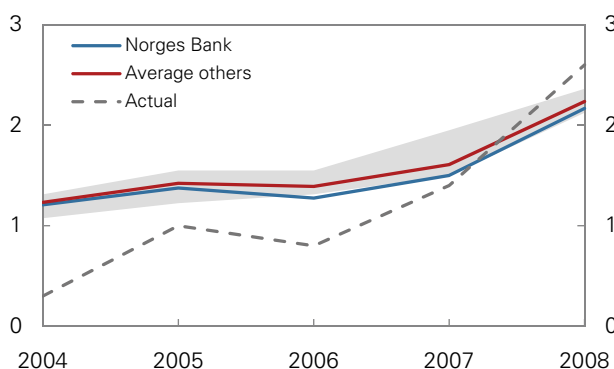
	CPI	CPI-ATE	Mainland GDP	Employment (QNA) ¹⁾	LFS unemployment	Annual wages ²⁾
Norges Bank	0.45	0.47	1.01	1.03	0.32	0.48
Statistics Norway	0.38	0.48	1.17	0.99	0.32	0.34
Ministry of Finance	0.47	0.48	1.15	0.89	0.26	0.49
NHO	0.52	0.56	1.00	0.82	0.27	
DnB NOR	0.54	0.53	1.20	1.26	0.34	0.49
Nordea	0.52	0.52	1.29		0.37	0.58
SEB	0.54	0.50	1.08		0.32	0.41
Handelsbanken	0.49	0.59	1.12	1.07	0.29	0.41
Danske Bank	0.50	0.49	1.12	1.13	0.30	0.40
Mean, other forecasters	0.46	0.51	1.09	1.07	0.29	0.41

¹⁾ Handelsbanken projects employment as per the Labour Force Survey (LFS) rather than the quarterly national accounts (QNA). This is taken into account in the calculation of forecast errors.

²⁾ Statistics Norway projects wages per full-time equivalent person. This is taken into account in the calculation of forecast errors.

⁶⁾ Statistics Norway, DnB NOR, Nordea and Handelsbanken published an additional set of forecasts last autumn. These are included in the calculations below and in the comparison of projections in section 2.

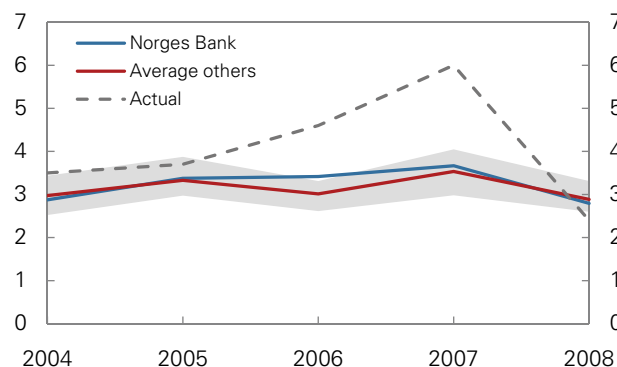
Chart 25 CPI-ATE. Projections of annual growth¹⁾.
Per cent. 2004 – 2008



¹⁾ The highest and lowest projections from forecasters other than Norges Bank are indicated by the grey interval. The red line is an average of the other forecasters' projections.

Sources: Norges Bank and reports from the different forecasters

Chart 26 Mainland GDP. Projections of annual growth¹⁾.
Per cent. 2004 – 2008



¹⁾ The highest and lowest projections from forecasters other than Norges Bank are indicated by the grey interval. The red line is an average of the other forecasters' projections.

Sources: Norges Bank and reports from the different forecasters

Norges Bank's mean forecast error for CPI inflation is zero for the period 2004–2008. The other forecasters also have low mean forecast error for CPI inflation. However, all forecasters overestimated CPI-ATE inflation over the period as a whole. This was due to overestimation of CPI-ATE inflation when it was low during the period 2004–2006 (see Chart 25).⁷ Several forecasters predicted CPI-ATE inflation relatively well in 2007, but all underestimated the growth in CPI-ATE from 2007 to 2008. Norges Bank's projections for CPI and CPI-ATE inflation over the period 2004–2008 were broadly in line with the mean for the other forecasters. None of the other forecasters had a lower mean absolute forecast error for CPI-ATE inflation than Norges Bank.

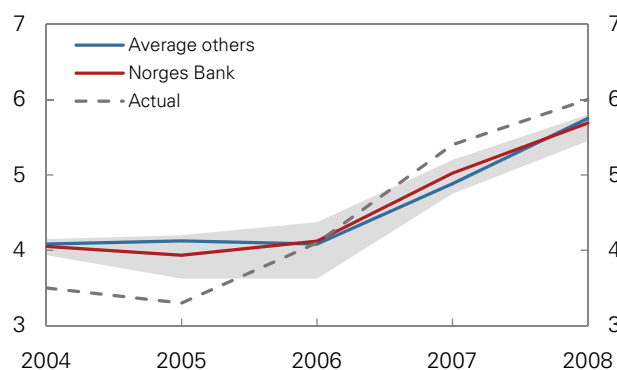
All forecasters underestimated the strong growth in the Norwegian economy from 2004 to 2007 (see Chart 26). However, they overestimated growth when it fell sharply from 2007 to 2008. Norges Bank's projections for mainland GDP growth were broadly in line with the mean for the other forecasters.

Norges Bank and the other forecasters underestimated growth in employment from 2004 to 2008. The forecasts for 2004 and 2005 were relatively accurate, but the forecasters underestimated the strong growth in employment in 2006–2008. All forecasters expected unemployment to fall more rapidly during the economic upswing than it did, but they overestimated unemployment when it fell sharply from 2005 to 2007. Norges Bank's forecast error for employment and LFS unemployment was in line with that for the other forecasters.

All forecasters overestimated wage growth in 2004 and 2005 when it was low (see Chart 27). They underestimated wage growth when it picked up in 2007.

The comparison above shows that Norwegian forecasters predicted fairly similar developments in main macroeconomic variables during the period 2004–2008. Norges Bank's projections were broadly in line with those of the other forecasters.

Chart 27 Annual wage. Projections of annual growth¹⁾.
Per cent. 2004 – 2008



¹⁾ The highest and lowest projections from forecasters other than Norges Bank are indicated by the grey interval. The red line is an average of the other forecasters' projections.

Sources: Norges Bank and reports from the different forecasters

⁷ The projections for a specific year are calculated as the mean of all projections published during that year and the preceding year.