

# Norges Bank's regional network: fresh and useful information

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In order to obtain early signals about developments in the Norwegian economy, Norges Bank has established a regional network of around 1 500 enterprises and other organisations around the country. Information from the regional network is an important factor in decision-making by Norges Bank's Executive Board in its conduct of monetary policy. This article reveals how information from the regional network correlates with other official statistics, and presents some of the strengths and weaknesses of the network's data series relative to other statistics. The variable set examined is relatively broad, and this overview will be a useful reference for those following the results from the regional network. The article shows that the regional network provides reliable information about economic developments, and that it captured the autumn 2008 economic downturn at an early stage. It also shows that the regional network provides information which is not otherwise available.

## 1. Introduction

Norges Bank established its regional network in 2002. Regular interviews with contacts in Norwegian industry are used to obtain information about enterprises' view of the current situation and outlook before other official statistics are available. This contact also results in a better understanding of the dynamics within and between sectors and a better insight into what is driving current economic developments. This insight from the enterprises in the network, together with the regular reports on economic developments, makes the regional network an important factor in decision-making by Norges Bank's Executive Board in its conduct of monetary policy. The economic developments reported are published regularly and made available on Norges Bank's website. Summaries of the national and regional reports are also published here.

Kallum, Sjøtøl and Haugland (2005) reported in their article on how the regional network is organised and what information is collected. Their article also includes a comparison of information from the regional network with official statistics. Since that article was published, the Norwegian economy has experienced a strong economic upswing and a financial crisis. It is therefore now appropriate to re-evaluate the information from the regional network in order to assess how well the network has captured these economic developments. This article also presents a broader variable set than previously published.

It should therefore be a useful reference for those following the regional network's regular published reports.

Section 2 provides some general information about the regional network. To explore how well the network captures and predicts developments in the economy, in Sections 3 and 4 we compare the series from the regional network graphically with relevant series from other available statistics, and calculate correlation coefficients. We use series for the national average, sector averages and regional averages. Section 3 looks at the network's retrospective series for reported developments, while Section 4 covers the network's prospective series. Section 5 summarises the most important results.

## 2. What is Norges Bank's regional network?

The regional network (RN) consists of around 1 500 enterprises, organisations, local authorities, hospitals and other public bodies right around the country. We refer to these as contacts or contact enterprises, and each one is contacted once or twice a year. We have divided the country into seven regions: Inland, Mid-Norway North, North-West, South-West, South and East. Information is normally collected through four ordinary contact rounds a year.<sup>2</sup> We hold meetings with 40–50 contact enterprises in each

<sup>1</sup> With thanks to Bjørn Helge Vatne, Fredrik Wulfsberg and colleagues at Norges Bank Monetary Policy for valuable comments and input, and especially to Kjetil Martinsen for his help with the data.

<sup>2</sup> Until autumn 2008, information from the network was collected exclusively through five ordinary contact rounds. Since autumn 2008, information from the network has been collected through four ordinary contact rounds plus additional telephone rounds where deemed appropriate.

region, making a total of almost 300 per round. The regular themes for contacts in the private sector can be divided into four categories: output and utilisation of production capacity; investment plans; employment and labour supply; and costs, prices and profitability (see Appendix A). The regular themes in the public sector are: investment; employment; labour supply; and costs (see Appendix B). Besides these regular themes, a topical special theme is chosen for each round, such as the use of foreign labour or planned action in response to the financial crisis.

Contacts are divided into the following sectors: manufacturing, building and construction, retail trade, services and public sector. Manufacturing contacts are categorised into export industry, domestically-oriented manufacturing and suppliers to the petroleum sector, according to where the bulk of their output is aimed. Contacts in the service sector are divided into household services (B2C) and corporate services (B2B). In the public sector, contacts are based at local authorities, regional authorities and hospitals. The regional network does not have contacts in oil production or overseas shipping, because the focus is on the mainland economy. Nor does the network include contacts from agriculture and some other primary industries, because these industries are deemed to be regulated and are guided more by factors other than the business cycle. We do not have contacts in central government, but obtain information periodically from central government bodies, such as the Norwegian Labour and Welfare Service's regional offices.

Information-gathering focuses on what the contacts believe the developments in their sector to be. The information received is used to produce both quantitative statistics and qualitative reports. The quantitative statistics are compiled by weighting the information received to reflect developments in each sector in the various regions. The regional series for the individual sectors are then weighted to create regional averages, national sector averages and national averages for each theme. The national average for a theme, compiled by weighting the various national sector series, is referred to as the aggregated series. Martinsen and Wulfsberg (2009) provide a detailed description of the principles for this weighting process.

One of the aims of the regional network is to obtain fresh information about developments in Norwegian industry. The time at which the data become available is therefore very important. The quarterly national accounts (QNA) are available roughly 50 days after the end of a calendar quarter. The regional network supplies data for the same quarter at a much earlier point. For example, the contact round carried out in November captures

developments in October and part of November. The regional network signalled as early as December 2008 that output in the mainland economy had fallen in Q4. It was more than two months (19 February 2009) before the QNA for Q4 were released and showed the same.

So that the information is as up-to-date as possible when presented at the Executive Board's rate-setting meetings, it is often collected across calendar quarters. Many of the official series against which the regional network data are evaluated are quarterly series, and so we also construct quarterly series. The quarterly values are a weighted sum of the two contact rounds covering the quarter in question.

### 3. Current situation

One important aim of the regional network is to provide a good picture of the current situation in Norwegian industry. In the following, we compare the results for the series for output growth, capacity utilisation, labour supply, employment growth and price changes with other available statistics.

#### *3.1 Growth in output over the past three months*

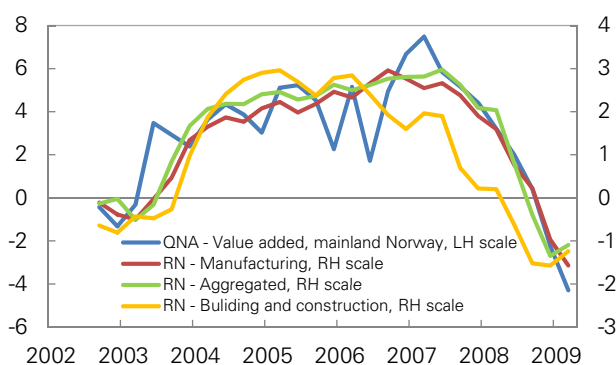
We ask the contacts in the regional network about seasonally-adjusted growth in their production volumes over the past three months relative to the previous three-month period (Question 1.1 in Appendix A). We also ask them to consider whether their volume growth is representative of the sector as a whole. We categorise the responses on a scale from -5 to +5, where +1 corresponds to annualised quarterly growth of 1–3 per cent, +2 corresponds to annualised quarterly growth of 3–5 per cent, and so on. An annualised quarterly decrease of 9 per cent or more is categorised as -5, while an annualised quarterly increase of 9 per cent or more is categorised as +5. This information is used in the preparation of Norges Bank's projections of GDP for mainland Norway. It is, for example, included in one of the models in Norges Bank's System of Averaging Models (SAM), where it has demonstrated solid explanatory power.<sup>3</sup>

In principle, the questions relating to output are designed to capture developments in gross output. However, as the network's output series are used for projections of value added (net output), it is also interesting to see whether the network's output series correlate with value added.<sup>4</sup> We have therefore compared the regional network's output series with the annualised quarterly

<sup>3</sup> See discussion of Norges Bank's System of Averaging Models in Monetary Policy Report 2/08 and Norges Bank's Annual Report 2008.

<sup>4</sup> Value added is gross output less intermediate inputs.

**Chart 1** Comparison of the RN series for quarterly growth in output (aggregated, building and construction and services, index, right-hand scale) with trend-adjusted annualised quarterly growth in value added for mainland Norway from the QNA (per cent, left-hand scale)



Source: Statistics Norway, Norges Bank's regional network

growth in value added for mainland Norway (see Appendix C). We have used a trend-adjusted series from the QNA where the seasonal component and irregular components have been removed. Chart 1 plots this series against the network's aggregated output series and the network's output series for manufacturing and services. Table 1 shows the correlation coefficients between the network's output series and the annualised quarterly growth in value added for mainland Norway.

Table 1 reveals a strong correlation between most of the network's output series and value added for mainland Norway. The correlation is strongest for manufacturing, which shows stronger correlation than the aggregated series. Chart 1 shows that both the RN series for building and construction and the aggregated RN series for 2008 reported a fall in output before the QNA reported a fall in value added.

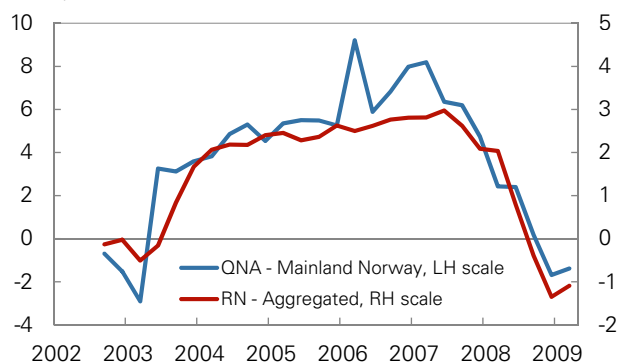
We have also compared the regional network's aggregated output series with annualised quarterly volume growth in gross output in mainland Norway from the QNA (see Appendix D). Again we have used trend-adjusted series from the QNA where the seasonal component and irregular components have been removed.

**Table 1** Correlation coefficients for the RN series for quarterly growth in output compared with trend-adjusted quarterly growth in value added for mainland Norway from the QNA

RN series	
Aggregated	0.86
Manufacturing	0.87
Building and construction	0.70
Retail trade	0.76
Services	0.83

Source: Statistics Norway, Norges Bank's regional network

**Chart 2** Comparison of the RN aggregated series for quarterly growth in output (index, right-hand scale) with trend-adjusted annualised quarterly growth in gross output for mainland Norway from the QNA (per cent, left-hand scale)



Source: Statistics Norway, Norges Bank's regional network

The RN series is expected to show strong simultaneous correlation with this QNA series. Chart 2 plots the series against one another, and the top line of Table 2 shows the correlation coefficient.

Both Chart 2 and the correlation coefficient of 0.91 show that the aggregated RN series closely mirrors developments in gross output for mainland Norway in the QNA series. In particular, the RN series and QNA series move almost identically from 2008 onwards. When the downturn in the economy struck in autumn 2008, the network reported a fall in overall output for mainland Norway in the last part of 2008 in December, whereas the QNA data, which also showed a decrease in output for the same period, were not published until February 2009. The network also provided information in mid-May 2009 that the downturn was easing, which was used for internal analyses in the Bank. In August 2009, the QNA revealed weak growth in the economy.

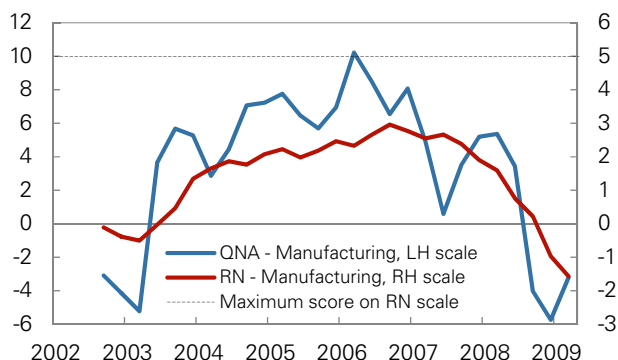
Chart 2 reveals that the regional network's earliest observations, in late 2002 and early 2003, captured developments in the QNA less well, but that the network has captured developments in the QNA series much better in the period since. We can also see from Chart 2 that the

**Table 2** Correlation coefficients for the RN series for quarterly growth in output compared with trend-adjusted quarterly growth in gross output from the QNA, aggregated and by sector

Aggregated	0.91
Manufacturing	0.81
Building and construction	0.67
Retail trade	0.80
Services	0.75

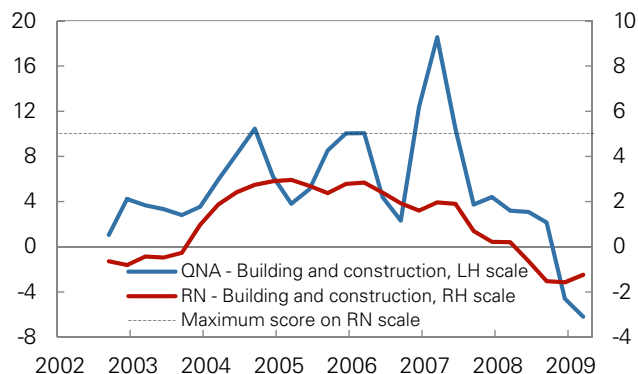
Source: Statistics Norway, Norges Bank's regional network

**Chart 3** Comparison of the RN series for quarterly growth in output in manufacturing (index, right-hand scale) with trend-adjusted annualised quarterly growth in gross output in manufacturing from the QNA (per cent, left-hand scale)



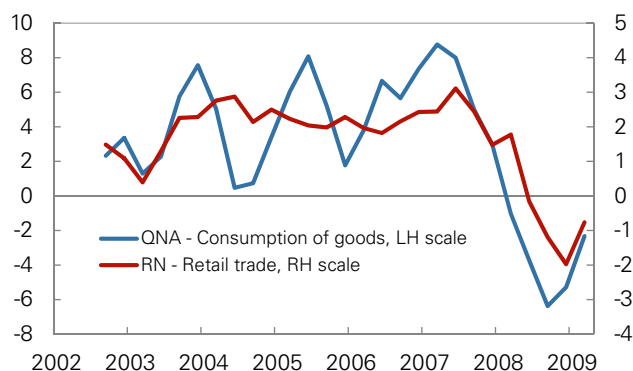
Source: Statistics Norway, Norges Bank's regional network

**Chart 4** Comparison of the RN series for quarterly growth in output in building and construction (index, right-hand scale) with trend-adjusted annualised quarterly growth in gross output in building and construction from the QNA (per cent, left-hand scale)



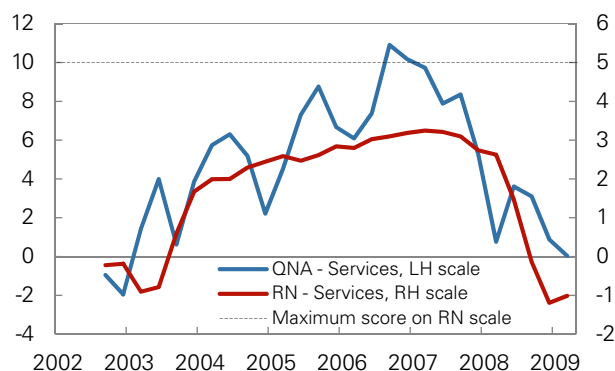
Source: Statistics Norway, Norges Bank's regional network

**Chart 5** Comparison of the RN series for quarterly growth in output in retail trade (index, right-hand scale) with annualised quarterly growth in the consumption of goods from the QNA (per cent, left-hand scale)



Source: Statistics Norway, Norges Bank's regional network

**Chart 6** Comparison of the RN series for quarterly growth in output in services (index, right-hand scale) with trend-adjusted annualised quarterly growth in gross output in services from the QNA (per cent, left-hand scale)



Source: Statistics Norway, Norges Bank's regional network

network captured the relatively large quarterly changes from the first quarter of 2006 to the first quarter of 2007 less well. We believe that part of the reason for this may be the scale used for the network, as increases and decreases of more than 10 per cent are not fully captured by the scale. In the period from 2006 to 2007, annual growth in some sectors was significantly more than 10 per cent. In the period since, the quarterly changes have been smaller. Another reason why the network did not fully capture the strong growth in the period from 2006 to 2007 may be that a substantial proportion of the growth in some sectors, such as building and construction, was absorbed by a growing number of enterprises. It is more difficult for the regional network to capture this form of growth than growth which is absorbed by existing contact enterprises. It is also important to note that 3 on the scale for the network indicates growth of 5–7 per cent.

We have also compared the RN series for output over the past three months by sector with annualised trend-

adjusted volume growth figures for gross output by sector from the QNA (see Appendix D and Chart 3–6).

The RN series for manufacturing, retail trade and services mirror the respective QNA series relatively closely. The correlation coefficients of 0.81, 0.80 and 0.75 respectively support this (see Table 2). Both Chart 4 and the correlation coefficient for building and construction of 0.67 show that this RN series has a slightly weaker correlation with the QNA than the other RN series. The chart nevertheless indicates that the RN series captures the trend in the QNA series quite well. Common to the sector series is that, like the aggregated series, they were less successful in capturing the strong growth during the period from 2006 to early 2007. Like the aggregated series, the sector series mirror developments from 2007 onwards relatively well. The RN series have moved more smoothly than the sector series from the QNA despite the latter being trend-adjusted.

To explore whether some regions capture developments in national output better than others, we have compared the aggregated RN output series for each region with the

annualised volume growth figures for gross output in mainland Norway from the QNA.

Table 3 reveals that all regions have a strong correlation with gross output for mainland Norway. The correlations are slightly weaker than for aggregated output, but this is not significant.

The RN series for output growth correspond well with both value added and gross output in the QNA. As described in the section on data availability, however, the series from the regional network are available much earlier than the QNA.

When it comes to the retail trade, Statistics Norway also publishes a monthly index for household consumption of goods, released six weeks after each month-end. This series therefore provides information more frequently than the regional network. Although the household consumption index is available earlier than the RN series, the network's information on output in the retail trade is still important as a cross-check in analytical work. It is also an important component of the network's aggregated output series. In addition, the retail trade contacts provide information on factors such as households' purchasing behaviour, changes in the breakdown between durable and non-durable consumer goods, and trends in other sectors such as building materials and food.

### 3.2 Capacity utilisation and labour supply

Information on whether enterprises have idle production capacity and whether they have ample access to labour is important for work on projecting future movements in prices, wages and real investment. Based on the questions we ask our contacts, we produce series which show the proportion of enterprises that are having capacity problems (Question 1.3 in Appendix A) and the proportion of enterprises that are having capacity problems due to a limited supply of labour (Question 3.3 in Appendix A and Question 1.4 in Appendix B). Hence, these variables measure a level and not a growth rate. No comparison of these series with official statistics has previously been published.

Chart 7 compares the RN series for capacity utilisation and labour supply in manufacturing with capacity utilisation as measured in Statistics Norway's *General Business Tendency Survey* (Statistics Norway, 2009a).

Chart 7 and correlation coefficients of 0.96 for capacity utilisation and 0.93 for labour supply show that the RN series largely mirror the tendency survey. The temporary dip in the RN series for capacity utilisation in the first quarter of 2008 can be explained to some extent by the sample of enterprises in that contact round.

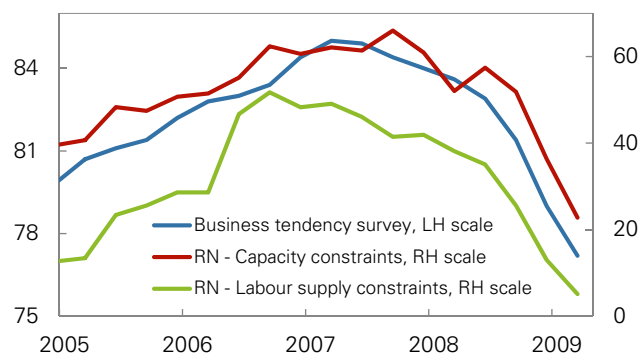
Chart 8 reveals that the RN series for capacity utilisation in manufacturing also has a relatively strong correlation with the overall Norwegian purchasing managers

**Table 3** Correlation coefficients for the regional RN series for quarterly growth in output compared with trend-adjusted annualised quarterly growth in gross output for mainland Norway from the QNA

RN series	
National (aggregated)	0.91
Inland	0.85
Mid-Norway	0.89
North	0.87
North-West	0.90
South-West	0.88
South	0.89
East	0.89

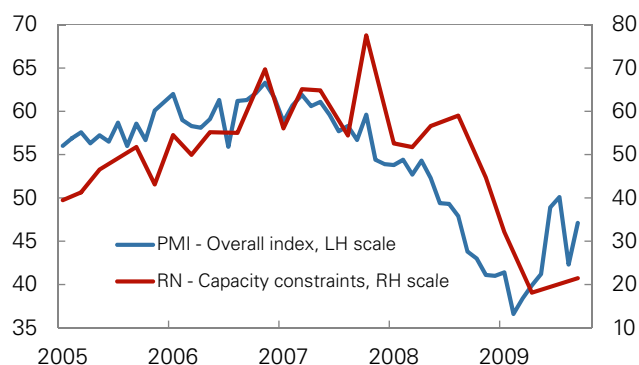
Source: Statistics Norway, Norges Bank's regional network

**Chart 7** Comparison of the RN series for capacity utilisation and labour supply in manufacturing (percentage share, right-hand scale) with Statistics Norway's business tendency survey (diffusion index, left-hand scale)



Source: Statistics Norway, Norges Bank's regional network

**Chart 8** Comparison of the RN series for capacity utilisation in manufacturing (percentage share, right-hand scale) with the PMI's seasonally-adjusted overall index (diffusion index, left-hand scale)



Sources: NIMA, Norges Bank's regional network

index (PMI) (NIMA, 2009a). Chart 9 also shows that the RN series for labour supply in manufacturing largely follows developments in the PMI's employment sub-index (NIMA, 2009b). The PMI data are published monthly a few days after the month-end.

The RN series for capacity utilisation and labour supply for manufacturing appear to contribute roughly the same information as the PMI and business tendency survey. The PMI is released only a few days after each month-end and is therefore available both more frequently and earlier than the RN series.

The business tendency survey and the PMI cover mainly manufacturing companies, whereas the RN series also cover several other sectors. The high degree of correlation with relevant series for manufacturing may indicate that the RN series provide a reliable picture of capacity utilisation in the other sectors as well. Chart 10 shows capacity utilisation in manufacturing, building and construction, retail trade and services, while Chart 11 shows labour supply in the same sectors. These series have not been published before.

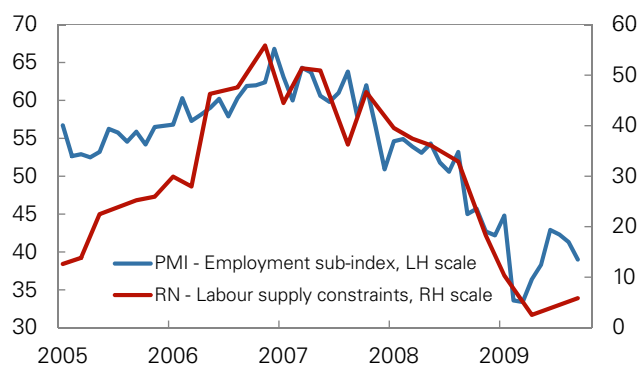
Building and construction stands out clearly from the other sectors in both Chart 10 and Chart 11. Building and construction had considerably higher capacity utilisation and faced a considerably tighter labour market than the other sectors through to mid-2008. Since the second half of 2008, capacity utilisation and labour supply in building and construction have been on a par with the other sectors.

### 3.3 Employment over the past three months

We ask contacts in the network about growth in the number of person-years worked over the past three months (Question 3.1 in Appendix A and Question 1.2 in Appendix B). We categorise these responses on a scale from -5 to +5, where +1 corresponds to quarterly growth of 0.5–1.5 per cent, +2 corresponds to quarterly growth of 1.5–2.5 per cent, and so on. A quarterly decrease of 4.5 per cent or more is categorised as -5, while a quarterly increase of 4.5 per cent or more is categorised as +5. Both the concrete growth figures provided and the dialogue on this theme provide information about developments in the labour market.

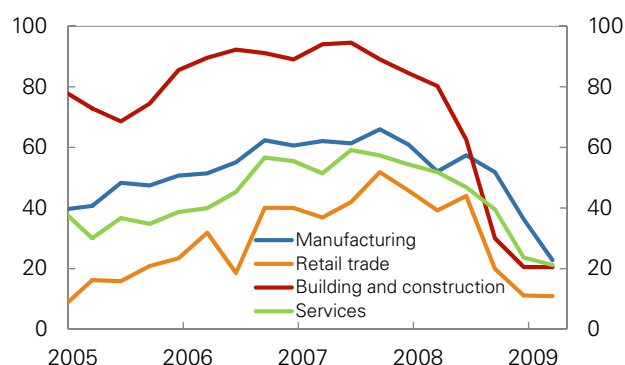
To explore whether the RN series are reliable indicators of developments in employment, we have compared the RN series with seasonally-adjusted quarterly growth in the number of employed from the QNA (Statistics Norway, 2009b). The results are shown in Chart 12.

**Chart 9** Comparison of the RN series for labour supply in manufacturing (percentage share, right-hand scale) with the PMI's employment sub-index (diffusion index, left-hand scale)



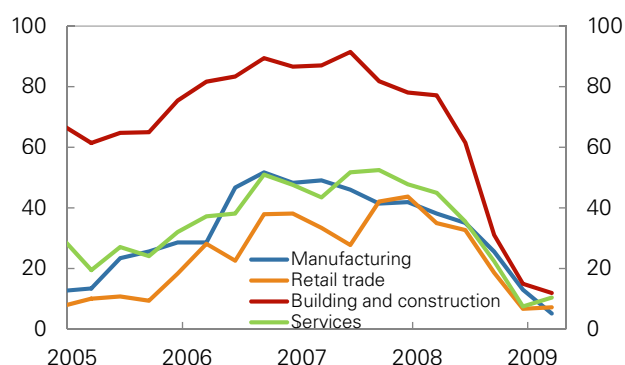
Sources: NIMA, Norges Bank's regional network

**Chart 10** RN series for capacity utilisation in manufacturing, building and construction, retail trade and services. Percentage share



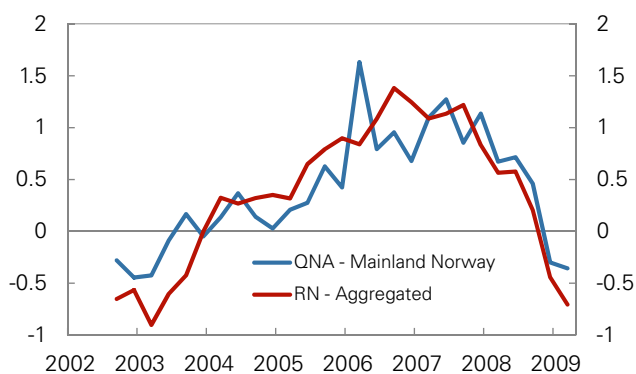
Source: Norges Bank's regional network

**Chart 11** RN series for labour supply in manufacturing, building and construction, retail trade and services. Percentage share



Source: Norges Bank's regional network

**Chart 12** Comparison of the RN aggregated series for growth in employment over the past three months with quarterly growth in the number of employed for mainland Norway from the QNA. Per cent

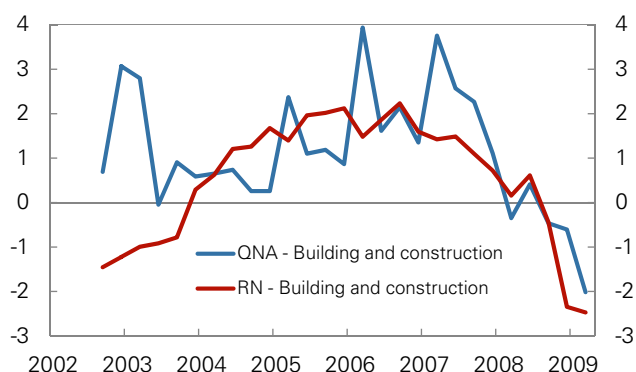


Source: Statistics Norway, Norges Bank's regional network

Chart 12 and Table 4 reveal that the aggregated RN series successfully captures the trend in the series for quarterly growth in the number of employed from the QNA. Chart 12 again shows that the QNA series varies slightly more than the RN series. This may be because the regional network's quarterly series are compiled by weighting more than one round (see the principles for the preparation of quarterly data in Section 2 above). This could serve to smooth the series somewhat.

Table 4 shows that the RN series for employment in manufacturing and services correlate relatively well with the corresponding QNA series. The correlation is weaker for the other sectors, especially building and construction. Chart 13 shows, however, that although the QNA varies substantially more, the RN series for building and construction and the QNA series show the same trend from mid-2006 onwards. In the previous period, there was less correspondence. If the first six observations are omitted from the comparison, the correlation coefficient rises to 0.68.

**Chart 13** Comparison of the RN series for growth in employment in building and construction over the past three months with quarterly growth in the number of employed in construction from the QNA. Per cent



Source: Statistics Norway, Norges Bank's regional network

**Table 4** Correlation coefficients for the RN series for growth in employment over the past three months compared with quarterly growth in the number of employed from the QNA, aggregated and by sector

Aggregated	0.86
Manufacturing	0.76
Building and construction	0.44
Retail trade	0.50
Services	0.72
Public sector <sup>1</sup>	0.58

<sup>1</sup> The RN series is compared with the percentage change in hours worked relative to the previous quarter in the QNA's series for health and social work and local government.

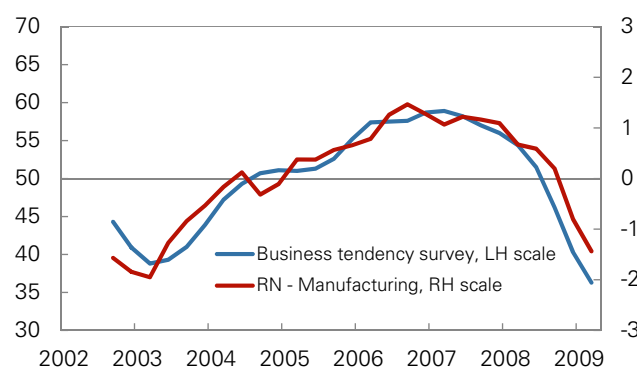
Source: Statistics Norway, Norges Bank's regional network

The series for the retail trade and the public sector also correlate relatively weakly with growth in the number of employed in these sectors according to the QNA. One explanation for this may be that a large proportion of the network's contacts in these sectors are from retail chain head offices and local government headquarters, which often have a better overview of employment on an annual basis than of developments from quarter to quarter.

The RN series for employment growth in manufacturing is strongly correlated with quarterly growth in average employment in Statistics Norway's business tendency survey for the manufacturing sector (see Chart 14). The correlation coefficient here is 0.94.

The growth in employment in the first part of 2006 was captured slightly more quickly by the tendency survey, while the slowdown in employment growth from the first quarter of 2008 was captured more or less simultaneously by the two series. Chart 14 suggests that the tendency survey leads the RN series slightly. It is important to

**Chart 14** Comparison of the RN series for growth in employment in manufacturing (per cent, right-hand scale) with quarterly growth in average employment in manufacturing from Statistics Norway's business tendency survey (diffusion index, left-hand scale)



Source: Statistics Norway, Norges Bank's regional network

**Table 5** Correlation coefficients for the regional RN series for growth in employment over the past three months compared with quarterly growth in the number of employed in mainland Norway from the QNA

RN series	
National (aggregated)	0.86
Inland	0.78
Central Norway	0.83
North	0.72
North-West	0.76
South	0.86
South-West	0.82
East	0.78

Source: Statistics Norway, Norges Bank's regional network

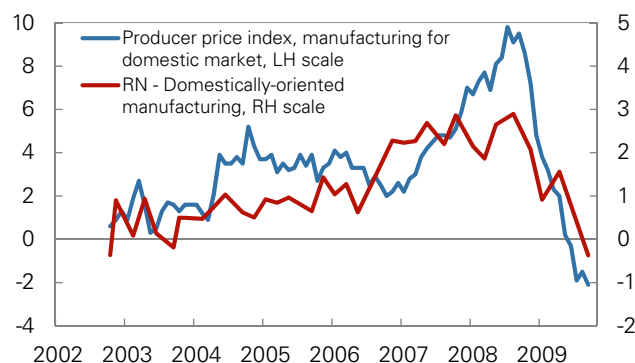
emphasise in this context that the RN series is normally presented a couple of weeks earlier.

Table 5 shows that none of the regional series for employment correlates better with quarterly growth in the number of employed from the QNA than the national series does. It should, however, be noted that Region South correlates just as closely as the national average. There are relatively small differences between the regional series' correlation with the QNA series.

### 3.4 Prices

Contacts in the network are asked about changes in prices over the past 12 months in their sector (Question 4.3 in Appendix A). A value of  $-5$  on the network's scale corresponds to a decrease of 9 per cent or more, while  $+5$  corresponds to an increase of 9 per cent or more. A value of 1 corresponds to a price increase of 1–3 per cent. Of the network's series for price changes, only the series for price changes in domestically-oriented manufacturing and building and construction are comparable with other official statistics. In this section, we compare the RN series for price changes in domestically-oriented manufacturing with the producer price index for manufacturing for the domestic market, and the RN series for price changes in building and construction with the construction cost index for residential buildings. The RN series for price changes in building and construction and the construction cost index for residential buildings do not measure quite the same thing: the construction cost index measures the cost of erecting dwellings, whereas the RN series measures not only this but also building contractors' mark-ups. We have assumed that the two series are partially comparable nevertheless. No comparison of the RN series for price

**Chart 15** Comparison of the RN series for annual price changes in domestically-oriented manufacturing (index, right-hand scale) with the change in the producer price index for manufacturing for the domestic market (per cent, left-hand scale)



Source: Statistics Norway, Norges Bank's regional network

changes with other official statistics has been published before.

Chart 15 compares the RN series for price changes in domestically-oriented manufacturing with the 12-month change in the producer price index for manufacturing for the domestic market (Statistics Norway, 2009c). Information from the network will rarely be available earlier than the producer price index, which is a monthly series. However, one important function of the RN series is as a cross-check for other information gathered, and the dialogue with our contacts also gives us a better understanding of the drivers behind price-setting in domestically-oriented manufacturing and related industries.

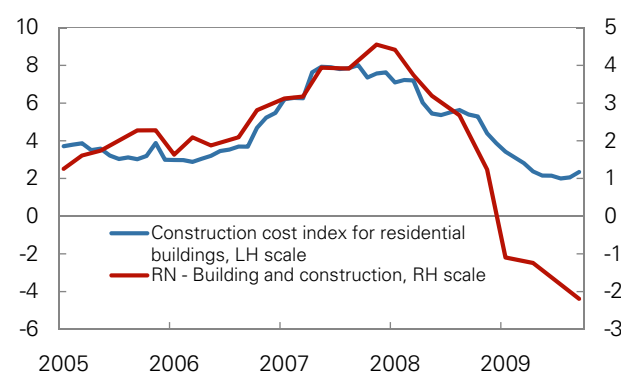
Chart 15 reveals that, at times, there is a weak relationship between the RN series and the producer price index for manufacturing for the domestic market. The correlation coefficient is 0.68. However, the producer price index rises considerably further in the period from 2004 to 2006 and in 2008. This can presumably be explained by the regional network not having followed Statistics Norway's principles for weighting the various manufacturing industries, as the regional network does not divide domestically-oriented manufacturing into sub-sectors. In addition, it is likely that the network's scale did not fully capture the strong actual rise in prices in periods such as 2008.

The RN series for price changes in building and construction has been compared with the 12-month change in the construction cost index for residential buildings (Statistics Norway, 2009d) (see Chart 16).

The correlation coefficient of 0.81 indicates a strong correlation between the RN series for annual price changes in building and construction and the construction cost index for residential buildings. Chart 16 shows that the RN series mirrors the construction cost index closely through to mid-2007, since when the two series have

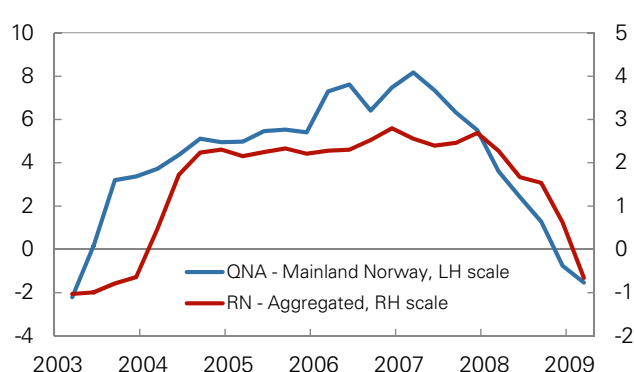


**Chart 16** Comparison of the RN series for annual price changes in building and construction (index, right-hand scale) with the construction cost index for residential buildings (per cent, left-hand scale)



Source: Statistics Norway, Norges Bank's regional network

**Chart 17** Comparison of the RN series for expected growth in output over the next six months (index, right-hand scale) with the annualised semi-annual growth in trend-adjusted gross output for mainland Norway from the QNA six months ahead (per cent, left-hand scale)



Source: Statistics Norway, Norges Bank's regional network

performed somewhat differently. For example, the RN series climbs further than the construction cost index in late 2007 before falling faster. The network's contacts in building and construction reported solid growth in profitability through to summer 2008, but have since reported decreasing profitability. This helps to explain why the RN series moved above the construction cost index for a period towards the end of the economic upswing and has since held below it. Chart 16 and the strong correlation coefficient indicate that the RN series provides early and reliable information about price movements in the building and construction sector. The series also adds value to the index from Statistics Norway, as it also captures price changes due to building contractors' mark-ups.

## 4. Expectations

We have compared the regional network's prospective series for output growth, investment growth, employment growth and wage growth with actual developments according to official statistics.

### 4.1 Expected growth in output over the next six months

Contacts in the network are asked about expected growth in output over the next six months (Question 1.2 in Appendix A). To explore how well the network's expectations of future output correspond to actual developments, we have compared the RN series with the annualised semi-annual growth in trend-adjusted gross output series from the QNA (Appendix D).

Chart 17 and Table 6 reveal no clear tendency for the RN series for the national average to lead growth in gross output for mainland Norway from the QNA. Chart 17 shows that, to some extent, contacts in the network predicted the fall in output towards the end of 2008. The leading correlation coefficients of 0.92 and 0.80 for three and six months ahead also indicate that the aggregated RN series has some leading properties relative to the QNA series for mainland Norway (see Table 6).

The correlation coefficients indicate that the prospective series for some sectors coincide closely with actual

**Table 6** Correlation coefficients for the RN series for expected growth in output over the next six months compared with the annualised semi-annual growth in trend-adjusted gross output from the QNA, aggregated and by sector

RN series	Period		
	0 months ahead (coincident)	3 months ahead (leading)	6 months ahead (leading)
Aggregated	0.93	0.92	0.80
Manufacturing	0.91	0.85	0.67
Building and construction	0.64	0.66	0.62
Retail trade	0.90	0.79	0.59
Services	0.72	0.78	0.77

Source: Statistics Norway, Norges Bank's regional network

developments and have lesser leading properties (see Table 6). There are a number of possible reasons for this. First, contacts' expectations will be greatly influenced by the current situation and will, to some extent, be adaptive. In addition, the strong correlations for all three periods may be a reflection of most changes being gradual.

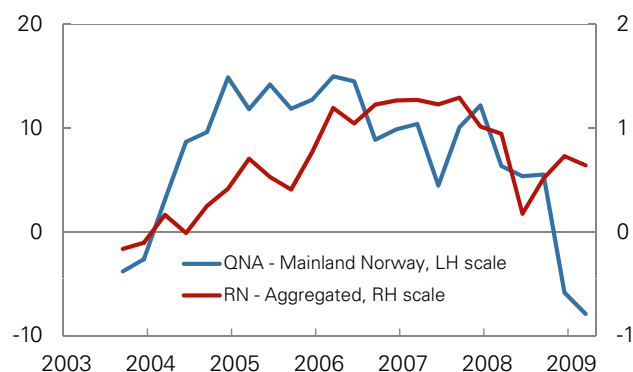
There are small differences in correlation between expectations for output in the various regions and the QNA. Region South-West has the strongest correlation. Table 7 shows that Region South-West has marginally stronger correlation coefficients for the periods three and six months ahead than the national series.

#### 4.2 Investment plans

We ask contacts in the network whether they are planning increased investment activity over the next 12 months relative to the previous 12 months (Question 2.1 in Appendix A and Question 3.1 in Appendix B). Again, we categorise responses on a scale from -5 to +5, where +1 corresponds to 12-month growth of 5–15 per cent, +2 corresponds to growth of 15–25 per cent, and so on. A 12-month decrease of 45 per cent or more is categorised as -5, while an increase of 45 per cent or more is categorised as +5. Chart 18 shows the aggregated RN series compared with the QNA's four-quarter growth in gross fixed capital formation for mainland Norway (Statistics Norway, 2009e).

As can be seen from Table 8, the national average for the RN series and gross fixed capital formation in the QNA show a clear correlation, and the RN series is strongly correlated with the QNA series three and six months ahead. However, it is clear from Chart 18 and Table 8 that the correlation is weaker nine and 12 months ahead. The further ahead in time investment activity is estimated, the greater the chances of circumstances arising that cause plans to change. Such circumstances

**Chart 18** Comparison of the RN series for growth in investment over the next 12 months (index, right-hand scale) with four-quarter growth in gross fixed capital formation for mainland Norway from the QNA 12 months ahead (per cent, left-hand scale)



Source: Statistics Norway, Norges Bank's regional network

might include increased demand or changes in credit conditions. The uncertainty associated with expectations more than two quarters ahead is exacerbated by contacts being asked about their investment plans over the next 12 months relative to the previous 12 months regardless of where in the financial year the enterprise finds itself. This may be particularly difficult to answer in the middle of a financial year, because the estimates need to be made across more than one set of accounts. This is a particular challenge for many contacts in the public sector.

Table 8 shows that the RN series for the individual sectors generally have relatively little correlation with the QNA series for gross fixed capital formation. The exception is the RN series for services, which has roughly as strong a correlation with the QNA series as the aggregated series does.

Table 9 reveals that there is considerable variation in the correlation between the various regions' investment series and gross fixed capital formation in the QNA. All

**Table 7** Correlation coefficients for the regional RN series for expected growth in output over the next six months compared with the annualised semi-annual growth in gross output for mainland Norway from the QNA

RN series	Period		
	0 months ahead (coincident)	3 months ahead (leading)	6 months ahead (leading)
National (aggregated)	0.93	0.92	0.80
Inland	0.84	0.82	0.78
Mid-Norway	0.82	0.87	0.86
North	0.89	0.83	0.65
North-West	0.89	0.88	0.72
South-West	0.89	0.93	0.84
South	0.91	0.89	0.78
East	0.93	0.88	0.78

Source: Statistics Norway, Norges Bank's regional network

**Table 8** Correlation coefficients for the RN series for growth in investment over the next 12 months compared with annual growth in gross fixed capital formation from the QNA, aggregated and by sector

	Period				
	0 months ahead (coincident)	3 months ahead (leading)	6 months ahead (leading)	9 months ahead (leading)	12 months ahead (leading)
Aggregated	0.79	0.80	0.75	0.60	0.39
Manufacturing	0.38	0.53	0.63	0.53	0.47
Retail trade	0.20	-0.04	-0.19	-0.25	-0.32
Services, aggregated	0.80	0.84	0.78	0.58	0.38
Public sector <sup>1</sup>	-0.03	0.15	0.42	0.56	0.67

<sup>1</sup> The RN series is compared with four-quarter growth in gross fixed capital formation in the QNA for health and social work and local government.

Source: Statistics Norway, Norges Bank's regional network

**Table 9** Correlation coefficients for the regional RN series for expected growth in investment over the next 12 months compared with annual growth in gross fixed capital formation for mainland Norway from the QNA

RN series	Period				
	0 months ahead (coincident)	3 months ahead (leading)	6 months ahead (leading)	9 months ahead (leading)	12 months ahead (leading)
National (aggregated)	0.79	0.80	0.75	0.60	0.39
Inland	0.31	0.26	0.25	0.12	-0.05
Mid-Norway	0.36	0.27	0.27	-0.01	-0.42
North	0.36	0.55	0.55	0.54	0.61
North-West	0.74	0.77	0.75	0.60	0.38
South-West	0.71	0.56	0.33	0.24	0.21
South	0.46	0.54	0.56	0.44	0.20
East	0.70	0.66	0.63	0.56	0.45

Source: Statistics Norway, Norges Bank's regional network

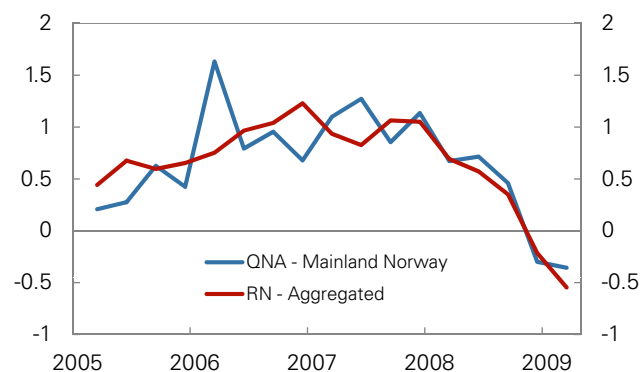
in all, it seems that the series for the national average is most closely correlated with gross fixed capital formation in the QNA, but the series for Region North-West is almost as closely correlated as the national average.

#### 4.3 Employment over the next three months

Contacts in the network are also asked about how they expect growth in the number of person-years worked to change over the next three months (Question 3.2 in Appendix A and Question 1.3 in Appendix B). To explore how well the network's expectations correspond to actual developments, we have compared the RN series with seasonally-adjusted quarterly growth in the number of employed from the QNA (Statistics Norway, 2009b) for the various dates. The results are shown in Chart 19.

Chart 19 and Table 10 show that there is a relatively strong correlation between the aggregated RN series and the QNA series for mainland Norway, and that the aggre-

**Chart 19** Comparison of the RN aggregated series for expected growth in employment over the next three months with quarterly growth in the number of employed for mainland Norway from the QNA three months ahead. Per cent



Source: Statistics Norway, Norges Bank's regional network

**Table 10** Correlation coefficients for the RN series for expected growth in employment over the next three months compared with quarterly growth in the number of employed from the QNA, aggregated and by sector

RN series	Period	
	0 months ahead (coincident)	3 months ahead (leading)
Aggregated	0.76	0.78
Manufacturing	0.68	0.76
Building and construction	0.71	0.77
Retail trade	0.30	0.44
Services	0.57	0.64
Public sector <sup>1</sup>	0.44	0.20

<sup>1</sup> The RN series is compared with the percentage change in the number of employed from the previous quarter for health and social work and local government.

Source: Statistics Norway, Norges Bank's regional network

gated RN series has good leading properties relative to the QNA series. This is particularly clear in the period from the second quarter of 2006 onwards.

The RN series for the individual sectors show varying degrees of power to predict developments in employment over the next three months (see Table 10). The series for building and construction and manufacturing have the best leading properties.

The information from the network on employment over the next three months adds value to other statistics, both because it is available slightly earlier and because it gives a more qualitative description of developments. This qualitative information might be the types of labour being made redundant in the event of downsizing, use of lay-offs, recruitment freezes, use of contract workers or types of qualification that are in demand.

We have compared the regional series for expected growth in employment over the next three months with quarterly growth in employment in mainland Norway from the QNA.

Table 11 shows that the series for expected employment in Region North-West and Region North have a slightly stronger leading correlation than the national series. Region East has a substantially lower leading correlation than the other regions.

#### 4.4 Wage growth

In each round, contacts in the network are asked about what they expect annual wage growth in their enterprise to be in the current calendar year (Question 4.1 in Appendix A and Question 2.1 in Appendix B). In the first rounds of the year, this is a question of expectations; in the later rounds,

**Table 11** Correlation coefficients for the regional RN series for expected growth in employment over the next three months compared with quarterly growth in the number of employed in mainland Norway from the QNA

RN series	Period	
	0 months ahead (coincident)	3 months ahead (leading)
National (aggregated)	0.76	0.78
Inland	0.64	0.74
Mid-Norway	0.77	0.79
North	0.68	0.80
North-West	0.71	0.83
South	0.83	0.70
South-West	0.69	0.71
East	0.64	0.57

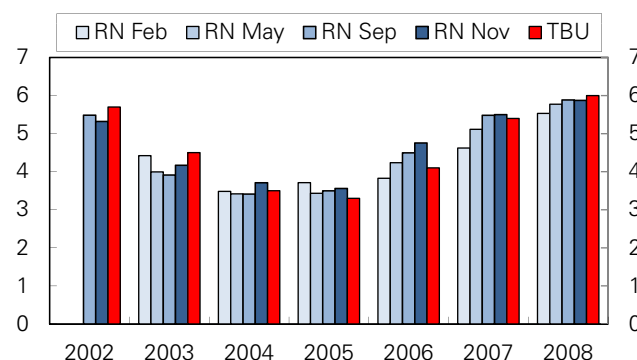
Source: Statistics Norway, Norges Bank's regional network

it is more of a retrospective question. Chart 20 compares the estimates from the network during the year with the calculations of wage growth issued by the Norwegian Technical Calculation Committee for Wage Settlements in February of the following year (Norwegian Technical Calculation Committee for Wage Settlements, 2009).

Chart 20 shows that the network's estimates tie in relatively well with the committee's calculations. It appears that contacts' estimates of wage growth in years of low wage growth (such as 2004 and 2005) are relatively accurate even early in the year. In years where wage growth accelerates during the year (such as 2007 and 2008), the final rounds are most accurate. The September round is the round with the lowest average divergence over the whole period.

Chart 20 reveals that the RN series provide early and

**Chart 20** Comparison of the RN estimates of annual wage growth in the current calendar year and the Norwegian Technical Calculation Committee for Wage Settlements (TBU) estimates of annual wage growth issued the following year. Per cent



Sources: Norwegian Technical Calculation Committee for Wage Settlements, Norges Bank's regional network

reliable information about annual wage growth in the current calendar year. Information from the first round is normally available in February, which is before pay talks begin and a year before the Norwegian Technical Calculation Committee for Wage Settlements presents its calculations. The evaluation of wage growth is based on very few observations, but we can provisionally conclude that the RN series for expected wage growth provides early and reliable information about wage growth in the current calendar year.

## 5. Summary

The regional network's most important role is to provide information about the economic situation and outlook. The main focus is on obtaining qualitative information about developments and expectations in Norwegian industry. The interviews with contacts in the network give Norges Bank an insight into the dynamics and drivers in different sectors and regions. They also provide first-hand knowledge of the challenges and conditions faced by Norwegian industry, and how enterprises are choosing to adapt to them. When the economy is exposed to sudden changes, the network rapidly provides information on how different sectors are affected and any action they are taking. This information puts Norges Bank in a better position to understand the current situation in the economy and project future developments.

The data series from the regional network are now long enough that the quantitative aspect is beginning to warrant considerable attention. The comparisons that we have performed show that the regional network's aggregated series for the real economy correlate well with official statistics. Capacity utilisation, output growth and employment growth all correlate very well with the official statistics. The prospective series for output and employment also seem to give a sound indication of expected developments. The nominal values for wage growth and construction costs seem to add useful information for Norges Bank's analyses. Other series, such as investment growth, are less forward-looking than we might wish.

In most cases, the regional series correlate relatively well with the official series, and none of the regions stands out generally as significantly better or worse than the national aggregated series. The main conclusion is that most series provide early and reliable information about developments in the Norwegian economy. Several of the data series are available earlier than other statistics, and some series provide information that is not available from other sources.

Work on this article has revealed a number of areas of interest for future work. In view of the regional network's value as a source of fresh information, it might be worth

comparing published monthly figures from the regional network with other available information at selected critical points in particularly turbulent periods. It might also be useful to compare the regional network's monthly data with different revisions of the official statistics to see whether the regional network correlates better with the official series once they have been revised.

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## Appendix A Interview guide for the private sector

The bullet points below outline the themes we primarily wish to discuss. We are interested in how actual developments compare with budget/expectations, and whether important driving forces behind these developments are specific to the enterprise or apply generally to the sector/region.

### 1. Demand and output (volume)

- 1.1 Developments in demand/output over the past three months relative to the previous three-month period (seasonally adjusted).
  - 1.1.1 For manufacturing, as distributed between the export and domestic markets.
  - 1.1.2 For services, as distributed between the business sector and households.
- 1.2 Market prospects for the next six months.
  - 1.2.1 Driving forces
- 1.3 Capacity: Will the enterprise find it difficult to meet an (unexpected/expected) rise in demand?
  - 1.3.1 If so, why?

### 2. Investment

- 2.1 Investments made, and plans for the next 12 months. Growth relative to the previous 12 months.
- 2.2 Types of investment: what (capacity expansion, maintenance, rationalisation) and where (abroad or in Norway)?
- 2.3 If no investment, why? (low demand, low utilisation of fixed assets, inadequate/expensive capital, high costs).

### 3. Employment/labour market

- 3.1 Change in number of person-years worked over the past three months.
- 3.2 Plans to reduce/increase employment over the next three months.
- 3.3 Labour supply: Will labour supply be a limiting factor for output/turnover if there is an (unexpected/expected) rise in demand?

### 4. Costs and prices

- 4.1 Annual wage growth in the enterprise/sector for the *current calendar year*. This includes carry-over from the previous year, pay increases in the current year and wage drift through the year. It also includes bonuses.
- 4.2 Changes in other important input costs.
- 4.3 Changes in selling prices over the past 12 months.
- 4.4 Expected price developments over the next 12 months.
- 4.5 Driving forces behind price developments (changes in input costs, margins, the competitive situation).
- 4.6 Developments in profitability in terms of the operating margin (EBITDA relative to turnover) over the past three months relative to the same period last year.

## Appendix B Interview guide for the public sector

Some of the themes we discuss with enterprises will not be relevant for public bodies. Important themes will be employment growth, wage growth/formation and investment plans. We are interested in how actual developments compare with budget, and which driving forces are behind these developments.

The following are the themes we primarily wish to discuss with contacts in the public sector.

### 1. Activity levels/employment

- 1.1 Scope of operations (size of budget, person-years worked or similar).
- 1.2 Change in person-years worked over the past three months.
- 1.3 Plans to reduce/increase the workforce over the next three months.
- 1.4 Labour supply: Will labour supply be a limiting factor for increased output?
- 1.5 Outsourcing: Has any production been outsourced over the past year? Any plans for outsourcing over the next year?
- 1.6 Productivity growth.

### 2. Costs and prices

- 2.1 Annual wage growth in the organisation for the *current calendar year*. This includes carry-over from the previous year, pay increases in the current year and wage drift through the year.
- 2.2 Coverage of costs.
- 2.3 Changes in prices for public services over the past year, and outlook for the next year.

### 3. Investment

- 3.1 Investments made over the past 12 months, and plans for the next 12 months.
- 3.2 Types of investment.
- 3.3 Funding of investments (including whether public-private-partnerships (PPPs) have been used over the past year/plans for PPPs over the next year).

## Appendix C Annualised quarterly volume growth figures for value added in mainland Norway from the quarterly national accounts

The series has been trend-adjusted by removing the seasonal component and irregular components.

Quarter	Mainland Norway
Q3 02	-0.4322
Q4 02	-1.3221
Q1 03	-0.3176
Q2 03	3.4727
Q3 03	2.9277
Q4 03	2.3832
Q1 04	3.6322
Q2 04	4.3424
Q3 04	3.8680
Q4 04	3.0311
Q1 05	5.1084
Q2 05	5.2293
Q3 05	4.5270
Q4 05	2.2604
Q1 06	5.1505
Q2 06	1.7195
Q3 06	4.9503
Q4 06	6.6775
Q1 07	7.4872
Q2 07	5.8411
Q3 07	5.1613
Q4 07	4.4116
Q1 08	3.2131
Q2 08	1.9978
Q3 08	0.4148
Q4 08	-2.2378
Q1 09	-4.2922

Source: Statistics Norway, Norges Bank



## Appendix D Annualised quarterly volume growth figures for gross production from the quarterly national accounts

The series has been trend-adjusted by removing the seasonal component and irregular components. The figures for the retail trade are based on figures for the consumption of goods from the quarterly national accounts.

Quarter	Mainland Norway	Manufacturing	Building and construction	Retail trade	Services
Q3 02	-0.6941	-3.0906	1.0453	2.3279	-0.9584
Q4 02	-1.5214	-4.1473	4.2269	3.3564	-1.9475
Q1 03	-2.9096	-5.2181	3.6666	1.2900	1.4285
Q2 03	3.2542	3.6628	3.3307	2.2768	3.9933
Q3 03	3.1194	5.6764	2.8048	5.7603	0.6164
Q4 03	3.5914	5.2741	3.5388	7.5615	3.8741
Q1 04	3.8217	2.8631	5.9292	5.0196	5.7393
Q2 04	4.8581	4.4540	8.1765	0.4662	6.3046
Q3 04	5.3027	7.0648	10.4571	0.7381	5.1857
Q4 04	4.5379	7.2291	6.2196	3.4048	2.2109
Q1 05	5.3529	7.7567	3.8131	6.0446	4.5224
Q2 05	5.5024	6.4595	5.1093	8.0721	7.3090
Q3 05	5.4851	5.6898	8.5291	5.2111	8.7649
Q4 05	5.2593	6.9496	10.0366	1.7749	6.6710
Q1 06	9.2106	10.2184	10.0600	3.7837	6.0904
Q2 06	5.8881	8.4878	4.4056	6.6547	7.3755
Q3 06	6.8302	6.5459	2.3153	5.6563	10.9037
Q4 06	7.9861	8.0734	12.3870	7.3618	10.1753
Q1 07	8.1937	4.9015	18.5471	8.7614	9.7301
Q2 07	6.3586	0.5890	10.4434	7.9979	7.8838
Q3 07	6.1947	3.5094	3.7386	5.0114	8.3538
Q4 07	4.7432	5.1980	4.4002	2.9450	5.2685
Q1 08	2.4292	5.3598	3.1926	-1.0375	0.7629
Q2 08	2.3995	3.4348	3.0810	-3.7337	3.6120
Q3 08	0.1736	-4.0260	2.1456	-6.3692	3.0994
Q4 08	-1.6892	-5.7330	-4.6038	-5.2797	0.8756
Q1 09	-1.3836	-3.2093	-6.1888	-2.3257	0.0328

Source: Statistics Norway, Norges Bank

## Appendix E Annualised semi-annual volume growth figures for gross production from the quarterly national accounts

The series has been trend-adjusted by removing the seasonal component and irregular components. The figures for the retail trade are based on figures for the consumption of goods from the quarterly national accounts.

Quarter	Mainland Norway	Manufacturing	Building and construction	Retail trade	Services
Q3 02	1.0368	-1.9946	-0.1954	1.6488	0.1589
Q4 02	-1.1064	-3.6029	2.6416	2.8519	-1.1417
Q1 03	-2.2099	-4.6557	3.9661	2.3286	-0.6334
Q2 03	0.1605	-0.8015	3.5139	1.7871	1.2228
Q3 03	3.1995	4.6956	3.0794	4.0349	0.9130
Q4 03	3.3694	5.5127	3.1842	6.7153	0.6558
Q1 04	3.7237	4.0875	4.7603	6.3380	4.7638
Q2 04	4.3631	3.6745	7.1135	2.7458	7.0153
Q3 04	5.1126	5.7988	9.4237	0.6026	6.2125
Q4 04	4.9504	7.2108	8.4197	2.0746	3.8153
Q1 05	4.9758	7.5630	5.0460	4.7504	4.7092
Q2 05	5.4645	7.1707	4.4856	7.1194	7.7543
Q3 05	5.5315	6.1206	6.8737	6.6942	9.6916
Q4 05	5.4083	6.3692	9.3899	3.5045	8.9448
Q1 06	7.2955	8.6728	10.1745	2.7877	7.8940
Q2 06	7.6172	9.4615	7.2882	5.2506	9.2290
Q3 06	6.4094	7.5863	3.3732	6.2026	11.8832
Q4 06	7.4763	7.3757	7.3870	6.5611	12.0476
Q1 07	8.1717	6.5369	15.7542	8.1422	10.6021
Q2 07	7.3413	2.7489	14.7373	8.4672	10.1470
Q3 07	6.3259	2.0518	7.1398	6.5548	9.7840
Q4 07	5.5057	4.3765	4.0899	3.9966	8.1765
Q1 08	3.6006	5.3137	3.8139	0.9499	3.3868
Q2 08	2.4216	4.4203	3.1491	-2.3808	1.5768
Q3 08	1.2871	-0.3129	2.6216	-5.0218	3.2842
Q4 08	-0.7582	-4.8506	-1.2414	-5.7824	2.1743
Q1 09	-1.5335	-4.4482	-5.3607	-3.7873	-0.5343

Source: Statistics Norway, Norges Bank