

NORGES BANK PAPERS

Evaluation of Norges Bank's projections
for 2016

NO. 3 | 2017



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BANKS'S PROJECTIONS FOR
2016

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Norges Bank's projections for inflation and economic developments are an important basis for the formulation of monetary policy. Analyses of forecast errors can help Norges Bank to make better projections and improve its understanding of the disturbances to which the economy is exposed. This article provides an evaluation of Norges Bank's projections for 2016.

This article starts with a brief overview of economic developments in 2016. This is followed by a comparison of Norges Bank's projections for 2016 with actual developments and a discussion of the most important forecast errors. The forecast errors for 2016 are then assessed against historical forecast errors and the Bank's projections are compared with the projections of other forecasters.

1. Economic developments in 2016

Growth in the global economy has softened in recent years, and in 2016 was at its lowest since the financial crisis. Growth among Norway's trading partners softened between 2015 and 2016. Low commodity prices contributed to low inflation abroad, but in a number of countries inflation expectations rose towards the end of 2016.

Low inflation and moderate growth prospects prompted a number of central banks to undertake further monetary easing in 2016. Sveriges Riksbank, the Bank of England and the European Central Bank (ECB) reduced policy rates in addition to expanding their asset purchase programmes. On the other hand, the Federal Reserve raised the target range for the federal funds rate in December, one year after its previous rate hike.

Although trading partner money market rates fell during the first three quarters of 2016, much of the decline was reversed towards the end of the year. Long-term interest rates also fell in the first half of 2016, before rising again to about the same level as at the beginning of the year.

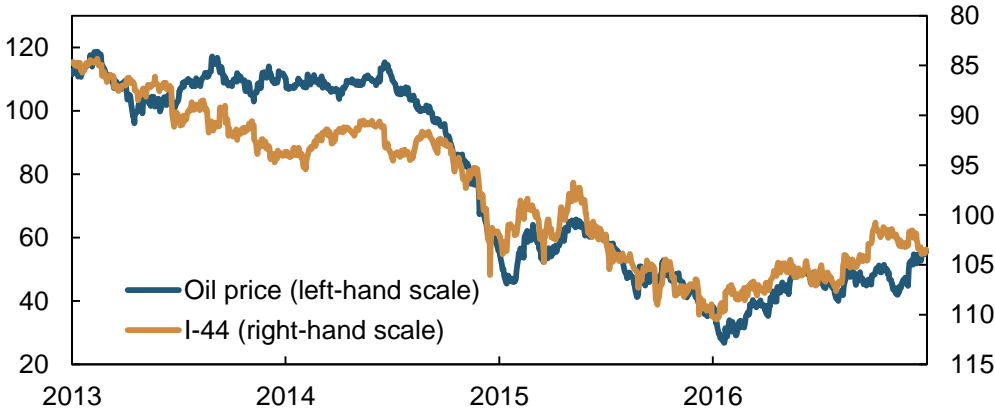
The premium in the Norwegian money market continued to rise in 2016, primarily owing to international factors and in particular new regulations for US money market funds. For 2016 as a whole, corporate lending rates were little changed, while household lending rates fell slightly.

The price of oil continued to fall at the beginning of 2016, and towards the end of January it was below USD 30 per barrel, its lowest level since 2003. The price then rebounded and at year-end 2016 was approximately USD 55 per barrel. Futures prices also moved up somewhat through 2016. The rise in oil

¹ In the analysis, projections for 2016 are compared with the *first* publication of national accounts figures for 2016. For a detailed account of the data used in the analysis, see Section 4.2 in the appendix.

prices partly reflected higher demand for oil from countries such as the US, China and India and the decision by the Organization of the Petroleum Exporting Countries (OPEC) and several other countries to limit oil production.

Chart 1 Oil price¹⁾ and import-weighted krone exchange rate index (I-44)²⁾.
1 January 2013 – 31 December 2016



1) USD per barrel.
2) A rising slope denotes a stronger exchange rate.
Sources: Thomson Reuters and Norges Bank

With the rise in oil prices and higher interest rate expectations in Norway, the Norwegian krone appreciated through 2016. Following a considerable depreciation over the previous three years (Chart 1), the krone, as measured by the import-weighted index I-44, appreciated by about 6 percent through the year.

Growth in the Norwegian economy picked up somewhat through 2016 (Chart 2). Average quarterly growth in mainland GDP was 0.3 percent, while average quarterly growth in 2015 was 0.1 percent. Nevertheless, annual GDP growth was at its lowest since 2009. Expansionary fiscal policy, low interest rates and improved cost competitiveness supported growth, while the decline in activity in petroleum-related industries slowed somewhat.

Chart 2 Mainland GDP. Four-quarter change. Percent
2000 Q1 – 2016 Q4

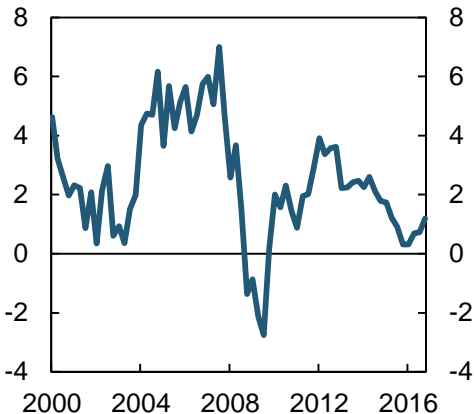
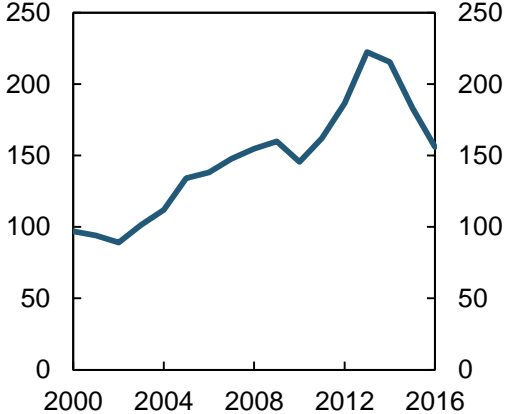


Chart 3 Petroleum investment
In billions of 2016 NOK.
2000 – 2016



Source: Statistics Norway

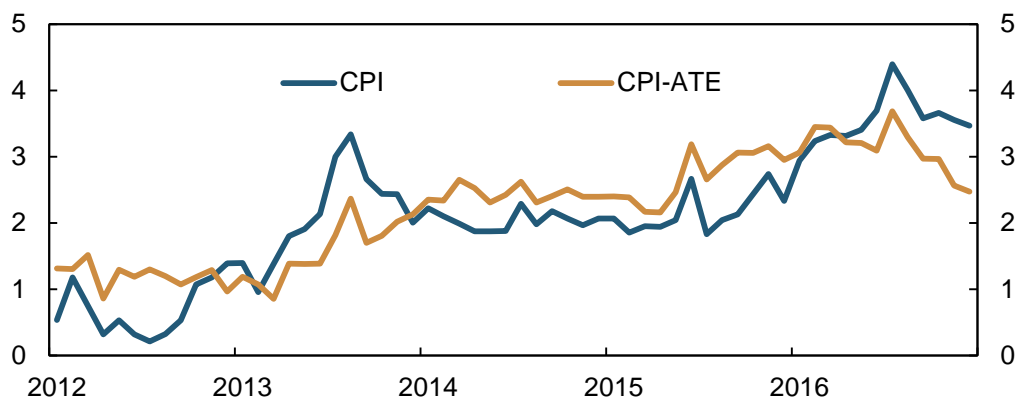
Petroleum investment continued to fall markedly in 2016 (Chart 3) and as a share of mainland GDP, it fell to approximately 6 percent. In 2013, the share was 9 percent. Lower exports from the oil service industry contributed to a substantial decline in total mainland exports. Even though cost competitiveness continued to improve, a number of temporary factors also led to weakness in other exports. After falling for several years, business investment rose moderately in 2016. Housing investment rose by nearly 10 percent. Growth in household consumption was weak in 2016, partly reflecting a marked decline in household real income growth. At the same time, the saving ratio declined slightly between 2015 and 2016.

House prices rose by more than 8 percent between 2015 and 2016, and house price inflation moved up sharply through the year. Prices increased the most in Oslo and surrounding areas. Household debt growth also accelerated through the year. Both house prices and household debt continued to rise faster than disposable income.

Capacity utilisation was assessed to be lower than a normal level at the beginning of 2016, and edged down in the period to autumn. Mainland GDP growth was lower than the Bank's projection for potential growth. Unemployment measures diverged considerably. While unemployment measured by the Labour Force Survey (LFS) was higher in 2016 than in 2015, the registered unemployment rate was broadly unchanged. Overall, employment according to the quarterly national accounts was approximately unchanged between 2015 and 2016. At the same time, growth in the labour force slowed, and the labour force participation and employment rates continued to fall. The wage settlement in 2016 was moderate, and annual wage growth declined to 1.7 percent. Changes in the distribution of wage earners among industries with different wage levels helped to pull down wage growth.

The annual rise in consumer prices in 2016 was the highest recorded in many years. The consumer price index (CPI) rose by 3.6 percent between 2015 and 2016, while consumer prices adjusted for tax changes and excluding energy products (CPI-ATE) rose by 3.0 percent in the same period. The twelve-month rise in the CPI-ATE receded through the latter half of 2016 (Chart 4), partly reflecting diminishing effects of the previous krone depreciation. At year-end 2016, the twelve-month rise in the CPI was 3.5 percent and 2.5 percent for the CPI-ATE.

Chart 4 Consumer prices. CPI and CPI-ATE¹⁾. Twelve-month change. Percent. January 2012 – December 2016



1) CPI adjusted for tax changes and excluding energy products.
Source: Statistics Norway

2. Projections for 2016

2.1. Norges Bank's projections for 2016

The starting point of the review of Norges Bank's projections for 2016 is the projections in the last *Monetary Policy Report* of 2015. The annual projections from this *Report* for mainland GDP, employment and the CPI-ATE proved to be fairly accurate (Table 1).² The projections for wage growth proved to be too high, despite lower-than-projected registered unemployment.

Table 1 Developments in key macroeconomic variables in 2016. Percentage change from 2015 unless otherwise stated. Projected and actual developments

	MPR 4/15	MPR 1/16	MPR 2/16	MPR 3/16	MPR 4/16	Act- ual
Mainland GDP	1.1	0.8	0.8	0.9	0.7	0.8
Employment, QNA	0.3	0.1	0.2	-0.3	-0.1	0.1
Registered unemployment¹	3.3	3.3	3.2	3.0	3.0	3.0
Annual wages	2.8	2.6	2.5	2.5	2.3	1.7
CPI-ATE	2.9	3.0	2.9	3.3	3.1	3.0

1) Rate, level. As a percentage of the labour force.

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

Output and demand

In *Monetary Policy Report* 4/15, growth in mainland GDP was projected to gain some momentum through 2016 (Chart 5). Annual growth was projected at 1.1 percent. Export enterprises were expected to benefit from a weaker krone,

² For an overview of projections and developments in other variables included in the Bank's forecasts, see Table A1 in the appendix. For figures obtained from the national accounts, projections are compared with the first publication of national accounts data.

and growth in public consumption and investment was projected to rise, partly owing to the increase in the number of asylum-seekers through autumn 2015.

The pick-up in growth was expected to be moderate. According to Norges Bank's regional network, there were signs that the effects of the fall in oil prices and the decline in oil investment spread to sectors where growth had so far remained steady. Oil prices continued to fall. Consumer confidence fell further, and there were prospects of moderately weaker growth in private consumption.

Chart 5 Mainland GDP.
Four-quarter change. Percent.
2014 Q1 – 2016 Q4¹⁾

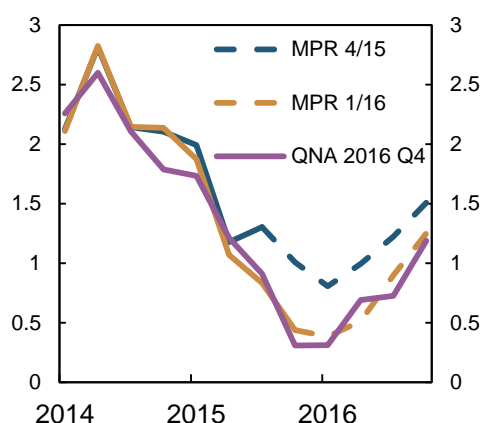
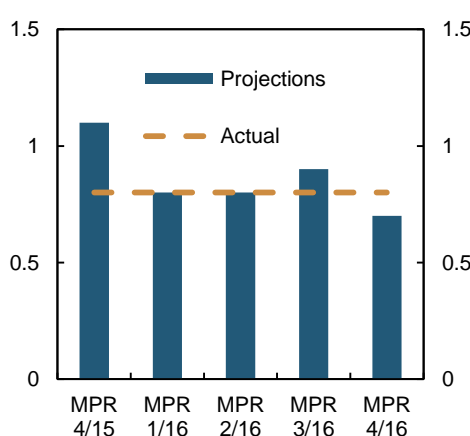


Chart 6 Mainland GDP. Percentage growth between 2015 and 2016.
Projected and actual growth



1) Left panel: Broken lines show projections from various reports.
Sources: Statistics Norway and Norges Bank

In the period up to *Monetary Policy Report 1/16*, developments in the Norwegian economy were weaker than assumed in December 2015. Growth in 2015 proved to be lower than projected. Growth in consumption and private investment was weaker than projected. Oil prices had risen somewhat from their lowest levels in January, but futures prices were still lower than in December. The projection for GDP growth in 2016 was revised down to 0.8 percent. The growth projection for 2016 remained unchanged in the period to summer, but in *Monetary Policy Report 3/16*, the projection was revised up slightly, since growth had up to that time been slightly higher than projected. However, national accounts figures that were published in November showed lower-than-expected growth in Q3, and the projection for 2016 was revised down somewhat. Preliminary national accounts figures for 2016 show that growth in 2016 was 0.8 percent, one tenth of a percentage point higher than projected in *Monetary Policy Report 4/16*. Overall, there were minor changes in the growth projections for 2016 between *Monetary Policy Report 1/16* and *Monetary Policy Report 4/16*, and the projections for GDP growth were close to actual developments (Chart 6). As Chart 5 shows, the projection from the end of 2015 captured the impending turning point fairly well, even though growth proved to be slightly lower than envisaged.

In *Monetary Policy Report 4/15*, growth in private consumption was projected to slow to 1.5 percent in 2016. Low employment growth, weakened purchasing power as a result of higher inflation and uncertainty regarding developments in

the Norwegian economy were expected to contribute to a decline in consumption growth.³ The projections were little changed through the first half of 2016. They were then revised up considerably in *Monetary Policy Report 3/16* and then revised down again in *Monetary Policy Report 4/16*. The variation in the projection for the year reflected in part revisions in the quarterly national accounts figures.

Consumption growth in 2016 was well in line with the projections in *Monetary Policy Report 4/15*, despite the markedly lower-than-projected rise in household real income. This led to a fairly pronounced fall in the saving ratio. This response may reflect a perception that the very low growth in real income was temporary. Wealth effects from unexpectedly high house prices may have also played a role. In *Monetary Policy Report 4/15*, the annual rise in house prices was projected at 4.8 percent. The rise in prices accelerated through the year, and the projections were revised up several times, as house price inflation proved to be higher than projected, among other reasons. The actual rise in prices in 2016 was 8.3 percent, and at the end of the year, the twelve-month rise moved up to 12.8 percent.

Growth in mainland private investment in 2016 was projected at 1.7 percent in *Monetary Policy Report 4/15*. The projections were unchanged in *Monetary Policy Report 1/16*, where projections for housing investment and business investment began to be published separately. At that time, housing investment was expected to rise by 5.9 percent between 2015 and 2016, while business investment was projected to fall by 1.4 percent. House price inflation was expected to contribute to a substantial rise in housing investment between 2015 and 2016. The projections were gradually revised up through the year, owing to both a marked increase in housing starts and to a higher-than-projected rise in house prices. Preliminary national accounts figures show that housing investment rose by 9.9 percent in 2016, even somewhat more than projected in the *Monetary Policy Report* from December of the same year.

In *Monetary Policy Report 2/16*, business investment was projected to rise by 1.9 percent in 2016, whereas a decline had been envisaged earlier. The upward revision reflects both higher-than-expected growth in Q1 and the fact that the decline in the second half of 2015 proved to be less pronounced than previously assumed. The projections were subsequently little changed through the remainder of the year. Preliminary national accounts figures show annual growth in 2016 of 2.8 percent, somewhat higher than projected in *Monetary Policy Report 4/16*. Overall annual growth in private investment was 5.8 percent. Both housing investment and business investment contributed to the higher-than-projected investment growth in 2016.

In *Monetary Policy Report 4/15*, petroleum investment was projected to fall by 11 percent in 2016, following a decline of more than 14 percent in 2015. Through the first half of 2016, the projection was revised down, partly reflecting lower expenditures owing to cost-cutting measures and the deferral

³ See Andersen, H., E. Husabø and M. Aasgaard Walle (2016), "What influences household demand for goods and services?", *Staff Memo 4/2016*, Norges Bank, for an analysis of factors affecting household consumption.

of shut-down and removal projects. The projected decline though the second half of 2016 was around 15 percent, close to the actual decline for the year of 14.7 percent.

At the end of 2015, exports from mainland Norway were projected to grow by 2.3 percent in 2016. Improved competitiveness as a result of the krone depreciation was expected to contribute to solid growth in mainland exports excluding oil services. This segment of exports was projected to grow faster than imports by trading partners. At the same time, a substantial decline in oil service exports was projected. At the time of *Monetary Policy Report 2/16*, the projection for total mainland exports was revised down and exports were expected to fall by 1.3 percent in 2016. The downward revision primarily reflected the sharp decrease in exports of refined petroleum products in Q1. The projections for both oil service exports and other mainland exports were revised down further in the course of autumn. Exports of refined petroleum products fell further in the face of weaker prospects for market growth. Capacity constraints in fish farming and parts of the process industry also had a dampening effect on exports. In addition, the decline in the global petroleum industry may have had a more pronounced adverse impact on service exports than had been assumed, for example via lower exports of financial and commercial services. Preliminary national accounts figures show a decline in mainland exports of 6.7 percent in 2016, a somewhat more pronounced fall than projected in *Monetary Policy Report 4/16*.

Labour market, productivity and capacity utilisation

In the last *Monetary Policy Report* of 2015, low output growth was expected to result in low employment growth in 2016. Employment according to the quarterly national accounts was projected to rise by 0.3 percent. At the same time, growth in the labour supply was expected to moderate. Lower demand for labour was expected to reduce labour participation rates somewhat, in line with experience from previous economic downturns in Norway. Labour immigration was also projected to slow, which would dampen the rise in unemployment. Registered unemployment was expected to rise to 3.3 percent, while LFS unemployment was projected to increase to 4.6 percent.

Employment growth in 2016 proved to be slightly lower than projected in 2015, reflecting the fact that GDP growth also proved to be slightly lower than expected. Employment projections varied somewhat through the year, partly owing to revisions to the quarterly national accounts. Labour supply growth proved to be slightly lower than expected at the beginning of 2016. LFS unemployment proved to be broadly as expected at the end of 2015, while registered unemployment proved to be lower than projected (Charts 7 and 8). As an annual average, registered unemployment was broadly unchanged from 2015. One reason that registered unemployment did not rise further was some increase in the number of places in ordinary labour market programmes through 2016.

The gap between registered unemployment and LFS unemployment widened to 1.7 percentage points in 2016, the widest gap ever. One of the reasons for the gap is that in recent years, the LFS has captured a market increase in

unemployment among students seeking part-time work or a holiday job. Unlike in previous downturns, there has not been an increase in registered unemployment among persons under age 25 in recent years.⁴

In Monetary Policy Report 4/15, the projection for capacity utilisation in 2016 was -1.6 percent. This projection was little changed through 2016. Slightly lower-than-projected GDP and employment growth in isolation pulled down capacity utilisation. However, the projection for potential growth was also reduced somewhat, primarily owing to the assumption of slightly lower underlying productivity growth.⁵ Lower-than-expected registered unemployment suggested in isolation that capacity utilisation was higher than projected. However, in the assessments, somewhat greater weight was eventually given to the relatively high LFS unemployment rate.⁶

Chart 7 LFS unemployment 2016.
Share of the labour force.

Percent. Projected and actual growth

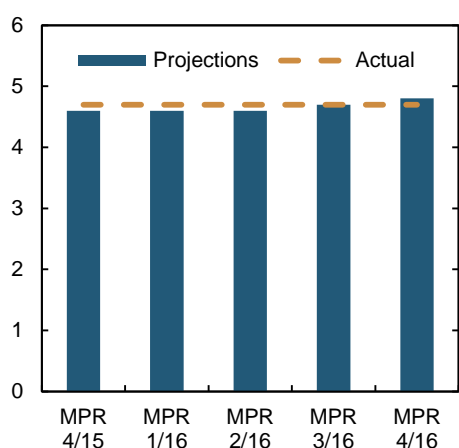
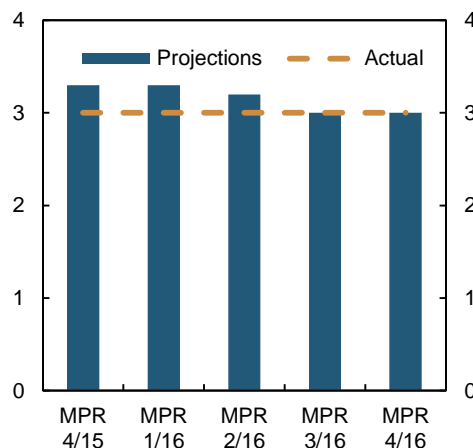


Chart 8 Registered unemployment 2016
Share of the labour force.

Percent. Projected and actual growth



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

Wages and consumer prices

In *Monetary Policy Report 4/15*, annual wage growth in 2016 was projected at 2.8 percent (Chart 9). The projection entailed broadly unchanged real wages between 2015 and 2016. Low activity and profitability in the petroleum and oil service industries were expected to restrain wage growth both in these industries and in the wider economy. Low productivity growth and rising unemployment were expected to push in the same direction. The wage growth projection was slightly higher than the expectations among the social partners as reported in Norges Bank's expectations survey, but at the same time, in the survey, the partners indicated expectations of lower inflation than the Bank's projections. The Bank's wage growth projections were also somewhat higher than expectations among regional network contacts.

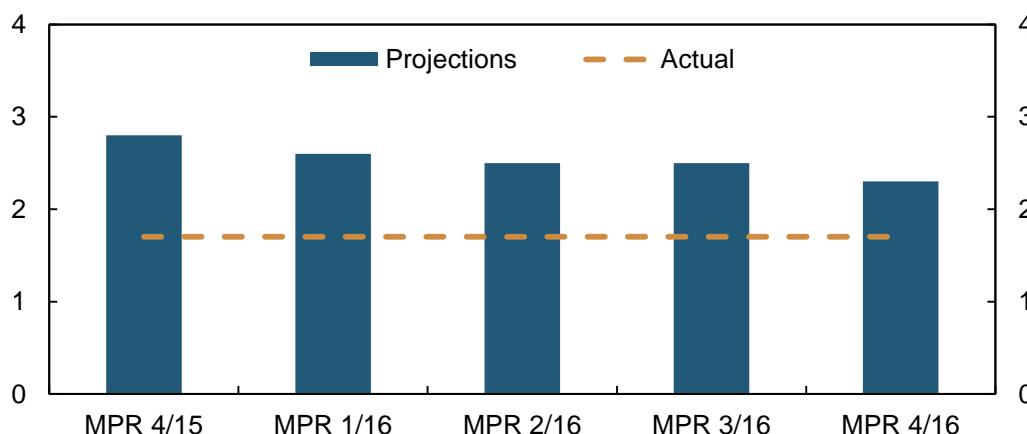
⁴ See Andersen, U., Å. Cappelen, E. W. Nordbø, H. N. Næsheim, J. Sørbo and R. Torvik (2017), "Mål for arbeidsledigheten: Avvik, årsaker og supplerende indikatorer [Measures of unemployment: Divergences, causes and supplemental indicators], *Arbeidsnotat 2017/8*, Ministry of Finance (Norwegian only) and Nordbø, E. W. (2016), "How many are unemployed?", *Economic Commentaries 9/2016*, Norges Bank.

⁵ See Special Feature "Low productivity growth" in *Monetary Policy Report 2/16*.

⁶ See Special Feature "Unemployment and capacity utilisation" in *Monetary Policy Report 4/16*.

In the wage settlement in spring 2016, the Norwegian United Federation of Trade Unions and the Federation of Norwegian Industries reached agreement following mediation. The wage norm for manufacturing was 2.4 percent, which was applied in most of the other wage settlements. The Bank's projection for wage growth in 2016 was revised down several times during the year. After the partners in the leading sectors in wage settlements reached wage agreements, the wage projection was revised down to 2.5 percent in *Monetary Policy Report 2/16*. Current statistics also subsequently indicated that wage growth would prove lower than projected. In *Monetary Policy Report 4/16*, the projection for annual wage growth was revised down to 2.3 percent. According to preliminary national accounts figures, actual wage growth in 2016 was 1.7 percent. The low wage growth partly reflects compositional effects owing to lower employment in high-wage industries. Such compositional effects pulled down wage growth by 0.4 percentage point, according to the Norwegian Technical Calculation Committee for Wage Settlements (TBU). In addition, structural changes within industries affected wage developments, particularly in manufacturing and the oil sector. In the largest bargaining areas, TBU estimated annual wage growth of 2.3 percent calculated as average of the annual wage growth in each area, weighted by the number of full-time equivalents.

Chart 9 Annual wages. Percentage growth between 2015 and 2016. Projected and actual growth.



Sources: Statistics Norway and Norges Bank

At the end of 2015, annual CPI and CPI-ATE inflation in 2016 was projected at 2.8 and 2.9 percent, respectively. The krone depreciation was assumed to continue to underpin consumer price inflation. Inflation was expected to be at its highest level in the first half of 2016, gradually declining thereafter (Chart 10). Prospects for lower capacity utilisation were expected to have a dampening effect on inflation further out.

Chart 10 CPI-ATE. Four-quarter change. Percent. 2012 Q1 – 2017 Q4¹⁾

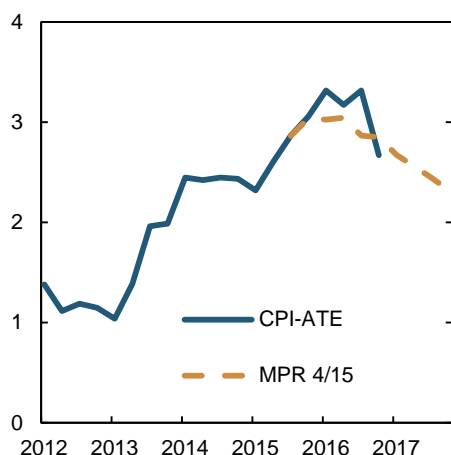
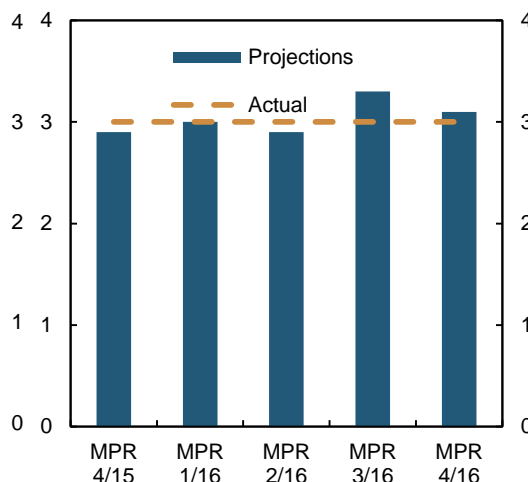


Chart 11 CPI-ATE. Percentage change between 2015 and 2016. Projection and actual change



1) Left panel: Broken line shows the projection from *Monetary Policy Report 4/15*.
Sources: Statistics Norway and Norges Bank

For the year as a whole, the projection for CPI-ATE inflation proved to be fairly accurate, but actual price developments and projections varied considerably through the year. Consumer price inflation rose faster than expected through summer, and the exchange rate pass-through to domestically produced goods and services appeared to be stronger than assumed.⁷ The inflation projection was revised up in *Monetary Policy Report 3/16*. However, rapidly receding inflation through autumn indicated a faster unwinding of the effects of the earlier krone depreciation on the rise in prices for imported goods than previously anticipated, and the projection was revised down in *Monetary Policy Report 4/16* (Chart 11). Headline CPI inflation rose faster than projected in *Monetary Policy Report 4/15*. Higher electricity prices than assumed led to a faster rise in the CPI than the CPI-ATE in 2016. CPI inflation was at its highest level since 2008.

2.2. Comparison with historical forecast errors and the projections of other forecasters

Projections and forecast errors may be evaluated in many ways and along various dimensions. In this article, the forecast errors for 2016 are assessed against Norges Bank's forecast errors in recent years. Then, Norges Bank's projections for 2016 are compared with projections of other forecasters through 2016.

2.2.1. Comparison with historical forecast errors

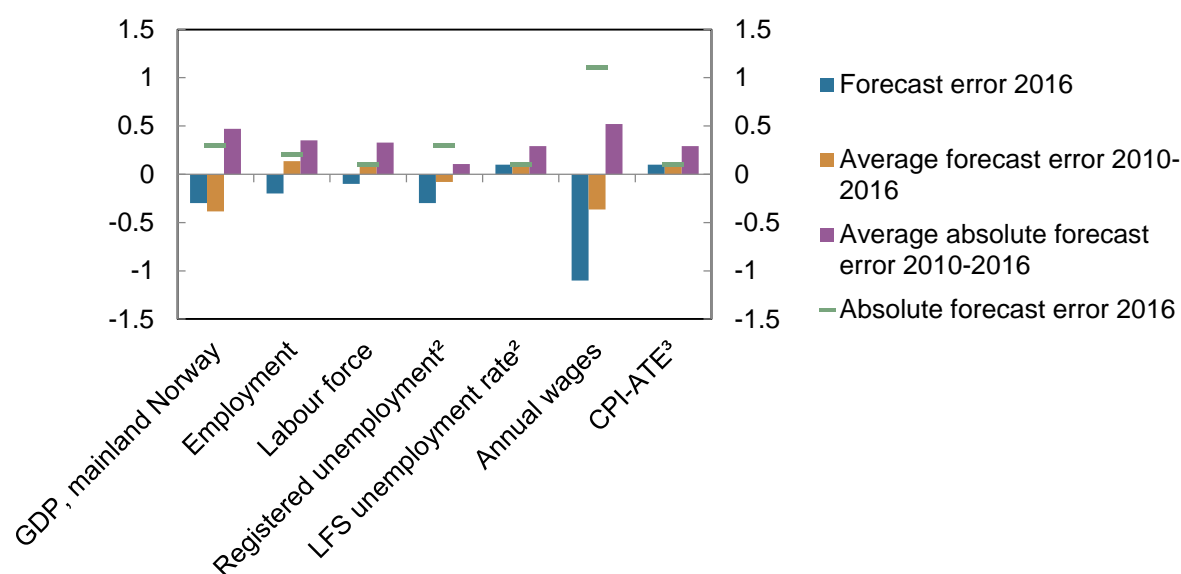
In this section, the forecast errors for 2016 are compared with Norges Bank's forecast errors for the years 2010-2016. Projections for a given year from the last *Monetary Policy Report* of the previous year are compared with actual

⁷ For a further discussion of the pass-through from exchange rate movements to consumer prices, see Ulvedal, P. B. and N. H. Vonen (2016), "Pass-through from exchange rate movements to consumer prices", *Staff Memo 3/2016*, Norges Bank.

developments for the year concerned. The forecast error for 2016 is thus given by the difference between actual developments in 2016 and the projection in *Monetary Policy Report 4/15*. A negative deviation means that the projection was too high compared with actual developments.

Chart 12 shows two different measures of forecast errors for the period 2010-2016 along the forecast error for 2016. The *average forecast error* shows whether the projections are unbiased, while the *average absolute forecast error* expresses how accurate the projections are.

Chart 12 Forecast error for 2016 and average forecast error in the period 2010-2016.¹⁾ Actual and absolute values. Percentage points



1) The calculations are based on annual change (in percent), except for unemployment, where the annual rate (level) is used. For GDP and employment, the deviations are calculated by comparing the projections with the first publication of the national accounts figures for the year concerned.

2) As a percentage of the labour force.

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

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

For mainland GDP, the forecast error for 2016 was negative, but slightly less negative than the average forecast error in recent years. Compared with the absolute average forecast error, the projection for 2016 was accurate.

Both employment growth and labour force growth proved to be lower in 2016 than projected. The deviation was less than the average absolute forecast error for the years 2010-2016.

Registered unemployment proved lower than expected, and the deviation was greater than what has been observed in recent years. LFS unemployment was slightly higher than projected. However, the projection was more accurate than the tendency in recent years, given by the average absolute forecast error.

Chart 13 Annual wages. Projected¹⁾ and actual change. Annual growth. Percent. 2010-2016

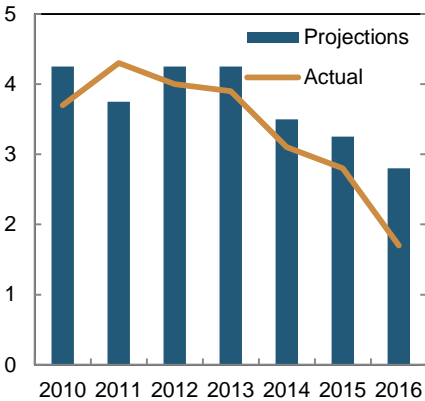
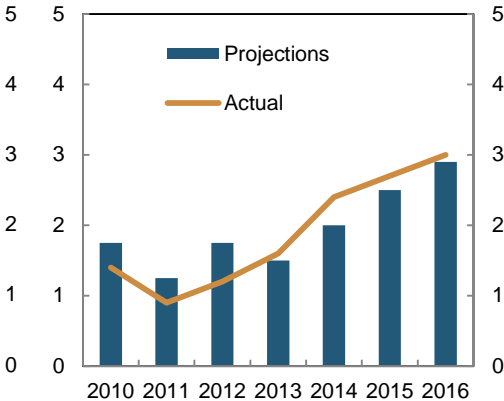


Chart 14 CPI-ATE. Projected¹⁾ and actual change. Annual growth. Percent. 2010-2016



1) Projection from the last *Monetary Policy Report* of the previous year.
Sources: Statistics Norway and Norges Bank

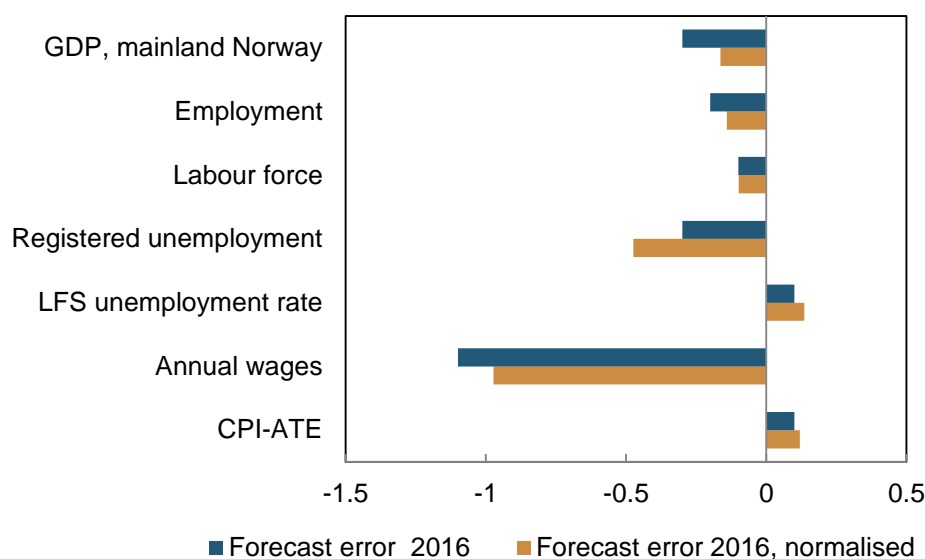
Wage growth stands out as the variable where the deviation between actual developments and projections was markedly greater in 2016 than the average deviation for the period 2010-2016.⁸ Except for the projection for 2011, the projections have overestimated wage growth through the entire period (Chart 13). In the last half of the period, the deviations probably reflect the fact that the norms for the wage settlements have proved to be lower than anticipated. Moreover, compositional effects in the wake of the fall in oil prices contributed to particularly low wage growth in 2016.

The forecast error for the year-on-year rise in the CPI-ATE was in line with the average forecast error for the years 2010-2016. However, the deviation was slightly less than the average absolute forecast error. Over the past four years, the projections have underestimated actual price developments (Chart 14). A positive forecast error for several years in a row may likely reflect the difficulty in estimating the effects of the krone depreciation between the beginning of 2013 and early 2016.

Since the typical variation (and thus the forecast error) varies somewhat among variables, it is not necessarily correct to compare the forecast errors in Chart 12 across variables. To correct for the typical variation in the series, forecast errors for 2016 are shown together with normalised forecast errors for 2016 (Chart 15). The chart shows that also measured in this way, annual wage growth stands out as the variable with the clearly largest forecast error. The deviation for registered unemployment is also relatively wide.

⁸ The deviation has not been this pronounced since 2003. At that time, however, wage growth was at a higher level, so that the percentage deviation was still lower than in 2016

Chart 15 Forecast error for 2016 and normalised forecast error¹⁾ for 2016



1) Normalised by dividing the forecast error for 2016 by the standard deviation of the series for the period 2003-2016.

Sources: Statistics Norway and Norges Bank

2.2.2. Comparison with projections from other forecasters

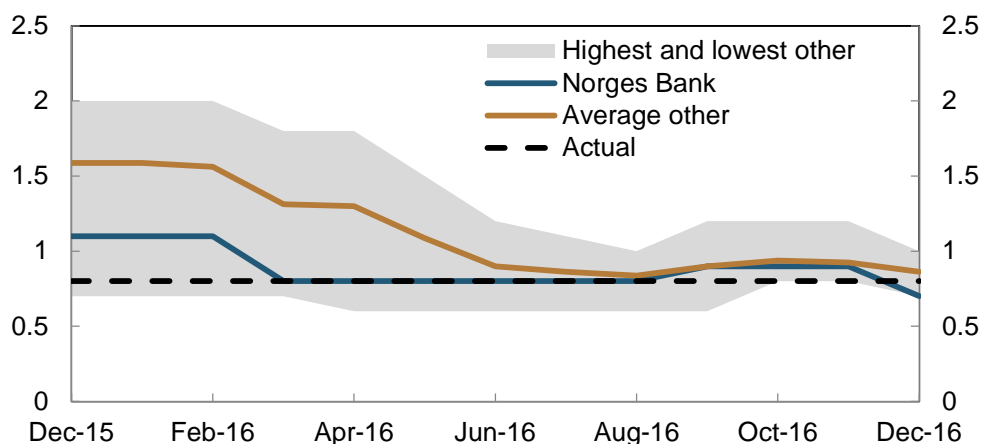
In this section, Norges Bank's projections for 2016 are compared with projections from other institutions that publish macroeconomic forecasts. The charts show developments in Norges Bank's projections from Monetary Policy Report 4/15 to Monetary Policy Report 4/16 together with projections from other forecasters⁹ in the same time period.¹⁰

Norges Bank's projection for GDP growth in 2016 at the end of 2015 was slightly closer to actual developments than an average of other forecasters' projections (Chart 16). However, there were considerable differences between the other forecasters' projections at the end of 2015 and in early 2016. Like Norges Bank, the other forecasters revised down their growth projections somewhat through the year.

⁹ The institutions included in "other forecasters" vary somewhat according to variable. This is because not all forecasters publish projections for all the variables under review.

¹⁰ The various forecasters publish projections at different times. The projections are thus based on slightly different underlying information. In the charts, the forecasts are sorted by the month in which they are published. Thus, all projections published by the relevant forecasters in the period December 2015 to December 2016 are included.

Chart 16 Mainland GDP. Projections from Norges Bank and other forecasters¹⁾. Percentage growth between 2015 and 2016

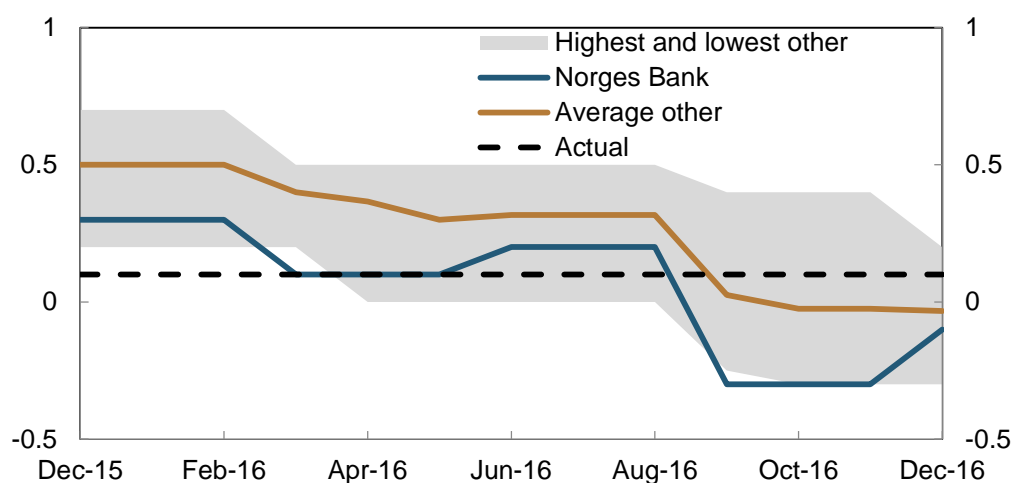


1) Danske Bank, DNB, Ministry of Finance, Handelsbanken, Nordea, SEB and Statistics Norway.

Sources: Other forecasters and Norges Bank.

Both Norges Bank's and other forecasters' projections for employment growth varied to some extent between the end of 2015 and the end of 2016, but for the period as a whole, the projections were revised down somewhat (Chart 17). In the period to autumn, Norges Bank's projection was closer to actual developments than other forecasters'. Both Norges Bank's and others' projections were revised down in autumn, but in the last part of the year an average of other forecasters' projections were still closer to actual developments than Norges Bank's projections. The Bank's projections were influenced by the downward revision in employment in the Q2 quarterly national accounts, which proved to be temporary. The dispersion of other forecasters' projections was just as wide at the end of 2016 as at the end of 2015.

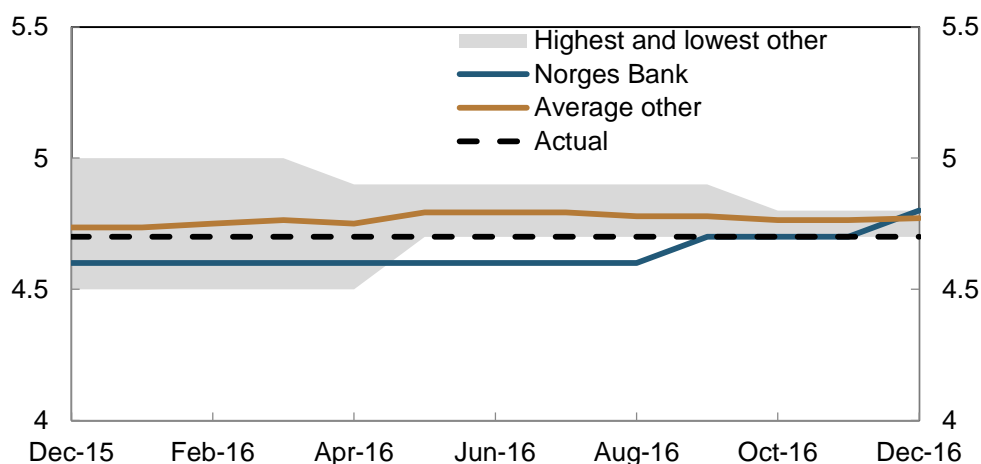
Chart 17 Employment. Projections from Norges Bank and other forecasters¹⁾. Percentage growth between 2015 and 2016.



1) DNB, Danske Bank, Ministry of Finance, Confederation of Norwegian Enterprise (NHO), Handelsbanken and Statistics Norway. Sources: Other forecasters and Norges Bank

Other forecasters' projections for LFS unemployment were, on average, slightly closer to actual developments in 2016 than Norges Banks were (Chart 18).¹¹ The differences among forecasters were fairly substantial in early 2016, but the differences narrowed relatively quickly through the first half of the year. On the whole, both the Bank's and others' projections were fairly stable through the year.

Chart 18 Unemployment (LFS). Projections from Norges Bank and other forecasters¹⁾. Percentage growth between 2015 and 2016

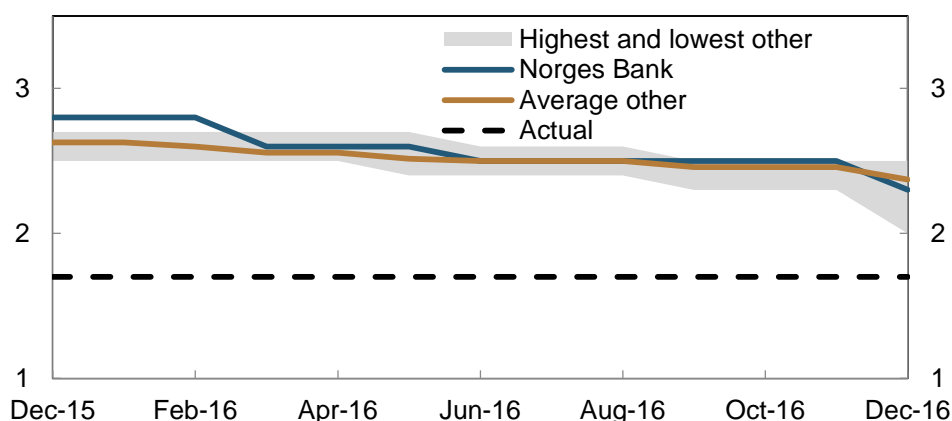


1) DNB, Ministry of Finance, Confederation of Norwegian Enterprise (NHO), Nordea, SEB and Statistics Norway.

Sources: Other forecasters and Norges Bank

Through 2016, there were small differences in the various forecasters' projections for wage growth, and the Bank's projection was close to other forecasters' projections (Chart 19). Both the Bank's and other forecasters' projections were revised down several times through the year. Nevertheless, actual wage growth in 2016 was markedly lower than projected, also compared with the year-end projections.

Chart 19 Annual wages. Projections from Norges Bank and other forecasters¹⁾. Percentage growth between 2015 and 2016.



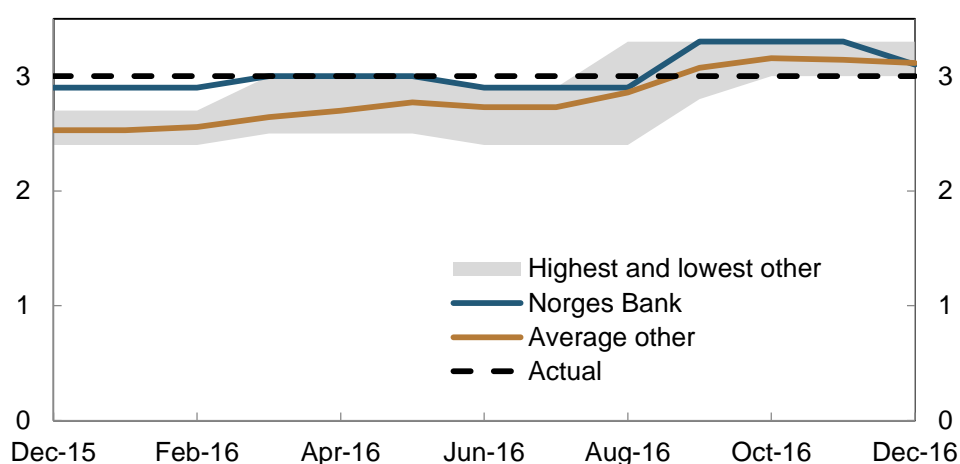
1) DNB, Danske Bank, Ministry of Finance, Handelsbanken, Nordea, SEB and Statistics Norway.

Sources: Other forecasters and Norges Bank

¹¹ The basis for this comparison is LFS unemployment, since most of the other forecasters make projections for this unemployment measure.

Norges Bank's projections for consumer price inflation (CPI-ATE) for 2016 from late 2015 were somewhat closer to actual price developments than other forecasters' projections (Chart 20). Both the Bank's and other forecasters' projections were revised up somewhat through the year. The upward revision was most pronounced after summer, when inflation proved to be higher than both the Bank and other forecasters expected. At the end of the year, Norges Bank's projections were in line with the average of others' forecasts, and slightly higher than actual inflation.

Chart 20 Consumer prices (CPI-ATE). Projections from Norges Bank and other forecasters¹⁾. Percentage change between 2015 and 2016



1) DNB, Danske Bank, Ministry of Finance, Handelsbanken, Nordea, SEB and Statistics Norway.

Sources: Other forecasters and Norges Bank

3. Conclusion

In this article, projections for the Norwegian economy for 2016 from *Monetary Policy Report 4/15* to *Monetary Policy Report 4/16* have been evaluated, with particular emphasis on the accuracy of the projections from *Monetary Policy Report 4/15* in forecasting actual developments. Compared with an average of other forecasters' projections, Norges Bank's projections for mainland GDP and CPI-ATE were relatively good, but similar to other forecasters, the forecast errors for wage growth and registered unemployment were relatively substantial.

In 2016, the Norwegian economy continued to be dominated by the fall in oil prices. Nevertheless, it appears that the trough was passed, as projected in *Monetary Policy Report 4/15*. GDP growth picked up, and there were signs of an improving labour market. At the same time, there was a noticeable shift in inflation, which after an initial rapid rise, fell markedly in the latter part of the year. This was also reasonably in line with the projections in *Monetary Policy Report 4/15*.

The projections for GDP growth also fairly accurately forecast actual developments. The forecast error for annual growth in 2016 was slightly less than the average absolute forecast error in recent years. The impending turning point for four-quarter growth was reasonably captured by the projections.

However, the composition of demand was slightly different than envisaged at the beginning of the year. Growth in private investment was higher than projected, while mainland exports were weaker than expected. Consumption growth was broadly in line with projections, even if income growth was clearly lower than projected. It may appear that when faced with fluctuations in income, consumers chose to smooth consumption over time and thus saved less rather than reduce consumption. Wealth effects owing to high house price inflation also likely underpinned consumption growth.

Wage growth in 2016 proved to be markedly lower than projected at the beginning of the year and lower than the norm on which the wage settlement was based. Wage growth was at its lowest since the Second World War, and real wages fell by nearly 2 percent. The decline in wage growth must be viewed in the context of the fall in oil prices, low productivity growth and spare capacity in the economy. At the same time, structural shifts in the Norwegian economy resulted in a marked fall in employment in high-wage industries. Such compositional effects pulled down wage growth substantially in 2016.

Annual CPI-ATE inflation was broadly in line with the projections from the end of 2015, and compared with previous years' projections, the forecast error was relatively small. Nevertheless, the composition of inflation and how quickly the inflation rate changed proved to differ from the Bank's assumptions. Consumer prices initially rose faster and then fell faster than had been assumed. The exact inflection point for inflation is difficult to forecast with precision. The effect of the exchange rate pass-through to consumer prices, both for imported goods and for domestically produced goods and services, was probably different from that assumed. The adjustments of the projections during the year were relatively substantial. Wide variations in inflation through the year also make it difficult to judge whether new data provide information about underlying developments or whether fluctuations are primarily due to temporary and random conditions.

4. Appendix

4.1. Forecasts and actual developments

Table A1 Projections for key macroeconomic variables for 2016. Percentage change from 2015 unless otherwise stated

	MPR 4/15	MPR 1/16	MPR 2/16	MPR 3/16	MPR 4/16	Preliminary figures for 2016 ¹⁾
Prices and wages						
CPI	2.8	3.1	3.3	3.6	3.6	3.6
CPI-ATE ²⁾	2.9	3.0	2.9	3.3	3.1	3.0
Annual wages ³⁾	2.8	2.6	2.5	2.5	2.3	1.7
House prices	4.8	4.1	6.6	7.9	8.3	8.3
Real economy						
GDP	0.9	-0.1	0.1	0.7	0.7	1.0
GDP, mainland Norway	1.1	0.8	0.8	0.9	0.7	0.8
Output gap, mainland Norway (level) ⁴⁾	-1.6	-1.8	-1.7	-1.6	-1.6	-1.6
Employment, persons, QNA	0.3	0.1	0.2	-0.3	-0.1	0.1
Labour force, LFS	0.4	0.3	0.6	0.4	0.5	0.3
LFS unemployment (rate, level)	4.6	4.6	4.6	4.7	4.8	4.7
Registered unemployment (rate, level)	3.3	3.3	3.2	3.0	3.0	3.0
Demand						
Mainland demand ⁵⁾	2.2	2.0	2.3	2.5	2.6	2.7
- Household consumption ⁶⁾	1.5	1.6	1.5	1.9	1.5	1.6
- Business investment ⁷⁾	-	-1.4	1.9	2.1	2.0	2.8
- Housing investment ⁷⁾	-	5.9	6.5	7.6	8.3	9.9
- Public demand ⁸⁾	3.4	2.8	3.0	2.7	3.4	3.0
Petroleum investment ⁹⁾	-11.0	-12.0	-14.0	-15.5	-15.2	-14.7
Mainland exports ¹⁰⁾	2.3	2.3	-1.3	-4.0	-5.4	-6.7
Imports	-0.8	1.1	0.4	0.6	1.4	0.3
Interest and exchange rates						
Key policy rate (level) ¹¹⁾	0.5	0.5	0.5	0.6	0.6	0.6
Import-weighted exchange rate (I-44, level) ¹²⁾	107.2	108.4	106.6	105.9	105.3	105.3
Global economy and oil prices						
GDP for trading partners ¹³⁾	2.2	2.0	2.1	2.1	2.2	2.2
External price impulses, IPK ¹⁴⁾	-	-0.6	-0.9	-0.5	-0.4	-0.4
Oil price (Brent Blend), USD per barrel (level) ¹⁵⁾	44	39	45	43	44	44

- 1) For national accounts variables, the first publication of figures for 2016 is used (published 9 February 2017).
- 2) CPI adjusted for tax changes and excluding energy products.
- 3) Annual wage growth is based on the Norwegian Technical Calculation Committee for Wage Settlements' (TBU) definitions and calculations. Actual figures for 2016 are from the quarterly national accounts.
- 4) The output gap measures the percentage deviation between mainland GDP and projected potential mainland GDP.
- 5) Household consumption and private mainland gross fixed investment and public demand.
- 6) Includes consumption for non-profit organisations.
- 7) In MPR 4/15, only projections for total private investment (the sum of business and housing investment) were published. At that time, annual growth was projected at 1.7 percent.
- 8) General government gross fixed investment and consumption.
- 9) Production and pipeline transport.
- 10) Traditional goods, travel, petroleum services and exports of other services from mainland Norway.
- 11) The key policy rate is the interest rate on banks' deposits in Norges Bank.
- 12) The weights are estimated on the basis of imports from 44 countries, which comprise 97 percent of total imports.
- 13) Export weights, 25 main trading partners.
- 14) Indicator of external price impulses to imported consumer goods. Projections for 2016 were published for the first time in MPR 1/16.
- 15) Average futures prices for last five trading days of 2016.

Sources: Statistics Norway. Norwegian Technical Calculation Committee for Wage Settlements (TBU). Norwegian Labour and Welfare Administration (NAV) and Norges Bank

4.2. Data

In the description of actual developments in national accounts variables through the year (in Section 2.1), reference is made to real-time data, ie the first publication of quarterly national accounts figures at the time in question. In the rest of the discussion and analysis of developments for 2016 as a whole, both in Sections 1 and 2, the first publication of annual national accounts figures are used, as published on 9 February 2017. This also applies to figures for 2016 in charts and tables.

On 16 May 2017, the quarterly national accounts for 2017 Q1 were published. At the same time, some of the annual figures for 2016 were changed. However, the changes from the first to second publication of the national accounts figures for 2016 are relatively minor and do not change the overall picture of developments in the Norwegian economy. In this article, the projections were therefore evaluated against the first publication of annual national accounts figures for 2016, among other reasons in the interest of consistence in the historical comparison of projections in Section 2.2.1.