Economic Survey 2/2002

Volume 12

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Inquiries should be directed to:
– *Norway*: Torbjorn.Eika@ssb.no, tel. +47 21 09 48 07
Roger.Bjornstad@ssb.no, tel. +47 21 09 48 17
– *foreign countries*: Per.Richard.Johansen@ssb.no, tel. +47 21 09 49 07
Andreas.Benedictow@ssb.no, tel. +47 21 09 47 98

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Editorial board: Ådne Cappelen (ed.), Helge Brunborg, Annegrete Bruvoll, Torbjørn Eika, Erik Fjærli, Kristian Gimming, Audun Langørgen, Erling Røed Larsen, Bjørn Naug and Li-Chun Zhang
Editorial assistent: Wenche Drzwi, tel.: +47 21 09 49 74, fax: +47 21 09 00 40
Editorial address: Statistics Norway, Research Department, P.O.Box 8131 Dep., N-0033 Oslo

Sales- and subscription service: N-2225 Kongsvinger, tel.: +47 62 88 55 00, fax: +47 62 88 55 95, e-mail: salg-abonnement@ssb.no

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Data not available	..
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Economic trends*

The first half of 2002 has proved to be a turbulent period for the Norwegian economy. Even though economic developments among our most important trading partners have generally been positive from Norway's point of view, developments in the Norwegian economy give grounds for concern. First, wage settlements have resulted in very high pay increases. Second, the krone exchange rate appreciated considerably up to the beginning of June, and Norwegian interest rates are very high compared with other European countries. Consumer price inflation in Norway has fallen considerably, but this is entirely consistent with what could be expected on the basis of the special factors underlying consumer price changes. Growth in the Norwegian economy does not appear to be particularly strong even though seasonally adjusted figures for production in the first quarter of 2002 are fairly high. However, the figures are not easy to interpret because of the timing of Easter in 2002 compared with earlier years. Unemployment is rising and the labour market is now characterized by fewer new vacancies than earlier.

The economic picture now appears to be highly uncertain and developments one year ahead will to a large extent depend on such a volatile variable as the exchange rate. If the current strong krone exchange rate persists for a period, the inflation rate will remain very low and appreciably below the target set by the Government for the conduct of monetary policy. Even though it is uncertain how swiftly an appreciation of the krone exchange rate will feed through to Norwegian import prices and thereafter to consumer prices, there is little doubt that the impact will be considerable one year ahead. We have therefore decided to present calculations showing the importance of different assumptions concerning the krone exchange rate for price developments and key macroeconomic variables in the period ahead.

Another factor that influences the economic picture is, as noted, the effect of the high pay increases awarded in the spring wage settlement. In view of the situation in the Norwegian economy, one may ask how the increases could be so high. One possible answer is that major institutional changes in the labour markets that influence wage determination are now taking place or perhaps have already taken place. Some fragmentation that hampers coordinated wage determination has occurred on both the employer and employee side. To what extent the industry-level settlements of recent years represent the beginning of a new epoch, or just a temporary phenomenon, is difficult to determine at this stage. In order to illustrate the importance of such changes, we have made calculations that show what a change in wage determination more in line with a continental European model may entail.

The overall picture for developments in the Norwegian economy in the period ahead is that we will probably experience a period of fairly sluggish economic growth and rising unemployment, with high real wage growth for those in employment. High productivity gains will contribute to the latter. Norwegian interest rates will probably remain high, at least if the krone should depreciate somewhat in relation to the current level. Fairly high oil prices will contribute to continued large current account surpluses and a rapid accumulation of capital in the Petroleum Fund. The size of the Petroleum Fund provides clear guidelines for fiscal policy in the period ahead, a factor that is of importance to monetary policy. However, the value of the Fund measured in krone terms is uncertain due to exchange rate developments and weak equity prices. The latter factor probably also helps to explain why the Norwegian krone has appreciated this year. When the return on equities is low and prices fall, it appears more profitable to invest capital in liquid assets with a high return and even with the expectation of exchange gains.

The revised national accounts figures that are being published along with this report come in addition to these factors of uncertainty. It has not been possible for us to update our model base and our traditional procedures in economic analysis to the new statistical reality shown in the national accounts. This also means that we are now more uncertain than usual in interpreting the situation in the Norwegian economy.

* Translated from Økonomiske analyser 3/2002 by Janet Aagenæs.

International economy

The global economy is now showing clear signs of recovery and growth is expected to pick up in 2002 and 2003. The US economy has fared better than first feared following the terrorist attacks on 11 September last year. The downturn in 2001, which was milder than expected, has been reversed to growth. Extensive tax cuts and last year's interest rate reductions have contributed to the swift turnaround. Growth is also expected in the euro area, fuelled by the recovery in the US. Among our most important trading partners, GDP is likely to expand by about 1.6 per cent this year, compared with 1.4 per cent in 2001. For 2003, the projection is 2.8 per cent. Growth in the US is expected to be stronger than in the euro area; for 2002, the OECD's projections are 2.5 and 1.3 per cent respectively, while growth in 2003 is projected at 3.5 and 2.9 per cent respectively. Japan's GDP is estimated to grow by 0.3 per cent next year, compared with a decline of 0.7 per cent this year.

Private consumption remained fairly buoyant in the US through 2001. In the euro area, consumption growth has been relatively subdued and is not expected to pick up until next year. Inflation has been higher than the European Central Bank's (ECB) upper limit of 2 per cent since May 2000, but the OECD expects inflation to be 1.9 per cent in 2003. However, the spring wage settlement in the euro area constitutes a risk of higher inflation. Key rates internationally are expected to be raised in 2002 from the current low level, but expectations of relatively low inflation may allow the tightening of monetary policy on both sides of the Atlantic to take place gradually so that a dampening of the economic recovery can be avoided.

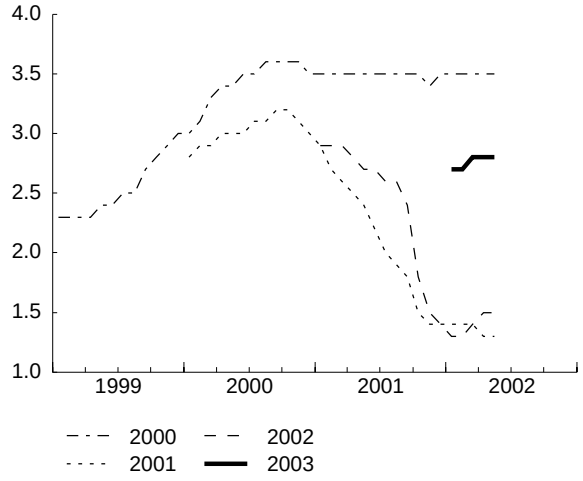
The US economy is of considerable importance to the global economic situation. Developments in the US will therefore largely determine the growth outlook in the period ahead. Several factors may restrain growth in the US economy. The growth potential of private consumption is limited by the current very low saving ratio and a high debt burden. The prospect of large, persistent current account deficits also constitutes an element of uncertainty. The same applies to the stock market. Another, more immediate threat to a swift upswing in the global economy is the risk of higher oil prices, viewed in the light of growing tensions in the Middle East.

International trade

Following last year's growth pause, world trade is expected to expand both in 2002 and 2003. The OECD estimates that world trade will increase by 2.5 per cent this year and 9.5 per cent next year. Higher US imports are a decisive factor, and expectations of higher growth in the US are the main reason for the projected higher growth in world trade. However, imbalances in world trade appear to persist, with large trade deficits in the US and large surpluses in Japan. A weaker dollar exchange rate, however, may contribute to reducing the trade deficit in the US.

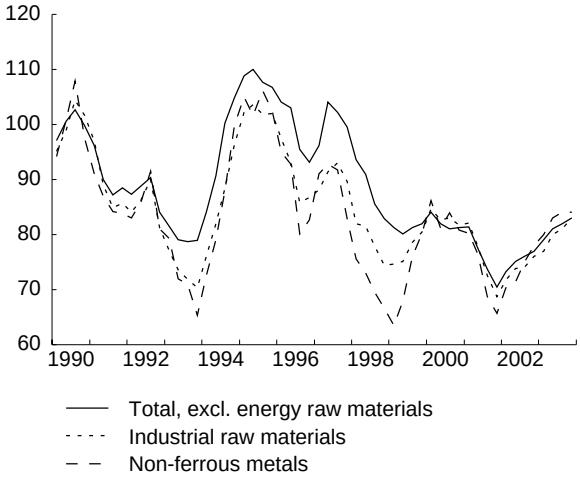
Commodity prices fell last year as a result of reduced growth in the global economy. In pace with the upswing in international demand, commodity prices rebounded in the first quarter of 2002. The AIECE projects a moderate rise in commodity prices in both 2002 and 2003.

GDP growth forecasts for Norway's main trading partners for 2000 - 2003 given on different dates



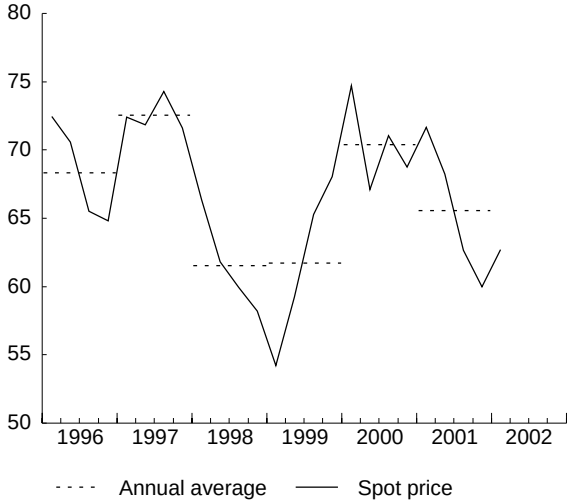
Source: Consensus Forecasts.

Commodity prices on the world market 1990 - 2003
Dollar based indices. 1990 = 100



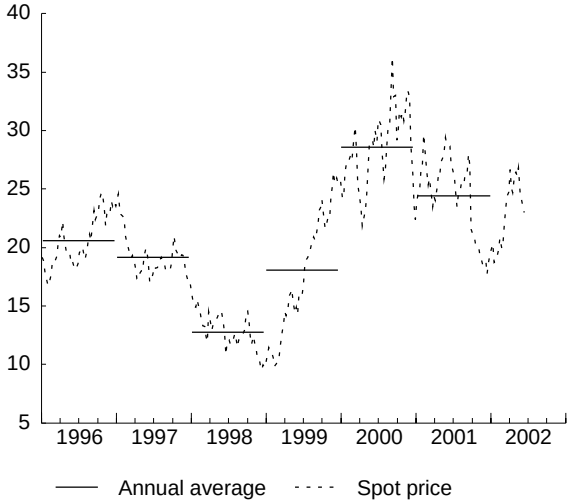
Sources: HWWA-Institut fur Wirtschaftsforschung and AIECE.

Spot price aluminium. 1996 - 2002
Dollar per 100 lbs.



Source: IMF.

Spot price crude oil, Brent Blend
Dollar per barrel



Source: Norges Bank.

Developments in the oil market

The spot price of Brent Blend fell from about USD 27 per barrel in September to USD 18 per barrel in December. Even though the main reason for the fall in oil prices was the terrorist attacks in the US, many analysts had revised down their projections for the demand for oil even prior to the attacks. Since then, the price of oil has risen and at the beginning of June it stood at around USD 24 per barrel. As an average for the first five months of 2002, the price has been just above USD 22 per barrel compared with an average of about USD 24.50 per barrel last year.

Several factors have contributed to the rise in prices through the first quarter of 2002. First, OPEC decided to reduce production by 1.5 million b/d for a period of six months beginning in January, while Norway, Russia, Mexico, Angola and Oman decided to reduce exports or production by a total of just under 0.5 million b/d. It has later proven to be the case that OPEC satisfied just under 80 per cent of its announced cuts, while among non-OPEC producers it appears that only Russia did not fulfil its announced reductions. Second, unrest in the Middle East and speculation that the US would attack Iraq contributed to greater concern about future oil production in the area, and this contributed to increased purchases in the crude oil futures market. Third, economic growth, and hence the demand for oil, picked up in the US at an earlier-than-expected stage.

According to the IEA, total stocks of crude oil and finished products in the OECD area are at the same level as the average at this time of the year over the last five years. The IEA expects a normal cold winter in the western hemisphere, which will contribute to higher demand for heating oil. At the same time, many analysts expect Iraq to continue its exports under a new and revised oil-for-food agreement with the UN in June. Among non-OPEC countries, only Oman has signalled that it will maintain its production cuts through the second half of the year. If OPEC also decides to maintain its cuts after June, global stocks of crude oil may be reduced by just under 0.4 million b/d when the second and third quarter are considered as a whole. This is a period when stocks of crude oil normally increase by between 0.5 and 1.0 million b/d, which is particularly important for ensuring supplies to refineries that are to produce heating oil.

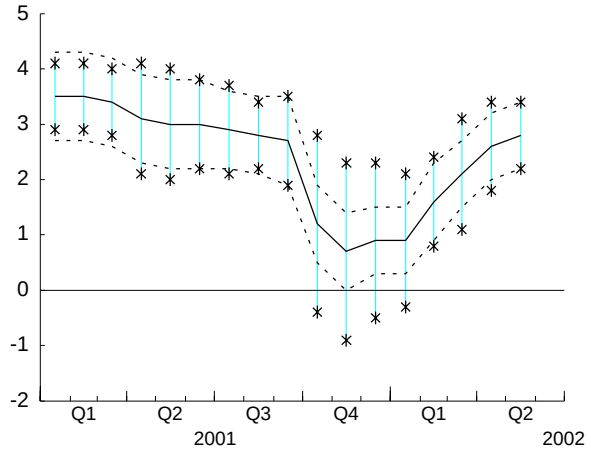
If it is assumed that OPEC succeeds in increasing production to a sufficient extent and in time to prevent increased concern about future deliveries of heating oil and thereby price pressures, the oil price may remain at approximately the current level in the period ahead. This is also contingent on no heightened turbulence in the Middle East or further speculation about an open conflict between the US and Iraq.

US

The US economy has experienced a swifter recovery than expected following the slump through 2001. The feared downturn following the terrorist attacks on 11 September did not materialize, and GDP growth was again positive in the fourth quarter of 2001. Based on the deviation between actual and trend (potential) GDP, the cyclical turnaround took place in the first quarter of 2002. Growth is expected to increase gradually, and the OECD estimates that GDP will expand by 2.5 per cent this year compared with 2001. In 2003, growth is expected to pick up further, to 3.5 per cent.

Growth in private consumption was relatively high throughout 2001, fuelled by substantial tax cuts and low interest rates following interest rate reductions through the year. In the labour market, wages rose in March for the first time in eight months, and it ap-

GDP growth forecasts
for the US for 2002 at different points in time
Average forecast (solid line) with +/- 2 standard deviation (star points) and +/- 2 "normal" deviation (dashed line)



Source: Consensus Forecasts.

pears that unemployment has stabilized. The NIESR estimates that productivity growth was 1.9 per cent in 2001. This is unusually high in a period of low economic growth. The estimate is 2.5 per cent in 2002 and 2003, on a par with average annual productivity growth since 1995.

Manufacturing industry, which was an important factor behind the slump recorded last year, showed positive tendencies as early as the fourth quarter of 2001 and the negative trend now appears to have been reversed. Private sector investment contracted last year, but is expected to increase from the second half of 2002. Inventory build-ups are also making a positive contribution to economic activity following the sharp reduction in inventories last year. Confidence indicators show that confidence in the US economy has picked up in both the business sector and among consumers. Nor is there an imminent risk of inflationary pressures, and the tightening of monetary policy will take place gradually so that the upswing in the economy will not be dampened by high interest rates. As the upswing gradually takes hold in the global economy, higher exports will contribute to further growth.

There are several factors that can restrain growth. The US has had a current account deficit of about 4 per cent of GDP in recent years, and the deficit is expected to remain high in the period ahead. The OECD estimates that as a result of faster growth in domestic demand than among trading partners, the trade deficit will rise to 4.9 per cent next year. There does not appear to be any immediate risk that the capital supply which is necessary to finance the current account deficit will dry up; productivity growth in the US is fairly high and foreign investors still find US capital markets attractive. However, very optimistic expectations concerning future corporate earnings are still being priced into the stock market. If sentiment changes and investors expect a sharp correction in the stock market, foreign investment may fall considerably and the dollar will depreciate further. A moderate depreciation of the dollar may have a positive impact through improved competitiveness in US export industries and a lower trade deficit. A sharp depreciation, however, may result in higher inflation and the risk of financial instability internationally. A fall in equity prices may, in conjunction with a high debt burden, also contribute to an increase in consumer saving in the US, which will result in lower demand for goods and services and reduced economic growth.

Europe

Moderate growth is expected in the euro area, fuelled by the recovery in the US. A subdued upswing is expected in the second half of 2002 followed by somewhat stronger growth in 2003. The OECD estimates GDP growth at 2.9 per cent next year, compared with only 1.3 per cent in 2002.

The international upswing will result in higher exports and stronger demand in the euro area. Business confidence in the economy has improved considerably in recent months, and the low real interest rate will pave the way for higher investment and increased domestic demand. In 2003, growth is expected to take root in most sectors.

However, there is uncertainty associated with the upswing. Growth is largely dependent on higher growth in the global economy and higher exports as well as developments in the oil price in the period ahead. Inflation has been higher than the ECB's objective of between zero and two per cent since May 2000. In the first quarter of 2002, consumer price inflation was around 2.5 per cent, partly due to special factors such as the introduction of euro notes and coins and high oil prices. However, consumer price inflation is expected to fall in the course of 2002 and is estimated by the OECD at 2 per cent in 2002 and 1.9 per cent in 2003. The inflation projections are based on moderation in this year's wage negotiations. Large pay increases may generate cost pressures, with consequences not only for prices but also for employment and GDP growth.

The euro has appreciated against the US dollar recently, a factor that may counter the upswing in the euro area through weaker developments in export industries. However, a strengthening of the euro may reduce the likelihood that the ECB will raise interest rates as a result of lower imported inflation.

In the euro area, Germany was the most severely affected by the international downturn last year. It appears, however, that Germany is also emerging from a slump, with growth of 0.2 per cent in the first quarter of 2002 compared with the previous quarter.

Macroeconomic projections according to selected sources
Annual change in per cent

	GDP-growth					Inflation (consumer prices)				
	1999	2000	2001	2002	2003	1999	2000	2001	2002	2003
USA										
NIESR	4.1	4.1	1.2	2.4	3.5	1.6	2.7	1.9	0.7	1.6
ConsF	4.1	4.1	1.2	2.8	3.5	2.2	3.4	2.8	1.6	2.4
EC	4.1	4.2	1.2	2.7	3.1	2.2	3.4	2.8	1.4	2.4
OECD	4.1	4.1	1.2	2.5	3.5	2.2	3.4	2.8	1.8	2.4
Japan										
NIESR	0.7	2.2	-0.4	-1.2	1.3	-0.5	-1.0	-1.6	-1.4	-0.3
ConsF	0.7	2.4	-0.5	-1.0	1.1	-0.3	-0.7	-0.7	-1.0	-0.6
EC	0.7	2.4	-0.5	-0.8	0.6	-0.3	-0.7	-0.5	-0.9	-0.1
OECD	0.7	2.4	-0.4	-0.7	0.3	-0.3	-0.7	-0.7	-1.2	-1.2
EMU										
NIESR	2.6	3.4	1.5	1.4	2.5	1.1	2.4	2.5	2.3	2.1
ConsF	2.6	3.4	1.4	1.3	2.8	1.1	2.2	2.6	2.0	1.9
EC	2.7	3.4	1.6	1.4	2.9	1.1	2.4	2.5	2.2	2.0
OECD	2.7	3.5	1.6	1.3	2.9	1.1	2.4	2.5	2.0	1.9
Trading partners										
NIESR	2.9	3.5	1.4	1.5	2.5	1.2	1.9	2.3	1.8	1.9
ConsF	3.0	3.5	1.3	1.5	2.8	1.4	2.2	2.5	2.0	2.0
EC	3.0	3.5	1.3	1.6	2.8	1.2	2.0	2.4	2.0	1.9
OECD	3.0	3.5	1.4	1.6	2.8	1.4	2.2	2.5	2.0	2.1

Sources: NIESR, European Commission and OECD from April 2002 and Consensus Forecasts from May 2002. The inflation projections for the US and Japan from NIESR apply to the consumption deflator.

It is primarily the export industry that must bear the brunt. Germany has also to a large extent experienced sluggish private consumption, but figures for the first quarter also show that private consumption is picking up.

Outside the euro area, both Sweden and Denmark recorded growth in the fourth quarter of 2001. In Sweden, this largely reflected the depreciation of the Swedish krona against the euro, while higher public spending was the main factor in Denmark. In Denmark, higher private consumption and higher investment are expected to result in a gradual increase in economic activity, underpinned by the international upswing. Unemployment has remained low and may be a limiting factor. In Sweden, higher domestic demand and exports will also result in higher growth in the first half of 2002. Sweden has low unemployment, and there is a risk that wage growth will contribute to high inflation. The OECD estimates that inflation will rise to 2.8 per cent in 2003, 0.8 percentage point higher than the inflation target of the Swedish central bank.

Japan

The economic situation deteriorated further through 2001 and Japan recorded the largest contraction in GDP in 40 years. This resulted in lower investment and higher unemployment. The banking sector is still experiencing considerable problems, with large volumes of non-performing loans. There is some risk that the implementation of structural reforms will result in increased deflationary tendencies in the economy. However, some growth is expected next year, based on higher demand from the US and Europe. The OECD projects GDP growth at 0.3 per cent next year, compared with a decline of 0.7 in 2002.

Norwegian economy

National accounts figures for the years 1991 to 2001 have now been revised. The most important data for our economic analyses – the quarterly national accounts (QNR) – have been revised from 1999, but revised QNA figures for the years prior to 1999 are not yet available. These will be produced in the period ahead on the basis of the new revised annual figures. In the following, two aspects of the revision of the figures that have a bearing on the evaluation of cyclical developments in the Norwegian economy will be discussed. First, we show preliminary calculations of the business cycle pattern in the 1990s and up to 2004 according to this report and compare this with the projections published in *Economic Survey* 1/2002. The main feature is that the cyclical pattern is approximately the same, but that higher growth projections for mainland GDP mean that the period of strong economic expansion, which started in the second half of the 1990s, appears to have lasted longer than estimated earlier. Second, the revision of the national accounts also entails revisions of factor inputs in industries, with the result that productivity growth in the Norwegian economy has been revised upwards. The magnitude of productivity growth is a key variable when estimating the growth potential of the economy, but it is also important when evaluating the rise in factor prices that is consistent with a given rise in aggregate prices, e.g. the rise in consumer prices. Any

Macroeconomic indicators 2000-2001
Growth from previous period unless otherwise noted. Per cent

			Seasonally adjusted			
	2000	2001	01.2	01.3	01.4	02.1
Demand and output						
Consumption in households and non-profit organizations	3.5	2.5	1.2	0.8	-0.5	1.2
General government consumption	1.2	2.0	0.8	0.8	0.7	2.0
Gross fixed investment	-1.5	-4.6	-4.1	-3.2	1.9	-3.2
- Mainland Norway	3.4	-0.3	0.1	-4.2	0.3	-0.4
-Extraction and transport via pipelines	-31.6	7.2	-6.1	14.3	16.1	-17.9
Final domestic demand from Mainland Norway[1]	2.9	1.8	0.9	-0.1	0.0	1.1
Exports	2.9	4.2	-1.1	3.2	2.6	-5.8
- Crude oil and natural gas	6.6	5.2	-4.7	10.6	-1.0	-7.7
- Traditional goods	1.7	4.0	1.0	-4.3	6.6	-2.1
Imports	3.2	0.0	-0.2	-1.8	2.3	-4.1
- Traditional goods	2.6	4.0	2.8	-3.2	2.7	2.2
Gross domestic product	2.4	1.4	-0.1	0.9	0.5	-0.3
- Mainland Norway	1.9	1.2	-0.3	0.3	0.8	1.1
Labour market[2]						
Man-hours worked	-1.1	-1.0	0.8	-0.7	-0.8	-1.3
Employed persons	0.4	0.5	0.2	-0.3	0.7	0.0
Labour force	0.8	0.6	0.3	-0.1	0.9	-0.1
Unemployment rate, level[3]	3.1	3.3	3.4	3.6	3.8	3.7
Prices						
Consumer price index (CPI)[4]	3.1	3.0	4.0	2.6	2.0	1.1
CPI adjusted for tax changes and excluding energy products (CPI-A28ATE)[4]	..	2.6	2.6	2.4	2.6	2.4
Export prices, traditional goods	13.5	-3.1	-1.2	-3.6	-2.7	-1.8
Import prices, traditional goods	4.8	0.4	-2.6	-3.3	-1.5	-2.4
Balance of payment						
Current balance, bill. NOK	219.6	233.4	57.0	62.9	50.3	59.1
Memorandum items (Unadjusted, level)						
Money market rate (3 month NIBOR)	6.8	7.2	7.5	7.3	6.8	6.5
Lending rate, banks	8.1	8.8	8.9	8.9	8.6	8.3
Crude oil price NOK[5]	252.0	220.1	250.1	228.3	173.0	186.1
Importweighted krone exchange rate, 44 countries, 1995=100	103.3	100.2	100.7	99.5	98.5	97.2
NOK per ECU/EUR	8.1	8.1	8.0	8.0	8.0	7.8

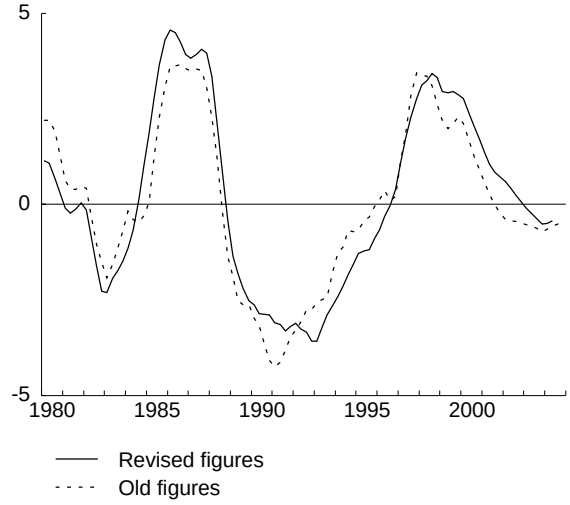
[1] Consumption in households and non-profit organizations + general government consumption + gross fixed capital formation in Mainland Norway.
[2] Figures for 2000 and 2001 are from national accounts. The quarterly figures are from Statistics Norway's Labour force survey (LFS), since the new quarterly national accounts series for employment are too short for seasonal adjustment.
[3] According to Statistics Norway's labour force survey (LFS).
[4] Percentage change from the same period the previous year.
[5] Average spot price, Brent Blend.
Sources: Statistics Norway and Norges Bank.

variations in productivity growth by industry also play a role in this evaluation.

Cyclical developments

Revised QNA figures back to 1990 will be available at the beginning of next year. In order to provide a preliminary assessment of how the revision of the annual figures has influenced traditional cyclical indicators, we have adjusted the previously published QNA figures for mainland GDP from the years prior to 1999 so that they are in accord with the new annual series, while retaining the old quarterly pattern. We have then calculated the usual cyclical deviations (deviation from trend) in the series and compared them with the series that was published in *Economic Survey* 1/2002 which were based on the old national accounts figures. The chart shows that these two series are generally congruent, albeit with deviations that are worth noting. The upward revision of GDP growth in the 1990s has resulted in an extended period of strong expansion. The new series show that the Norwegian economy was still recording strong expansion at the end of last year, while the old figures showed that the period of strong expansion was over. The new figures compared with our forecasts for developments ahead show that 2002 may be a year when the level of activity is slightly above trend even though it is reduced to trend level through 2002.

Output gap
Per cent



Source: Statistics Norway.

New information about productivity developments

Considerable attention is focused on developments in productivity. The table shows changes in gross output at constant prices per man-hour in the 1990s for some main groups of industries in the mainland economy. Changes according to the old national accounts figures are compared with the figures following the revision of the national accounts. The figures for 2000 and 2001 are preliminary. The calculations show that the new national accounts figures result in higher productivity growth for mainland enterprises and that this primarily reflects higher estimates for productivity in private services. The higher estimates here apply to both labour productivity and total factor productivity. The latter has generally been revised up by 0.4 per cent per year for the period 1990-2001 for mainland enterprises. It is otherwise worth noting that growth in factor productivity in manufacturing industry was very low in both the new and revised figures and that the figures have been revised most for service industries. It is also here that the revision of the national accounts has been greatest.

Decomposition of annual percentage change in labour productivity (gross output per man-hour) 1991-1995, 1996-2000 and 2001

	1991-1995			1996-2000			2001		
	Labour productivity	Contribution from change in capital and material inputs	Total factor productivity	Labour productivity	Contribution from change in capital and material inputs	Total factor productivity	Labour productivity	Contribution from change in capital and material inputs	Total factor productivity
Mainland enterprises									
Old NA figures	3.1	2.0	1.1	2.2	1.6	0.7	2.2	1.3	0.9
New NA figures	4.0	2.5	1.5	4.1	3.0	1.1	2.8	1.5	1.3
Manufacturing total									
Old NA figures	2.2	1.8	0.4	2.0	1.9	0.1	1.1	0.9	0.1
New NA figures	2.4	2.1	0.3	3.4	3.3	0.1	0.4	0.2	0.2
Other goods production									
Old NA figures	5.3	3.0	2.3	2.3	1.5	0.9	3.0	1.6	1.4
New NA figures	5.6	2.6	2.9	2.5	2.1	0.4	0.8	1.1	-0.3
Private services									
Old NA figures	2.6	1.8	0.8	2.8	1.9	0.9	3.3	2.1	1.2
New NA figures	4.4	2.6	1.8	5.4	3.7	1.8	4.8	2.6	2.2

Source: Statistics Norway.

These revisions are interesting for several reasons. In this connection we will confine our comments to pointing out that according to the Scandinavian inflation model differences in productivity growth between internationally exposed and sheltered industries play an important role in what is often referred to as the structural component of inflation. The revision of the national accounts figures indicates that productivity growth has increased in what has traditionally been described as sheltered industries, while growth in goods-producing industries has shown little change. In isolation, this means that the structural component of inflation is now lower than estimated earlier. If these growth rates are also representative for the years ahead, it implies that economic growth may be higher than assumed earlier without necessarily being inconsistent with a given target for price inflation.

Fiscal policy

In line with the Government's proposed Revised National Budget (RNB), the Storting has planned on a fiscal policy that follows the new fiscal policy guideline with regard to the use of the real return on the Petroleum Fund. Higher tax receipts in 2001, however, have increased the scope for government budget expenditure without breaching the guideline. However, the question may be raised as to what extent the cyclical adjustment of tax revenues is sufficient given developments in the Norwegian economy. Underlying growth in government budget spending in 2002 was estimated at 2.5 per cent in the RNB. The Storting's deliberations have not changed this estimate substantially, which means that the growth rate is now noticeably higher than estimated in the supplementary proposition last year. As a result of the Storting's resolutions, our projection for growth in general government consumption in 2002 is slightly higher than the estimate in the RNB. The fiscal policy guideline, however, only refers to the structural deficit over time. Fiscal policy shall continue to be conducted with a view to stabilizing cyclical movements. To the extent one is of the view that the level of activity in the Norwegian economy is still too high, the revised orientation of fiscal policy then means that a greater burden is imposed on monetary policy for stabilization purposes.

Fiscal policy's scope for manoeuvre in 2003 will primarily be determined by developments in the Norwegian economy, but also by the projected size of the Petroleum Fund at the end of 2002. It is actually the size of the Fund that determines the expected return in 2003 and hence the structural budget deficit that can be planned according to the guideline. At this stage there is considerable uncertainty with regard to the size of the Petroleum Fund six months ahead. This is not only because current investment in the Fund depends on developments in the crude oil price, which in itself is an uncertain and volatile variable. In addition, the krone exchange rate is very volatile. Even though it has been possible to stabilize the inflation rate to a large extent so far (adjusted for energy products and taxes), the krone exchange rate is still very unstable.

In the RNB for 2002, the Government estimated that the Petroleum Fund would amount to NOK 776 billion at the end of 2002, while the estimate was NOK 838 billion in the supplementary proposition in December last year. The estimate in the RNB was based on exchange rates and equity prices prevailing at the end of the first quarter of 2002. Since then, the Norwegian krone has appreciated considerably and equity prices have fallen. The strengthening of the krone exchange rate over the last two months alone will reduce the value of the Petroleum fund by about NOK 50 billion, and thereby fiscal scope for manoeuvre by NOK 2 billion in 2003 if the krone remains at its current level until the end of the year. The fall in global equity prices may further reduce the Fund's value at the end of 2002, but this is difficult to forecast and equity prices may also change substantially through the remainder of 2002. A monetary policy that results in a krone appreciation via higher interest rates or expectations concerning this will therefore, through the formulation of the fiscal policy guideline, also result in a tightening of fiscal policy if the guideline is followed slavishly. Viewed in this way, the change in policy rules in spring 2001 entailed a link between monetary and fiscal policy that did not apply earlier.

Given fiscal policy commitments for 2003 that have already been approved – particularly the removal of the investment tax and higher labour costs in the public sector as a result of the wage settlement – there is probably little scope for further spending increases or tax reductions financed by the return on the Petroleum Fund. Moreover, a majority in the Storting has recently concluded an agreement concerning an expansion of day-care coverage and higher government support for operations in order to reduce day-care rates. The effect on revenues can be roughly estimated at NOK 1 billion in 2003. We have otherwise assumed unchanged real indirect tax rates in 2003, but lower day-care rates will in isolation reduce CPI inflation by 0.1 percentage point in 2003.

The fiscal programme for 2004 has not been clarified to any extent, but the agreement on expanded day-care coverage and further rate reductions may have a revenue effect of about NOK 3 billion and a direct impact on CPI inflation of –0.4 percentage point in 2004. In the RNB for 2002 it is estimated that the structural budget deficit may rise by NOK 7 billion in 2004. There may be scope for an additional use of the return on the Petroleum Fund, but the implementation of already approved reforms implies that in reality a large portion of the expected higher financial return has already been used.

Effects of a stronger Norwegian krone with unchanged interest rates

Between May 2000 and the beginning of June 2002, the Norwegian krone has appreciated gradually by altogether 14 per cent, either measured by the trade-weighted exchange rate index or by the import-weighted krone exchange rate. Just since the beginning of this year the krone has appreciated by almost 9 per cent. Even though we assume that the appreciation has been exaggerated, this raises the question of how an appreciation of the krone affects the Norwegian economy. For pedagogical reasons, we will discuss the case in which the entire appreciation takes place instantaneously instead of gradually as has actually been the case. It will then be easier to follow the dynamics of the effects over a longer period.

In the calculations, the krone is assumed to appreciate against all other currencies by 10 per cent. Interest rates are kept unchanged. It is assumed that the stronger krone immediately results in lower prices measured in krone terms for products whose prices are determined by the international price level, such as the oil price. In the model a one-off appreciation of 10 per cent feeds through to import prices in the course of the first year so that the impact is complete as early as the second year. A reservation must be made, however, as to how quickly the appreciation affects different prices inasmuch as changes in exchange rates in part of the time period used to quantify the model often consisted of explicit, announced devaluations of the krone. It may be the case that such announced changes in the exchange rate have a swifter impact on prices measured in krone terms than a more gradual and purely market-driven appreciation.

Because prices for Norwegian enterprises' competing products decline, export prices also fall, but the impact takes longer here. The partial impact on exposed enterprises' prices means that they lose market shares to foreign competitors, which reduces exports and deliveries to the domestic market. The result is lower production and employment. The calculations show that the number employed in manufacturing industry is quickly reduced by a good 10 000.

Domestic prices also fall (in relation to the baseline scenario) as a result of the stronger krone exchange rate and thereby reduced import prices. The effect on the CPI is 3 per cent the first year, and the effect increases gradually towards 5 per cent after three years. Lower prices push down wages, but do not prevent real wages from increasing the first year. This is followed by a fall in relation to the baseline scenario beginning with the third year. Higher real wages in the first year result in a slight increase in consumption that year.

However, the far most important contractionary effect of the appreciation on production and employment in the first few years comes through the sheltered sector of the economy. This is due to the assumption of unchanged interest rates. With lower domestic price inflation the first few years, the real after-tax interest rate rises considerably. According to the model, this has a strong negative impact on prices for existing homes, a factor that results in an equivalent and strong decline in housing investment (in relation to the baseline scenario). A pronounced rise in unemployment has a similar effect, both for house prices and housing investment. Lower house prices also result in reduced household wealth and hence reduced private consumption. Household saving increases markedly, and this affects a number of sheltered sectors. Moreover, the loss of market shares for internationally exposed enterprises reduces production in sheltered industries, through lower material inputs. All in all, employment in industries, excluding manufacturing, is reduced by 25 000 after three years.

The result is that even though manufacturing activity is affected the most severely (lower housing investment will also have an impact on the building materials industry) and for the longest time, other industries will also be noticeably affected by the appreciation the first few years. Mainland GDP falls by 2¼ per cent (in relation to the level in the baseline scenario) over the first two years and employment is reduced by 1½ per cent.

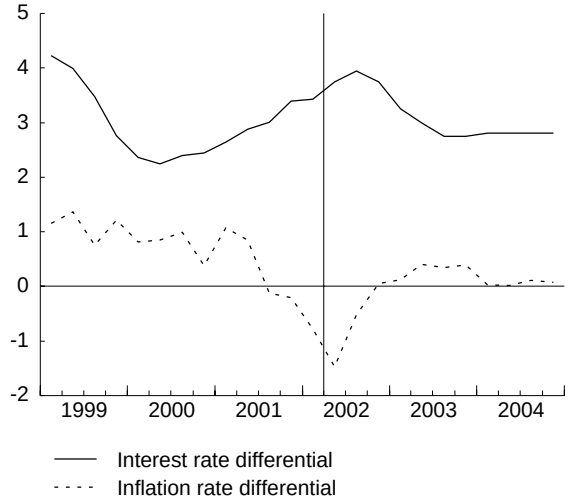
Unemployment rises by a little more than half a percentage point as an average over the first three years and the labour force contracts. However, as the effects of lower inflation on real interest rates are gradually exhausted, domestic demand again picks up. The effect on unemployment starts to be reversed as early as the third year, and the decline in real wages thereafter comes to a halt and manufacturing industry's cost competitiveness starts to stabilize.

Pct. deviation from baseline	1 year	2 year	3 year
Private consumption	0.2	-2.5	-0.9
Mainland gross investments	-1.2	-5.3	-5.0
Housing	-2.1	-14.6	-13.2
Enterprises	-1.2	-3.8	-3.8
Dom. demand m. Norway	-0.1	-2.3	-1.3
Exports trad. goods	-1.7	-1.4	-2.3
Imports trad. goods	0.3	-2.5	-1.8
Mainland GDP	-0.8	-2.3	-1.7
Manufacturing	-3.5	-4.0	-4.0
Employment	-0.7	-1.4	-1.6
Unemployment (pp)	0.5	0.8	0.6
Labour force	-0.2	-0.6	-1.0
Wages	-1.9	-4.2	-5.5
Consumer prices	-2.9	-4.2	-5.1
Prices trad. exports	-5.2	-8.5	-8.0
Prices trad. imports	-8.6	-10.0	-10.0
Import-weighted exch. rate	-10.0	-10.0	-10.0
Current account balance	-8.2	-6.6	-9.7
House prices	-6.4	-14.1	-12.6
Household real disp. income	1.8	0.9	0.7
Saving ratio (pp)	1.4	2.9	1.3

Slightly higher interest rate and continued strong krone?

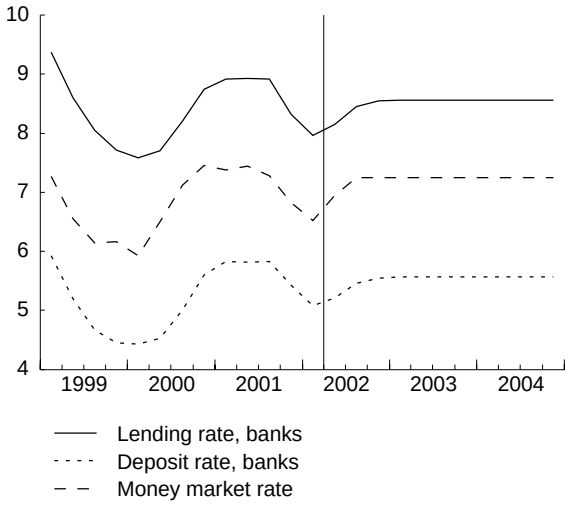
Norges Bank has left its key rate unchanged, at 6.5 per cent, since 12 December 2001. At its most recent monetary policy meeting on 22 May, the Bank indicated that with unchanged interest rates the probability that inflation (adjusted for taxes and energy products) two years ahead would be higher than 2.5 per cent was greater than the probability that it would be lower. Three-month money market rates have risen since the end of January and now stand at a good 7 per cent. Forward contracts in the money market (FRAs) indicate that market participants expect the money market rate to rise further in the second half

Interest rate and inflation differential between NOK, and the ECU/euro



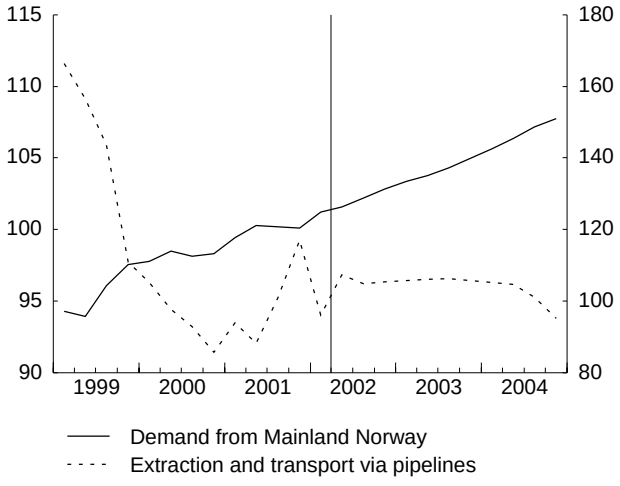
Sources: Norges Bank and Statistics Norway.

Lending rate and deposit rate
Per cent



Sources: Norges Bank.

Demand from Mainland Norway and investment in petroleum activities
Seasonally adjusted volume indices, 2001=100



Source: Statistics Norway.

of 2002. The spring wage settlement and spending growth in the public sector increase the risk of rising inflation and have fuelled expectations of higher interest rates. The strengthening of the krone exchange rate has the opposite effect; lower imported price inflation and a lower level of activity in the internationally exposed sector curbs overall inflation and reduces the need for an increase in interest rates. Our projections are based on the assumption that Norges Bank will increase its key rate by 0.5 percentage point in the third quarter and leave it unchanged thereafter. This is slightly less than indicated by market expectations at the beginning of June. We assume that three-month money market rates will in the event edge up to 7.25 per cent in the third quarter of 2003 and then remain unchanged at this level through the projection period.

In line with our projections for international developments, we assume that interest rates in the EU and the US will be raised slightly in the second half of 2002 and next year. This means that the interest rate differential between Norway and other countries will narrow somewhat in the course of 2003, but will still remain at a relatively high level.

The import-weighted krone exchange rate appreciated gradually by about 6 per cent from May 2000 to September 2001. Following a "pause" in the fourth quarter of last year, the krone has appreciated by nearly 9 per cent since the beginning of the year. The krone has appreciated to a greater extent than assumed earlier. This particularly reflects changes against the euro, but the krone has also strengthened more against the US dollar and Swedish krona than we expected when *Economic Survey* was published in February. The large interest rate differential against other countries, a robust oil price, large current account surpluses and rapidly increasing foreign wealth have contributed to the appreciation of the krone. The new guidelines for fiscal and monetary policy have also boosted confidence in the Norwegian economy. We nevertheless assume that the strong appreciation of the krone is exaggerated. We therefore project that the krone will weaken to NOK 7.53 against the euro in the third quarter and then depreciate gradually to NOK 7.78 by the end of 2004.

Higher petroleum investment

As a result of the approved reduction in oil production in the first half of this year, Norway's production of oil declined in the first quarter and is expected to fall further in the second quarter. OPEC wants Norway to maintain its production cut in the second half of 2002. A technical assumption that this does not occur has been applied. Norway's production of crude oil is nevertheless projected to contract by about 2 per cent from 2001 to 2002. For 2003 and 2004, production is assumed to show a marginal increase in the order of 2-3 per cent annually, with the production of crude oil reaching its peak in 2004 and declining thereafter.

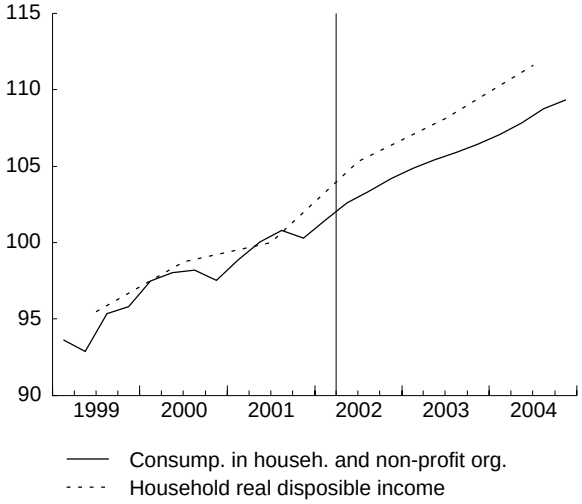
The oil price has been rising through the year, and is expected to remain at approximately the average recorded so far this year. We assume that the price edges up in the rest of the projection period. For 2002, we have assumed an oil price of about USD 23 and USD 24 from next year. This is based on the low stocks of crude oil in the US and OPEC's willingness to limit production to achieve a higher price. As a result of the strong krone that is assumed in 2002, the price will be around NOK 190 and about NOK 200 thereafter. Gas production is projected to rise by 25 per cent this year and then increase further by 6 per cent in each of the following two years.

Statistics Norway's investment intentions survey of gross investment in the petroleum sector now shows that investment in 2002 is expected to remain at approximately the same level as last year. It is particularly investment in land-based facilities and fields in operation that is now expected to show an increase. The estimates are based on the development of the Snøhvit field, even though there are still aspects of the project that are controversial and delays may take place. Investment in existing facilities is expected to edge up, while investment in field development, exploration and pipeline transport is projected to fall. The demand impetus from petroleum investment for the Norwegian economy is expected to increase somewhat as a result of higher investment in land-based facilities. In 2003, it is assumed that petroleum investment will increase by a little less than 2 per cent. Investment in land-based facilities is the main reason for the increase in total investment next year as well. The estimates for this year are approximately the same as earlier, while the estimates for 2003 have been revised down. For 2004, petroleum investment is expected to decline marginally, but experience shows that there is considerable uncertainty associated with investment projections two years ahead.

Higher consumption growth ahead – continued high saving

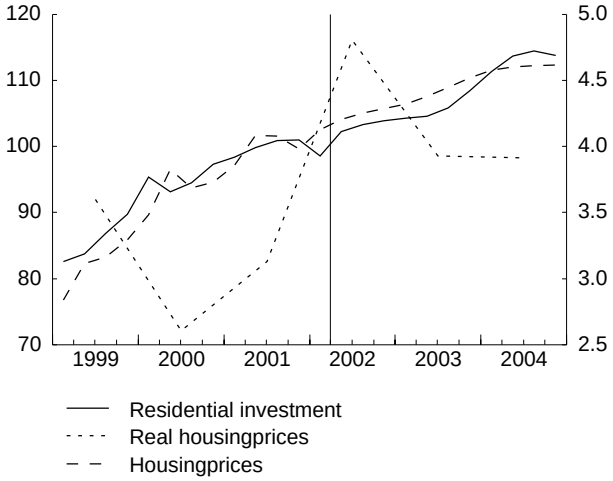
Growth in household consumption has not been revised up to any extent in 2001 compared with earlier projections, according to the national accounts. On the other hand, growth rates for the years prior to 2001 have been revised up to a greater extent, and the household saving ratio has been revised up considerably as a result of the revision of the national accounts for the years from 1990. Recent developments in consumption are not clear-cut and an early Easter in 2002 compared with the previous year makes seasonal adjustment uncertain. Following sluggish developments in the fourth quarter of 2001, consumption growth has picked up, but the strength of the upswing is uncertain. Consumption growth appears to have slowed somewhat in the spring months and car purchases, for example, show no growth at all.

Income and consumption in households
Seasonally adjusted volume indices, 2001=100



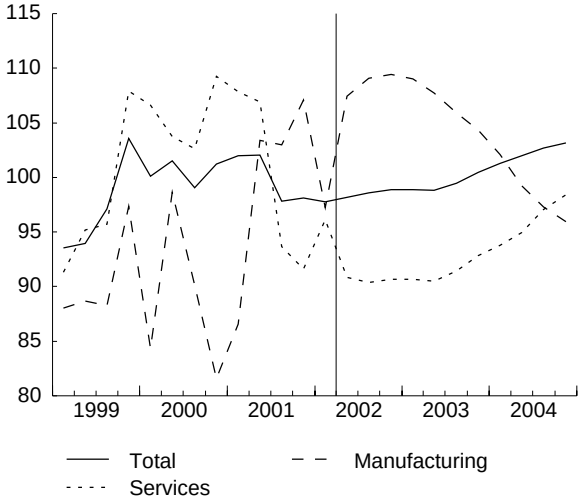
Source: Statistics Norway.

Residential investment and housingprices
Seasonally adjusted volume indices, 2001=100



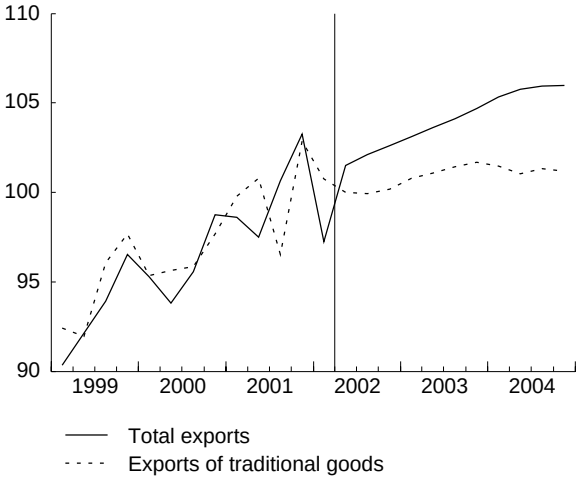
Source: Statistics Norway.

Investment, Mainland Norway
Seasonally adjusted volume indices, 2001=100



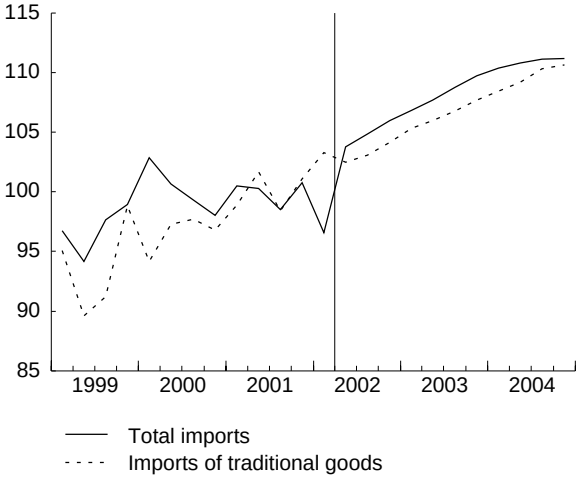
Source: Statistics Norway.

Exports
Seasonally adjusted volume indices, 2001=100



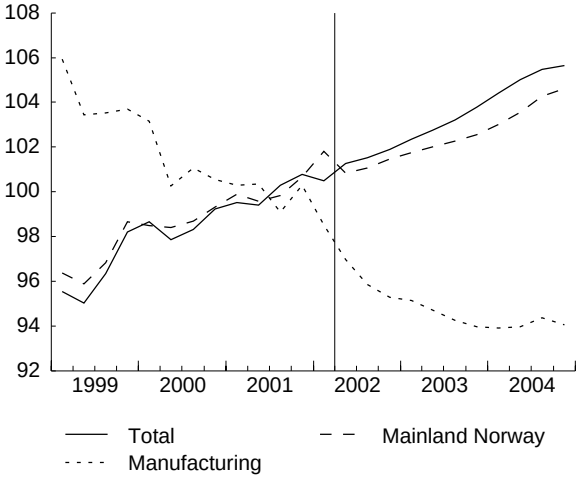
Source: Statistics Norway.

Imports
Seasonally adjusted volume indices, 2001=100



Source: Statistics Norway.

Gross domestic product
Seasonally adjusted volume indices, 2001=100



Source: Statistics Norway.

High real wage growth in 2002 will make a strong contribution to higher household real disposable income. The social security settlement will normally also give pensioners and other social security recipients high income growth, which means that household real disposable income may rise by a good 5 per cent this year. Based on developments so far in 2002, it is not very likely that consumption growth will be substantially higher than 3 per cent. The household saving ratio may then rise by about 2 percentage points from 2001 to 2002. High real interest rates are an important reason for the increase in the saving ratio. Another reason is that when income growth rises rapidly, the saving ratio will first increase and then decline gradually as households adjust consumption to what they perceive as permanently higher income. For the years ahead, we have in these calculations assumed high nominal interest rates that permanently contribute to maintaining a high saving ratio, but slightly higher inflation means that the real interest rate falls somewhat from the high level in 2002. This would imply that the saving ratio edges down in the period ahead. However, one factor that has the opposite effect is that rising unemployment contributes to increased uncertainty with regard to income and, in isolation, pushes up the saving ratio. All in all, we have therefore estimated that the saving ratio will remain approximately unchanged from 2002 to 2004.

Housing investment – which in terms of level has been revised up sharply in the revision of the national accounts – peaked in 2001 and has fallen slightly since the third quarter of 2001. Housing starts, however, have picked up this year after declining through the end of 2001. Starts measured by floor space, however, show a more stable trend over the past year. Major changes in housing investment in the period ahead are therefore not very likely. Prices for existing homes have continued to increase in real terms. Higher interest rates and increasing unemployment indicate that the rise will come to a halt, while strong growth in household income points to the opposite. All in all, we now project a more moderate rise in prices for existing homes than estimated earlier. This will contribute to reducing real growth in household wealth, which will curb consumption growth and, in isolation, contribute to a higher saving ratio.

Decline in mainland investment

Gross investment in the mainland economy, excluding general government, appears to have peaked at the beginning of 2001, according to revised national accounts figures. This decline was primarily due to a fall in investment in service industries. Towards the end of last year, it also appears that the investment upswing in manufacturing came to a halt, so that the projected growth from 2001 to 2002, which is in accordance with estimates from Statistics Norway's May investment intentions survey, primarily reflects the carry-over from the end of 2001. For other goods pro-

duction, investment has shown little change through recent quarters. We expect this picture to remain unchanged in the period ahead. Investment in the electricity sector is partly influenced by the postponed construction of gas-fired power stations, and in isolation this will contribute to pushing down investment in relation to our projections in the previous report.

Manufacturing investment is expected to remain at a high level in 2003 before falling in 2004, partly as a result of the completion of major plants for the production of metals. Weak production and profitability trends in manufacturing will, in isolation, push down investment. For private service industries, on the other hand, it is likely that slightly higher growth in the Norwegian economy will contribute to reversing the investment decline to a moderate upswing through 2003.

Increased market growth among trading partners, but sluggish trend for Norwegian exports

The volume of traditional merchandise exports fell on a seasonally adjusted basis from the fourth quarter of 2001 to the first quarter of 2002, but developments through last year showed considerable fluctuations. Given the sluggish trend in markets for Norwegian export goods in 2001, the growth in Norwegian exports was fairly high. Market growth is expected to pick up considerably in the period ahead as a result of international cyclical developments. As a result of the krone appreciation and high wage growth in Norway, traditional Norwegian exports are nevertheless expected to show very low growth. Deteriorating competitiveness is projected to lead to a substantial loss of market shares in international markets in the period ahead. This will contribute to curbing growth in the Norwegian economy. The uncertainty in this area is fairly considerable. The strengthening of the krone may be reversed to a greater extent than we have assumed, and local wage negotiations in the period ahead may result in smaller pay increases than what has been customary in recent years. In that case, it is conceivable that export growth will be somewhat higher than we have assumed in our calculations.

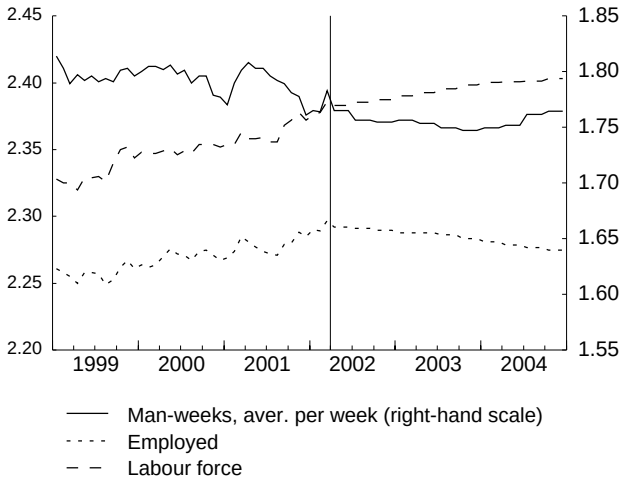
Growing domestic demand

Stronger growth in household demand and a gradual levelling off of the investment decline for mainland enterprises will contribute to a pick-up in domestic demand in the period ahead. The growth contribution from the petroleum sector will underpin this. Demand growth in both 2002 and 2003 is approximately the same as we projected in our previous report. Demand growth is expected to be somewhat higher in 2004, primarily due to mainland investment.

Weak GDP growth ahead

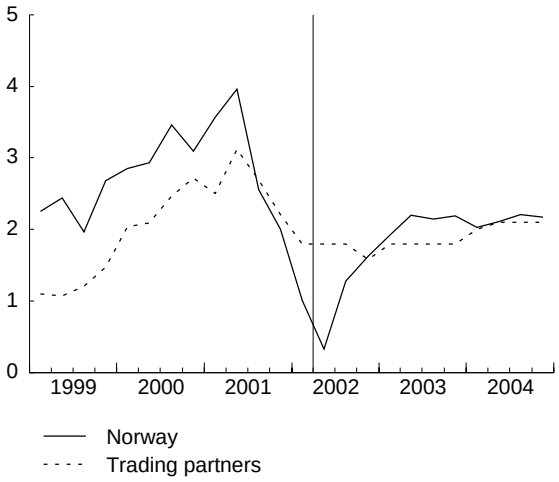
Total GDP fell from the fourth quarter of 2001 to the first quarter of 2002, primarily reflecting a sharp decline in petroleum activities and shipping Production

Labour force, employment and number of man-weeks
Millions. Seasonally adjusted and smoothed indices.



Source: Statistics Norway.

Consumer price indices
Percentage growth from the same quarter previous year



Sources: Statistics Norway, OECD and Eurostat.

limitations in the oil sector are an important explanatory factor. Mainland GDP, on the other hand, rose appreciably, primarily as a result of sharp growth in private and public services. For manufacturing, production continued to decline and has been falling since peaking in the second half of 1997.

Several important conditions for manufacturing industry have changed considerably since we published our last forecasts for the Norwegian economy in February. The wage settlement has been more expensive than was assumed at that time, the appreciation of the krone has eroded manufacturing industry's competitiveness further, and higher interest rates result in higher capital costs. Combined with record low inflation, this entails a very high real interest rate. Although market growth abroad is expected to pick up gradually, manufacturing will lose market shares both at home and abroad. A somewhat stronger impetus from petroleum investment may help to make the

Main economic indicators 2001-2004. Accounts and forecasts
Percentage change from previous year unless otherwise noted

	Accounts 2001	Forecasts 2002 SN	2002 MoF	2002 NB	2003 SN	2003 MoF	2003 NB	2004 SN	2004 NB
Demand and output									
Consumption in households and non-profit organizations	2.5	3.1	3.5	3 1/2	3.0	3.5	3 1/4	3.3	3
General government consumption	2.0	1.8	1.5	2	1.9	0.8	2 1/4	2.4	2 1/4
Gross fixed investment	-4.6	0.9	0.5	-1/4	1.7	2.6	4 1/4	2.2	1/4
Extraction and transport via pipelines	7.2	0.5	1.0	0	1.7	10.4	15	-2.0	-5
Mainland Norway	-0.3	-1.3	0.0	-1/4	1.9	0.4	1 1/4	3.5	1 3/4
Firms	-1.3	-4.9	-1.9	-3	2.2	-0.1	1	2.4	1 1/4
Housing	5.1	2.7	-0.5	4	2.9	4.7	3 1/4	10.4	2 3/4
General government	-4.3	6.5	6.7	4 3/4	-0.2	-2.1	0	-0.2	2 1/4
Demand from Mainland Norway[1]	1.8	2.0	2.4	2 1/2	2.6	2.3	2 1/2	3.1	2 3/4
Stockbuilding[2]	-0.8	0.0	-0.1	..	0.0	0.0	..	0.0	..
Exports	4.2	1.6	2.0	1/4	2.3	3.1	2 3/4	2.3	2 3/4
Crude oil and natural gas	5.2	2.4	2.9	0	3.0	2.4	4	4.0	2 1/2
Traditional goods	4.0	0.8	1.6	-1/2	2.3	3.9	2	0.2	3
Imports	0.0	3.7	2.7	2 1/4	4.0	3.8	4 3/4	2.9	3
Traditional goods	4.0	3.2	3.2	2 1/4	4.0	4.4	4 3/4	3.5	3
Gross domestic product	1.4	1.5	2.0	1 1/4	1.8	2.5	2 1/2	2.5	2
Mainland Norway	1.2	1.2	1.8	1 3/4	1.7	2.2	2 1/4	2.3	2
Labour market									
Employed persons	0.5	0.1	0.6	1/2	0.2	0.5	1/2	-0.2	1/2
Unemployment rate (level)	3.6	3.9	3.6	3 3/4	4.2	3.5	3 3/4	4.8	3 3/4
Prices and wages									
Wages per standard man-year	5.0	5.0	5	5	4.4	..	5	4.6	5
Consumer price index (CPI)	3.0	1.1	1.4	1 1/4	2.1	..	2 1/2	2.1	2 1/2
CPI adjusted for tax changes and excluding energy products (CPI-ATE)	2.6	2.3	..	2 1/4	2.1	..	2 1/2	2.2	2 1/2
Export prices, traditional goods	-3.1	-4.1	..	-9	3.7	..	-1/2	4.9	2 1/2
Import prices, traditional goods	0.4	-6.7	..	..	1.9	..	..	1.3	..
Housing prices	6.6	4.8	..	8	4.7	..	6	4.3	5
Balance of payment									
Current balance (bill. NOK)	233.4	205.0	188.6	140	203.0	179.7	130	226.0	130
Current balance (per cent of GDP)	15.4	13.5	..	10	12.8	..	9	13.5	8
Memorandum items:									
Household saving ratio (level)	4.6	5.9	8.6	8	5.7	8.1	8	5.8	8
Money market rate (level)[3]	7.2	7.3	6.8	..	7.3	6.9	..	7.3	..
Lending rate, banks (level)[4]	8.8	8.6	..	..	8.8	..	..	8.3	..
Crude oil price NOK (level)[5]	220.1	199.7	200	179.8	220.1	182.0	179.8	189.1	179.8
Export markets indicator	0.4	4.0	..	..	7.1	..	..	7.1	..
Importweighted krone exchange rate (44 countries)[3, 6]	-3.2	-6.0	..	-2 1/2	0.8	..	0	0.9	0

[1] Consumption in households and non-profit organizations + general government consumption + gross fixed capital formation in Mainland Norway.
[2] Change in stockbuilding. Per cent of GDP.
[3] NB technically assumes its rates to be constant through the forecast period.
[4] Households' borrowing rate in private financial institutions.
[5] Average spot price Brent Blend.
[6] Increasing index implies depreciation.
Sources: Statistics Norway (SN), Ministry of Finance, St.meld. nr 2, 2001 (MoF), Norges Bank, Inflation report 1/2002 (NB).

picture for some manufacturing sectors more positive. Value added is expected to decline by about 3 per cent this year, and the fall in production is assumed to take place in the domestic market. Those manufacturing sectors that supply goods to the export market are typically more specialized, less labour-intensive and also make use of a higher share of imported intermediate goods, thereby neutralizing the krone appreciation and wage growth to a greater extent. In addition, stronger market growth abroad compared with Norway will contribute to this result. For 2002, we have assumed that the development of the Snøhvit field will start, with investment initially taking place in land-based facilities. In 2003, value added in manufacturing industry is projected to decline slightly before showing a marginal increase in 2004. Developments in the coming two years are influenced by the gradual depreciation of the krone exchange rate.

Given this forecast, the number of employees in manufacturing will be about 25 000 fewer in 2004 than in 2001, and about 50 000 (15 per cent) fewer than in

1998. Even though the displacement of labour in manufacturing is in line with the intentions in the new fiscal policy guidelines, this is, according to our calculations, such a sharp fall that it frees up more labour than that being absorbed in other sectors of the economy up to 2004.

Moderate growth in total demand will contribute to a moderate rise in value added for mainland enterprises in the period ahead, and production in the general government sector will push up growth in mainland GDP both in 2002 and next year. Our projections for growth in the mainland economy in 2002 have been revised down considerably compared with earlier. This primarily reflects lower growth in total exports as well as traditional exports. In 2003 and the following years, GDP is expected to expand at a faster pace, but still showing growth rates that must be characterized as moderate and below what we consider trend growth, particularly following the revision of national accounts figures.

Less tight labour market and slower wage growth ahead

Seasonally adjusted figures from Statistics Norway's Labour Force Survey (LFS) show that unemployment rose from 2.9 per cent at the beginning of 1999 to 3.7 per cent in March 2002. The Directorate of Labour's figures for registered unemployment have shown a slightly more pronounced increase over the last three quarters after having remained stable in the previous three years. The number of vacancies, measured as a percentage of the labour force, has been halved since 2000. Pressures in the labour market thus appear to be lower than in several years. However, the pay increases granted in connection with wage settlements so far in 2002 have been relatively high, despite very low price inflation. In particular, the pay increases in the public sector appear to have been considerable. One possible interpretation of this is that there are wage-wage spirals in service sectors which have made a particularly strong contribution (see analysis of this in *Economic Survey* 1/2002).

Analyses of Norwegian wage determination indicate that the wage level and unemployment level are closely related to each other. However, changes in unemployment have medium-term implications for wage growth, partly through wage compensation for price increases and other types of lags. The sharp decline in unemployment in the period 1993-1998 may thus contribute to fairly high wage growth in the years ahead (see separate box in *Economic Survey* 4/2001). As a result of this, the labour market may thus have been perceived by a number of observers as too tight, which the settlement in 2002 seems to confirm.

As a result of higher labour costs along with the high real interest rate and an appreciation of the krone exchange rate, unemployment is expected to continue to rise, from 3.6 and 3.9 per cent in 2001 and 2002 respectively to 4.2 and 4.8 per cent in 2003 and 2004 respectively. Higher unemployment is primarily due to the decline in manufacturing employment. Demographic factors indicate a continued rise in the supply of labour, even though higher unemployment may reduce labour force participation rates for some groups. Reduced day-care rates, which are expected to increase the labour supply among women but perhaps not until the end of the projection period, point to the opposite.

The general pay increases that were awarded in this year's wage settlement were high. A considerable portion of the pay increases in the central government will not be effected until autumn, thereby contributing to a considerable wage carry-over into 2003. At the same time, agreement has now been reached concerning pay increases for a number of groups in 2003. The situation for manufacturing industry and weak profitability in some service sectors, combined with the rise in unemployment, must be expected to have a noticeable, dampening effect on wage drift in 2002 and 2003 compared with the last few years. Growth in wages per normal man-year in 2002 and 2003 are thus estimated at 5.0 and 4.4 per cent respectively. Wage growth is estimated at 4.6 per cent in 2004. Rising profits in manufacturing due to the increase in prices for traditional Norwegian export goods and the new main settlement to take place in 2004 will push up wage growth, whereas higher unemployment will reduce wage growth. With the lower rise in the consumer price index that is projected, real wage growth will be on a par with productivity growth in the same period. In 2002, real wage growth is substantially higher than productivity growth that year, which is otherwise estimated to be close to trend growth.

There is, however, considerable uncertainty associated with developments in wages – and to the actual system for wage determination in the period ahead. On the one hand, greater emphasis on the allocative advantages of decentralization, an increased use of petroleum funds domestically, technological changes that favour highly educated labour and the fact that the central bank no longer has to participate in the tripartite cooperation presupposed by the Solidarity Alternative indicate that wage determination is or will be more decentralized than what has traditionally been the case in Norway. We have calculated a scenario based on the assumption that wage determination moves in the direction of a regime similar to that of continental Europe, i.e. a relatively limited degree of coordination between the various trade unions. This results in noticeably higher wage growth than assumed in the baseline scenario. The results of these alternative calculations are presented in a separate box.

On the other hand, the prospect of a pronounced rise in unemployment – where the level in 2004 reaches

Effects of decentralized wage determination

Throughout the post-war period Norwegian wage determination has been highly centralized. Wage negotiations have either been coordinated or by industry, but it has often been difficult to distinguish between these two settlement types. The question of how the Norwegian economy will react to any decentralization of wage determination is therefore difficult to answer. We have no national experience on which to base this. The problem can be approached with the help of theoretical analysis with particular emphasis on microeconomic reasoning or by comparing the macro-economy across countries and over time. From the micro-economy we have elements that can have both a positive and negative impact on the economy. More flexible wages make it easier to allocate labour to sectors with the highest return at the same time that individual wage determination can increase productivity with the help of incentive schemes. On the other hand, unprofitable and unproductive enterprises are maintained for an unnecessarily long period because lower wages function as a subsidy. Bjørnstad and Johansen (2002) analyze the problem by quantifying how different degrees of decentralized wage determination will influence key macroeconomic variables with the help of the second method, i.e. by drawing on the experience of other countries.

Bjørnstad and Johansen replace wage relationships in Statistics Norway's macroeconometric model MODAG with the wage relationship in Nunziata (2001). This wage relationship is quantified for 20 OECD countries, including Norway. The model is then exposed to changes in several of the institutional variables that are included in the new wage relationship and which describe wage determination and factors that influence this. These variables are the degree of coordination in wage determination, employment protection, the level of unemployment benefits and union density. In their calculations, they look at the effects if wage determination in Norway is like that of continental Europe, with strong trade unions that do not coordinate pay demands to any extent. At the same time, favourable social security arrangements and extensive employment protection are retained. Trade unions then have strong bargaining power without affecting such a large part of the economy that they must take macroeconomic considerations into account. The result is higher real wages and higher unemployment as a result of deteriorating competitiveness and the loss of manufacturing jobs. A second set of calculations analyzes how wage determination like that in the US and the UK would affect the Norwegian economy. In these countries, wage determination is even less coordinated than in continental Europe. In isolation, less coordination has the effect of increasing wages, but reduced unemployment benefits and reduced employment protection curb this effect so that the effect on main macroeconomic variables is somewhat weaker than in the previous example. Viewed in relationship to the wage policy regime Norway has traditionally had, however, both scenarios have unfavourable effects for the macroeconomy. The result is a scaling back of internationally exposed activities and higher unemployment. If we see the emergence of an Anglo-American regime, it is also likely that we will record a sharp increase in wage disparities between those who are in employment, in addition to differentials in income between those in employment and those receiving social security benefits. Moreover, the climate in working life will probably be far tougher in the form of reduced worker rights.

The results of the analysis referred to above must be considered as more long-term consequences of a reduced degree of coordination in wage determination. The focus in the forecasts presented here is of a more short-term nature. Even though the analysis in the article referred to above focuses on the long-term properties of alternative wage determination regimes, this is also specified in the short term. This version of MODAG may thus also be able to describe developments in the Norwegian economy following any transition to new wage policy regimes. We present here a shift calculation in line with the results of this model run, where we have only changed the degree of coordination in wage determination so that it corresponds to that of continental Europe. We have thus not used the calculation in the article referred to above as this presupposes an instantaneous shift in a set of institutional variables. It is in fact the case that even if the degree of coordination in Norwegian wage determination changes, unemployment benefits, employment protection and union density are still the same. In the model version used in the analysis of Bjørnstad and Johansen, the real interest rate and balance in public sector budgets are kept unchanged in order to maintain a neutral monetary and fiscal policy stance. In this calculation, however, we want to look at the partial effect of a change in the degree of coordination. We therefore keep the nominal interest rate unchanged and allow public sector budgets to weaken as a result of wage increases. The exchange rate is kept unchanged in both analyses. The table below summarizes the results for five years from the time the shift takes place. The results must in other words be interpreted as estimates for developments in the Norwegian economy on the assumption that wage determination actually changes. Our forecasts are, however, based on the assumption that the Norwegian system of wage determination will remain unchanged.

Some maintain that a shift to a wage determination system similar to that of continental Europe has already taken place and this is the reason for the high pay increases awarded in wage settlements in Norway since 1998. In the event, it may be that the social partners are in the process of moving towards less coordination between them. In these calculations, we have changed the degree of coordination in wage determination down to the continental European level instantaneously. If this process in reality has been taking place over several years, the transition will be less evident than the results in the table suggest.

The reduced degree of coordination increases wage growth the same year by 3.3 percentage points. The effect then tapers off from wage growth that is 2.7 percentage points higher in the second year to 2.3 percentage points after five years. Higher wage growth has several effects on the economy; it increases household income but it also increases enterprises' costs. The segment of the business sector that is sheltered from international competition can to a greater extent pass on the increase in costs to prices. This contributes in particular to higher price inflation domestically. The rise in the consumer price index increases by 0.7 percentage point in the first two years. In the fourth and fifth years, consumer price inflation is 1.0 percentage point higher. This reduces to some extent the effect on real wage growth compared with the effect on the nominal level. Viewed in

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relation to a situation without a change in wage determination, growth in household real disposable income is increased by 1.1 and 1.9 percentage points respectively in the first two years. After five years, growth in real income is 0.9 percentage point higher. Income growth contributes to pushing up household consumption, imports and housing investment.

The increase in labour costs erodes manufacturing industry's competitiveness. The operating results of manufacturing industry deteriorate by as much as 5.7 and 9.5 per cent in the first two years. After five years, the operating results in manufacturing are 23.6 per cent lower than in a situation without a reduced degree of coordination. This means that 3 600 manufacturing jobs disappear the first year and twice as many disappear after two years. After five years, 15 900 manufacturing jobs have been eliminated. Even though private consumption increases slightly as a result of the increase in real income, higher labour costs contribute to lower employment in the rest of the economy as well. The level of employment is reduced by a total of 0.4 per cent the first year and 1.0 per cent after five years compared with a situation without a reduced degree of coordination. In the same period, the unemployment rate rises by 0.2 and 0.5 percentage point respectively.

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Effects on growth rates in some main macroeconomic variables through reduced coordination in wage determination
Growth deviation in percentage points unless otherwise noted

	1 year	2 year	3 year	4 year	5 year
Consumtion in households and non-profit organizations	0.2	1.4	1.7	1.0	0.7
Housing investments	0.0	2.7	4.2	4.8	4.9
Manufacturing investments	-0.6	-0.0	0.2	-0.2	-0.5
Export traditional goods	-0.4	-0.5	-0.6	-0.6	-0.6
Imports	0.2	1.2	1.5	1.0	0.8
Mainland GDP	-0.1	0.4	0.6	0.2	0.1
Gross product manufacturing	-0.7	-0.8	-0.9	-1.2	-1.2
Man-hours worked in industry	-1.3	-1.1	-1.1	-1.1	-1.0
Employed persons	-0.4	-0.3	-0.1	-0.1	-0.1
Labour supply	-0.2	-0.2	-0.1	-0.0	0.0
Unemployment (deviation in percentage points)	0.2	0.3	0.4	0.4	0.5
Wages	3.3	2.7	2.4	2.4	2.3
Consumer price index (CPI)	0.7	0.7	0.8	1.0	1.0
Real disposable income, housholds	1.1	1.9	1.2	1.0	0.9
Current balance (deviation in per cent)	-0.4	-4.0	-9.5	-15.2	-22.0

the same level as at the beginning of the 1990s – provides the basis for new income policy measures in connection with the main settlement in 2004. It is difficult to consider this possible, however, unless the Government and the central bank cooperate with the social partners. It has been a tradition for the authorities and the large employee and employer organizations to participate in efforts to improve competitiveness in particularly difficult periods. Income policy in the 1970s, wage acts in 1988-1989 and the Solidarity Alternative in the 1990s are examples of this cooperation.

Strong krone contributes to moderate rise in prices

As a result of indirect tax reductions, the appreciation of the krone and developments in electricity prices, the year-on-year rise in the consumer price index (CPI) has fallen markedly over the last 12 months. Electricity prices showed unusual movements last year, with no decline in the summer half-year. As a result, the rate of inflation reached as much as 4.3 per cent in May 2001. In May this year, the inflation rate was reduced to 0.4 per cent. The rate of inflation, measured by the rise in the CPI adjusted for tax changes and excluding energy products (CPI-ATE), reached a peak in February 2001, at 2.9 per cent, but has since fluctuated around 2.5 per cent. The year-on-year rise in the CPI will probably reach the lowest level ever recorded (as long as the current system for the index has existed, i.e. since 1960) in June inasmuch as we expect a fall in the level of prices on an annual basis for this month. Price inflation is expected to pick up after this, as the 12-month effect of the halving of VAT on food from last summer is then eliminated and the effects of the extraordinary path for electricity prices last year are gradually reduced through the second half of 2002. On an annual basis, CPI inflation is expected to be about 1 per cent this year.

Money market rates have been slightly higher the last four months than we assumed in our previous report. The interest rate influences the inflation process through several channels. The most direct effect is seen through the cost element of the interest rate in the user price of capital. House rents in particular are influenced, and developments in house rents have in recent months contributed to curbing the fall in the inflation rate. A higher interest rate will also contribute to cooling off activity in the economy. Reduced pressures in the labour market will, in isolation, translate into lower wage growth, thereby resulting in a gradual reduction in inflation. According to our model's description of the functioning of the economy, the total effect of an increase in interest rates through these interest rate channels will first be an increase in inflation followed by a reduction in inflation after two years. The strongest interest rate channel, however, is the effect on the exchange rate. The current strong krone exchange rate has both a direct impact through lower prices for imported goods and an indirect effect by contributing to reducing the level of activity.

In the assessment of the inflation outlook, further developments in exchange rates have thus played a key role. Developments are obviously influenced by Norges Bank's setting of interest rates, but expectations concerning future developments in capital and foreign exchange markets probably play a decisive role. Our calculations are based on the assumption that the import-weighted krone exchange rate will gradually fall from the level prevailing at the beginning of June this year and through the projection period. Even though the krone declines in value, this entails an appreciation of the krone on an annual basis of about 6 per cent from 2001 to 2002 and a depreciation of 1 per cent the next two years.

Even this more moderate appreciation than we have witnessed so far will generate strong price-dampening impulses to the Norwegian economy. One factor of uncertainty, however, is the timing of the feed-through to consumer prices. There are many reasons why there is a considerable time lag. First, inventories mean that costs are not influenced immediately. Importers and foreign producers may have agreed on prices in NOK for a lengthy period, or they may have hedged against exchange rate fluctuations in the financial market. A key element for price setters will be whether a change in the exchange rate is perceived as a temporary phenomenon or a more permanent change. Under the former monetary policy regime, Norges Bank's objectives were linked to the exchange rate. Devaluations and revaluations were for that reason far more quickly perceived as permanent than under the current monetary policy regime where there are no such explicit objectives. Experience from earlier exchange rate changes may thus provide limited information with regard to the time profile of the feed-through to Norwegian prices. According to our model's description of the functioning of the Norwegian economy, a permanent exchange rate change will in the long run result in an equivalent change in the level of domestic prices – and the effects on inflation will be increasing the first year. According to our calculations, inflation, as measured by the consumer price index adjusted for tax changes and excluding energy products (CPI-ATE), will fall markedly through this year and well into next year, and the annual rise may be in the range 2-2.5 per cent both in 2002 and in the next two years. Inflation may be lowest around the end of this year. The reason that price inflation in 2004 is estimated to be lower than 2.5 per cent is that the contribution from lower day-care rates is then expected to reduce CPI inflation by 0.4 percentage point that year. Even though the CPI-ATE has not been formally adjusted for this, monetary policymakers may nevertheless take into account that lower day-care rates represent a special and temporary factor that influences price developments.

The low estimates for price inflation may appear surprising given high wage growth. Wages per normal man-year may be slightly higher in 2002 than in 2001, but the rise in labour costs shows little change inasmuch as in the previous year we had the effect of the costs of additional vacation days. Productivity growth for mainland enterprises of about 2.5 per cent per year means that unit labour costs will not deviate substantially from 2.5 per cent in 2002 before edging down in 2003.

High oil prices result in large current account surpluses

The revision of the national accounts figures has resulted in an upward adjustment of exports of services, total exports and the trade surplus, while the value of imports has not been changed to any extent. All in all, this has resulted in an upward revision of the current account surplus in 2001 of about NOK 17 billion, to a good NOK 233 billion, which is equivalent to 15.4 per cent of GDP. Higher oil prices will contribute to substantial trade surpluses in the years ahead. Sluggish growth in the volume of traditional merchandise exports and high growth in imports will be partly offset by an estimated improvement in the terms of trade for traditional goods. All in all, the trade surplus is projected at NOK 220 billion and the current account surplus at NOK 205 billion in 2002. Slightly higher prices measured in krone terms are expected to boost the trade surplus somewhat in the years ahead, but in general the current account balance shows fairly stable and large surpluses, according to our calculations. This means that total saving in Norway will remain at a high level and that investments in the Petroleum Fund will continue.

National accounts: Final expenditure and gross domestic product
At fixed 1999 prices. Million kroner

	Unadjusted		Seasonally adjusted							
	2000	2001	00.2	00.3	00.4	01.1	01.2	01.3	01.4	02.1
Final consumption exp. of housh. and NPISHs	604 894	619 828	151 886	152 168	151 102	153 187	154 971	156 164	155 374	157 215
Household final consumption expenditure	579 806	594 720	145 668	145 964	144 819	146 822	148 653	149 874	149 233	150 767
Goods	323 787	331 261	81 812	81 427	80 391	81 529	82 634	82 896	84 092	84 631
Services	247 270	254 712	61 805	62 427	62 001	62 883	63 743	64 666	63 457	64 033
Direct purchases abroad by resident househ.	26 089	26 065	6 416	6 555	6 476	6 667	6 555	6 688	6 057	6 116
Direct purchases by non-residents	-17 340	-17 317	-4 365	-4 446	-4 050	-4 257	-4 278	-4 376	-4 372	-4 014
Final consumption exp. of NPISHs	25 088	25 108	6 218	6 205	6 283	6 365	6 318	6 290	6 141	6 448
Final consump. exp. of general government	266 784	272 179	66 324	66 271	66 795	67 367	67 923	68 460	68 959	70 340
Final consump. exp. of central government	105 943	107 664	26 277	26 040	26 258	26 916	26 953	27 005	27 301	37 623
Central government, civilian	81 256	83 875	20 044	19 920	20 188	20 914	21 030	21 137	21 310	31 513
Central government, defence	24 687	23 789	6 233	6 120	6 071	6 002	5 923	5 868	5 991	6 110
Final consump. exp. of local government	160 840	164 516	40 048	40 231	40 537	40 451	40 970	41 455	41 658	32 718
Gross fixed capital formation	267 774	255 527	67 118	62 872	61 831	65 115	62 454	60 460	61 607	59 655
Extraction and transport via pipelines	47 929	51 362	11 133	10 579	9 770	10 708	10 054	11 489	13 337	10 953
Service activities incidential to extraction	6 573	-897	492	476	470	253	1 034	295	-2 479	194
Ocean transport	16 298	8 672	5 683	3 226	1 917	4 112	1 283	679	2 597	535
Mainland Norway	196 974	196 390	49 810	48 591	49 675	50 042	50 083	47 996	48 153	47 972
Mainland Norway ex. general government	158 114	159 189	39 777	38 990	39 859	40 255	41 000	38 945	38 788	38 651
Manufacturing and mining	19 620	22 457	5 497	5 022	4 544	4 823	5 760	5 738	5 967	5 417
Production of other goods	15 832	15 601	4 180	3 885	3 708	3 947	3 742	3 920	3 884	3 792
Dwellings	47 830	50 288	11 704	11 877	12 230	12 358	12 538	12 680	12 689	12 391
Other services	74 832	70 842	18 396	18 206	19 378	19 126	18 960	16 607	16 248	17 051
General government	38 860	37 201	10 033	9 601	9 816	9 787	9 082	9 051	9 364	9 321
Changes in stocks and stat. discrepancies	29 300	18 583	8 060	9 923	8 951	6 631	7 856	4 986	4 620	5 997
Gross capital formation	297 074	274 110	75 178	72 795	70 782	71 746	70 310	65 445	66 227	65 652
Final domestic use of goods and services	1168751	1166117	293 388	291 234	288 679	292 300	293 204	290 069	290 560	293 207
Final demand from Mainland Norway	1068652	1088398	268 020	267 030	267 572	270 596	272 977	272 620	272 486	275 527
Final demand from general government	305 644	309 380	76 358	75 872	76 611	77 155	77 006	77 510	78 323	79 661
Total exports	500 366	521 299	122 310	124 569	128 760	128 552	127 094	131 199	134 598	126 796
Traditional goods	188 774	196 328	46 959	47 066	47 958	48 985	49 490	47 383	50 506	49 461
Crude oil and natural gas	169 668	178 502	41 394	42 794	42 806	44 060	42 005	46 476	46 009	42 469
Ships and oil platforms	8 892	14 178	1 573	3 068	2 892	2 399	2 864	3 867	5 049	3 217
Services	133 032	132 291	32 384	31 640	35 103	33 109	32 735	33 473	33 034	31 649
Total use of goods and services	1669118	1687416	415 698	415 803	417 439	420 852	420 298	421 268	425 158	420 003
Total imports	406 472	406 535	102 236	100 856	99 537	102 037	101 865	100 022	102 307	98 075
Traditional goods	260 826	271 200	65 906	66 204	65 583	66 988	68 891	66 679	68 482	69 988
Crude oil	1 009	1 034	51	409	408	233	224	194	382	103
Ships and oil platforms	22 592	12 112	5 942	4 566	2 384	3 907	1 753	2 928	3 524	657
Services	122 045	122 188	30 337	29 677	31 163	30 908	30 997	30 221	29 918	27 326
Gross domestic product	1262645	1280881	313 462	314 947	317 902	318 815	318 433	321 245	322 851	321 928
Mainland Norway (market prices)	1055400	1068417	262 946	263 690	265 385	266 965	266 065	266 804	269 031	272 082
Petroleum activities and ocean transport	207 245	212 464	50 516	51 257	52 517	51 850	52 368	54 441	53 820	49 845
Mainland Norway (basic prices)	915 775	930 091	227 700	229 031	230 398	232 156	231 185	232 129	234 607	237 584
Mainland Norway ex. general government	711 897	723 906	177 015	178 122	179 272	180 856	179 901	180 650	182 745	184 630
Manufacturing and mining	134 200	132 701	33 246	33 518	33 346	33 257	33 278	32 858	33 255	32 668
Production of other goods	102 805	98 808	26 121	25 906	25 082	25 259	24 147	23 872	25 080	24 932
Service industries	474 893	492 397	117 648	118 698	120 843	122 341	122 476	123 920	124 410	127 030
General government	203 878	206 185	50 685	50 909	51 126	51 300	51 284	51 479	51 862	52 954
Correction items	139 624	138 326	35 245	34 659	34 987	34 809	34 880	34 675	34 424	34 498

Source: Statistics Norway.

National accounts: Final expenditure and gross domestic product
At fixed 1999- prices. Percentage volume change from previous period

	Unadjusted		Seasonally adjusted							
	2000	2001	00.2	00.3	00.4	01.1	01.2	01.3	01.4	02.1
Final consumption exp. of housh. and NPISHs	3.5	2.5	0.6	0.2	-0.7	1.4	1.2	0.8	-0.5	1.2
Household final consumption expenditure	3.6	2.6	0.7	0.2	-0.8	1.4	1.2	0.8	-0.4	1.0
Goods	3.3	2.3	0.7	-0.5	-1.3	1.4	1.4	0.3	1.4	0.6
Services	3.5	3.0	1.1	1.0	-0.7	1,4	1.4	1.4	-1.9	0.9
Direct purchases abroad by resident househ.	0.7	-0.1	-3.1	2.2	-1.2	2.9	-1.7	2.0	-9.4	1.0
Direct purchases by non-residents	-7.6	-0.1	0.7	1.8	-8.9	5.1	0.5	2.3	-0.1	-8.2
Final consumption exp. of NPISHs	1.2	0.1	-2.8	-0.2	1.3	1.3	-0.7	-0.4	-2.4	5.0
Final consump. exp. of general government	1.2	2.0	0.5	-0.1	0.8	0.9	0.8	0.8	0.7	2.0
Final consump. exp. of central government	0.5	1.6	-0.1	-0.9	0.8	2.5	0.1	0.2	1.1	37.8
Central government, civilian	3.2	3.2	0.0	-0.6	1.3	3.6	0.6	0.5	0.8	47.9
Central government, defence	-7.4	-3.6	-0.4	-1.8	-0.8	-1.1	-1,3	-0.9	2.1	2.0
Final consump. exp. of local government	1.6	2.3	0.9	0.5	0.8	-0.2	1.3	1.2	0.5	-21.5
Gross fixed capital formation	-1.5	-4.6	-6.4	-6.3	-1.7	5.3	-4.1	-3.2	1.9	-3.2
Extraction and transport via pipelines	-31.6	7.2	-7.1	-5.0	-7.6	9.6	-6.1	14.3	16.1	-17.9
Service activities incidential to extraction	-458.4	-113.6	-90.4	-3.3	-1.3	-46.1	308.3	-71.5	-940.3	-107.8
Ocean transport	23.8	-46.8	3.8	-43.2	-40.6	114.5	-68.8	-47.1	282.2	-79.4
Mainland Norway	3.4	-0.3	1.4	-2.4	2.2	0.7	0.1	-4.2	0.3	-0.4
Mainland Norway ex. general government	6.7	0.7	0.5	-2.0	2.2	1.0	1.9	-5.0	-0.4	-0.4
Manufacturing and mining	-3.4	14.5	17.0	-8.6	-9.5	6.2	19.4	-0.4	4.0	-9.2
Production of other goods	1.0	-1.5	4.6	-7.1	-4.5	6.4	-5.2	4.8	-0.9	-2.4
Dwellings	11.0	5.1	-2.4	1.5	3.0	1.1	1.5	1.1	0.1	-2.4
Other services	8.3	-5.3	-2.7	-1.0	6.4	-1.3	-0.9	-12.4	-2.2	4.9
General government	-8.1	-4.3	5.4	-4.3	2.2	-0.3	-7.2	-0.3	3.5	-0.5
Changes in stocks and stat. discrepancies	41.3	-36.6	5.9	23.1	-9.8	-25.9	18.5	-36.5	-7.3	29.8
Gross capital formation	1.5	-7.7	-5.2	-3.2	-2.8	1.4	-2.0	-6.9	1.2	-0.9
Final domestic use of goods and services	2.5	-0.2	-1.0	-0.7	-0.9	1.3	0.3	-1.1	0.2	0.9
Final demand from Mainland Norway	2.9	1.8	0.7	-0.4	0.2	1.1	0.9	-0.1	0.0	1.1
Final demand from general government	-0.1	1.2	1.1	-0.6	1.0	0.7	-0.2	0.7	1.0	1.7
Total exports	2.9	4.2	-1.5	1.8	3.4	-0.2	-1.1	3.2	2.6	-5.8
Traditional goods	1.7	4.0	0.3	0.2	1.9	2.1	1.0	-4.3	6.6	-2.1
Crude oil and natural gas	6.6	5.2	-2.1	3.4	0.0	2.9	-4.7	10.6	-1.0	-7.7
Ships and oil platforms	-38.9	59.4	15.8	95.0	-5.7	-17.1	19.4	35.0	30.6	-36.3
Services	4.9	-0.6	-4.1	-2.3	10.9	-5.7	-1.1	2.3	-1.3	-4.2
Total use of goods and services	2.6	1.1	-1.1	0.0	0.4	0.8	-0.1	0.2	0.9	-1.2
Total imports	3.2	0.0	-2.1	-1.3	-1.3	2.5	-0.2	-1.8	2.3	-4.1
Traditional goods	2.6	4.0	3.3	0.5	-0.9	2.1	2.8	-3.2	2.7	2.2
Crude oil	-51.4	2.5	-63.8	702.0	-0.2	-42.8	-3.8	-13.7	97.4	-73.1
Ships and oil platforms	13.0	-46.4	-38.7	-23.2	-47.8	63.9	-55.1	67.1	20.4	-81.3
Services	3.9	0.1	-1.5	-2.2	5.0	-0.8	0.3	-2.5	-1.0	-8.7
Gross domestic product	2.4	1.4	-0.8	0.5	0.9	0.3	-0.1	0.9	0.5	-0.3
Mainland Norway (market prices)	1.9	1.2	-0.1	0.3	0.6	0.6	-0.3	0.3	0.8	1.1
Petroleum activities and ocean transport	4.9	2.5	-4.4	1.5	2.5	-1.3	1.0	4.0	-1.1	-7.4
Mainland Norway (basic prices)	2.0	1.6	-0.2	0.6	0.6	0.8	-0.4	0.4	1.1	1.3
Mainland Norway ex. general government	2.4	1.7	-0.3	0.6	0.6	0.9	-0.5	0.4	1.2	1.0
Manufacturing and mining	-2.9	-1.1	-2.8	0.8	-0.5	-0.3	0.1	-1.3	1.2	-1.8
Production of other goods	5.0	-3.9	0.9	-0.8	-3.2	0.7	-4.4	-1.1	5.1	-0.6
Service industries	3.5	3.7	0.1	0.9	1.8	1.2	0.1	1.2	0.4	2.1
General government	0.5	1.1	0.2	0.4	0.4	0.3	0.0	0.4	0.7	2.1
Correction items	1.4	-0.9	0.7	-1.7	0.9	-0.5	0.2	-0.6	-0.7	0.2

Source: Statistics Norway.

National accounts: Final expenditure and gross domestic product
Price indices. 1999=100

	Unadjusted		Seasonally adjusted							
	2000	2001	00.2	00.3	00.4	01.1	01.2	01.3	01.4	02.1
Final consumption exp. of households and NPISHs	103.3	105.1	102.4	103.5	105.1	105.5	105.3	104.3	105.8	105.8
Final consumption exp. of general government	105.0	112.5	104.4	106.0	107.4	110.3	111.5	112.2	114.7	112.3
Gross fixed capital formation	105.9	109.6	105.3	107.0	108.3	109.6	110.3	109.9	108.4	108.1
Mainland Norway	104.4	107.6	104.4	105.1	105.5	108.5	108.1	107.6	106.2	107.1
Final domestic use of goods and services	104.3	107.5	104.4	104.5	106.2	106.8	108.3	106.3	109.0	107.6
Final demand from Mainland Norway	103.9	107.4	103.3	104.4	105.8	107.2	107.3	106.9	108.1	107.7
Total exports	137.2	134.1	134.1	142.0	145.9	140.6	142.3	133.6	121.0	124.4
Traditional goods	113.5	110.0	114.1	115.0	117.0	113.6	112.2	108.1	105.2	103.4
Total use of goods and services	114.1	115.7	113.2	115.7	118.5	117.1	118.6	114.8	112.8	112.7
Total imports	108.2	108.7	108.0	109.3	111.2	112.3	110.1	107.0	105.9	104.0
Traditional goods	104.8	105.2	103.8	105.1	107.0	109.7	106.8	103.3	101.8	99.3
Gross domestic product	116.0	118.0	114.9	117.8	120.8	118.7	121.3	117.2	115.0	115.3
Mainland Norway (market prices)	104.4	107.8	104.8	104.8	106.0	106.9	108.0	107.0	109.3	108.3

Source: Statistics Norway.

National accounts: Final expenditure and gross domestic product
Price indices. Percentage volume change from previous period

	Unadjusted		Seasonally adjusted							
	2000	2001	00.2	00.3	00.4	01.1	01.2	01.3	01.4	02.1
Final consumption exp. of households and NPISHs	3.3	1.8	0.5	1.1	1.6	0.3	-0.2	-0.9	1.4	0.1
Final consumption exp. of general government	5.0	7.1	2.0	1.6	1.3	2.7	1.1	0.7	2.2	-2.1
Gross fixed capital formation	5.9	3.5	2.1	1.6	1.3	1.2	0.6	-0.4	-1.4	-0.2
Mainland Norway	4.4	3.1	1.9	0.7	0.4	2.8	-0.3	-0.4	-1.3	0.9
Final domestic use of goods and services	4.3	3.1	2.8	0.0	1.7	0.6	1.4	-1.9	2.6	-1.3
Final demand from Mainland Norway	3.9	3.4	1.1	1.1	1.3	1.4	0.1	-0.4	1.1	-0.4
Total exports	37.2	-2.3	6.6	5.8	2.8	-3.7	1.3	-6.2	-9.4	2.9
Traditional goods	13.5	-3.1	6.0	0.7	1.8	-2.9	-1.2	-3.6	-2.7	-1.8
Total use of goods and services	14.1	1.4	4.1	2.2	2.4	-1.1	1.3	-3.2	-1.7	-0.1
Total imports	8.2	0.4	3.8	1.2	1.7	1.1	-2.0	-2.8	-1.1	-1.7
Traditional goods	4.8	0.4	1.3	1.2	1.8	2.5	-2.6	-3.3	-1.5	-2.4
Gross domestic product	16.0	1.7	4.2	2.5	2.5	-1.7	2.2	-3.4	-1.8	0.2
Mainland Norway (market prices)	4.4	3.3	3.2	0.0	1.2	0.8	1.1	-0.9	2.2	-0.9

Source: Statistics Norway.

Technical comments on the quarterly figures

Quarterly calculations: The calculations are made on a less detailed level than the calculations for the annual national accounts, and are based on more simplified procedures.

Base year and chain linking of the data: In the quarterly national accounts (QNA) all volume measures are currently calculated at constant 1999 prices using weights from that year. The choice of base year influences the constant price figures and thus the annual rates of change in volume (growth rates). For the sake of comparison, all tables present growth rates with 1999 as the base year (common year of recalculation). The recalculation of prices is carried out at the sectoral level of the quarterly national accounts.

Revised national accounts figures: Stronger growth in the 1990s*[1]

Erling Joar Fløttum, Tore Halvorsen and Tor Skoglund

Revised figures from the national accounts show stronger volume growth in Gross Domestic Product (GDP) than previously estimated for the period of 1995-1999. Growth rate estimates for these years are on average increased by 0.6 percentage points. The revisions were largest for 1999, for which year the growth rate has been increased by 1 percentage point due to the incorporation of structural statistics for the service industries. New preliminary growth figures for 2000 and 2001 do not deviate much from previous figures. Revised figures for GDP and final consumption expenditures of households are 1 to 3 per cent higher than previously published for the years 1991-2001. The current external balance has been adjusted upwards due to new information on exports of services. Incorporation of new structural statistics has also led to changes in the distribution of GDP and employment figures by industry.

The background for the revision

In 1995, Statistics Norway published results from an extensive revision of the national accounts (the main revision). With this revision, Norway became the first country in Europe to institute the new international guidelines for national accounts published in the System of National Accounts (SNA) 1993 and the European System of National Accounts (ESA) 1995. The main revision led to changes in definitions and classifications and integrated new statistics and new calculation methods. The revision was finished in 2000 with the publication of revised time series back to 1970. Large effects in the national accounts figures were inevitable considering it had been 20 years since the previous main revision.

Statistics Norway has in the last few years prepared new structural statistics for many industries, see box. For manufacturing, the structural statistics have been incorporated on a continual basis in the final national accounts figures. For construction, wholesale and retail trade, business services and transport, the changes, in relation to earlier statistics, were so extensive that the information could not be incorporated on a continual basis. Therefore in 1999, Statistics Norway decided to endeavour a new revision of the national accounts on a more limited scale than the main revision of 1995. The purpose being to utilise the new structural statistics and other new statistics in a coordinated and concentrated effort to improve the quality of the national accounts time series. Many divisions within Statistics Norway have contributed to the work involved in this project.

Excepting some individual new price indices, no new statistics are available for the years before 1995 that were not included in the main revision of 1995. The figures for the period 1991 to 1995 are however revised to prevent a break in the national accounts time series around 1995. For 1991-1995, the figures are affected in part by the new price indices and in part by new methods and some changes in definitions that were extended back to 1991.

The most important contributions within the revision have been:

- Incorporation of new level figures for production, intermediate consumption, compensation of employees and investments from structural statistics for service and construction industries in 1998 and 1999 and accompanying revisions for previous years
- Revision of figures for employed persons, full-time equivalent persons, and hours worked that are consistent with the revisions mentioned above
- Incorporation of new price indices; including, among others, new indices for exports and imports and quality adjusted indices for individual capital goods

Erling Joar Fløttum is Senior Statistical Adviser at the Department of Economic Statistics. (erling.joar.flottum@ssb.no)

Tore Halvorsen is Statistical Adviser at the Division for National Accounts. (tore.halvorsen@ssb.no)

Tor Skoglund is Research Fellow at the Division for National Accounts. (tor.skoglund@ssb.no)

* Translated by Jennifer Bush, Division for National Accounts.

[1] Revised figures for the years 1991-2001 can be found at www.ssb.no/english/subjects/09/01/nr-en/ .

Structural statistics

The structural statistics are adapted to the EU regulation on structural statistics. The statistics are based upon information from a specific tax questionnaire with the statistical unit being an enterprise and producing figures for both establishments and enterprises. Routines have been set up for converting and redefining individual variables in the structural statistics according to the national accounts industry divisions and concepts.

Statistics Norway publishes annual structural statistics 1.5 to 2 years after the end of the statistical year in the following areas (some beginning in 1995, and some beginning in later years):

- Manufacturing and mining and quarrying
- Construction
- Wholesale and retail trade
- Hotels and restaurants
- Transport (not including ocean transport)
- Post and telecommunications
- Real estate, renting and business activities
- Personal services

Revised national accounts figures

1991-1999: new final figures

For the years 1998 and 1999 only preliminary figures, based upon the quarterly national accounts, have been previously published. These figures were prepared by projections from the base year 1997 coordinated with the developments described by various economic short-term indicators. These estimates were calculated on a more aggregated and summarized level than in the final national accounts. Final national account figures for the years 1991-1999 are now available. In this article, we have mainly used 1997 as the reference year for comparisons of level figures before and after the revision, as 1997 was the last year with final accounts before the revision.

2000-2001: new preliminary figures

The figures for 2000 and 2001 have been released with estimates from both before and after the revision, using data from the quarterly national accounts as the basis. The revisions to previously published figures in Economic Survey 1/2002 can be attributed to two main adaptations. Firstly in this revision, the level estimates have shifted because the projection base year has been shifted from 1997 to 1999. This also effects volume and price developments for the aggregated figures because relative prices are used as weights in the aggregation from component variables. Secondly, new information in some areas has been considered in the development of 2000 and 2001. In the previous publication, data on the development at the end of the previous year were insufficient.

- Utilisation of trade margins surveys in retail trade (1996) and wholesale trade (1998) to revise gross trade margins rates in wholesale and retail trade
- Revision of figures for dwelling services based on survey data regarding rents in 1998, 1999, 2000
- Revision of figures for exports of services on the basis of new information for the years after 1995
- Incorporation of new international standards of classifications for household final consumption expenditure, for non-profit institutions serving households, and for general government
- Revision of capital and consumption of fixed capital estimates, with the introduction of new estimates of lifetime and new depreciation methods for general government
- Incorporation of new accounting statistics for private non-financial corporations in 1999 in the institutional sector accounts.

Stronger GDP growth in the 1990s

Gross Domestic Product measured in current prices has been increased for all of the years back to 1991 due to the revisions. The increase consists of approximately NOK 15 billion or 1.4 per cent for 1997. For 1999 GDP was nearly 36 billion or 3 per cent higher than earlier estimates. The most important contributors to higher GDP levels are new calculation models for consumption of fixed capital by general government, new incorporated information for the construction and service industries, and a new definition of production in the forestry and logging industry. These changes, among others, in the national accounts structural figures will be described in more detail later in the article.

The new national account figures show stronger volume growth in the Gross Domestic Product for all of the years from 1995 to 1999 than previously estimated, see table 1. The growth rate estimates for these five years are on average increased by 0.6 percentage points. The revision is particularly substantial for 1999, in which year earlier calculations were built upon quarterly national accounts and less detailed databases. The growth rate in GDP for Mainland-Norway was increased from 1.0 to 2.7 per cent for 1999. The growth rate for value added in the business service industry was increased from 4 per cent to nearly 13 per cent in 1999. Incorporation of figures from the structural statistics for other service industries has also led to stronger growth estimates for these industries.

The volume growth in GDP varied little for the years from 1991 to 1994 compared to previous estimates. New growth rates have not yet been calculated for the development from 1990 to 1991.

The revised national accounts figures for growth in total number of employed persons and hours worked vary insignificantly from previously published figures for the 1990s. The volume growth in GDP per total hours worked can be interpreted as an indicator of the development in labour productivity in the Norwegian economy, and therefore has had stronger growth than previously estimated for the period 1995-1999.

The growth rate for household consumption expenditure and non-profit institutions consumption expendi-

Table 1. Main economic indicators. Revision results 1992-2001. Annual percentage change in volume

	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001	
	New fig.	Old fig.	New fig.	Old fig.	New fig.	Old fig.	New fig.	Old fig.	New fig.	Old fig.	New fig.	Old fig.	New fig.	Old fig.[1]	New fig.	Old fig.[1]	New fig.[1]	Old fig.[1]	New fig.[1]	Old fig.[1]
Gross domestic product (GDP)	3.3	3.3	2.8	2.7	5.3	5.5	4.6	3.8	5.3	4.9	5.2	4.7	2.6	2.4	2.1	1.1	2.4	2.3	1.4	1.4
GDP Mainland-Norway	2.3	2.2	2.8	2.8	3.8	4.1	3.8	2.9	4.2	3.8	4.9	4.2	4.1	3.6	2.7	1.0	1.9	1.8	1.2	1.0
Petroleum activities and ocean transport	8.5	9.0	2.4	2.5	13.4	13.0	9.0	9.3	11.3	11.0	6.4	7.1	-3.8	-2.6	-1.7	1.4	4.9	4.4	2.5	3.7
Consumption exp. of households and NPISHs	2.2	2.2	2.4	2.2	3.3	4.0	3.7	3.4	6.5	5.3	3.2	3.6	2.7	3.4	3.3	2.2	3.5	2.4	2.5	2.2
Consumption exp. of general government	5.6	5.3	2.7	2.2	1.5	1.4	1.5	0.3	3.1	2.8	2.5	1.9	3.3	3.8	3.2	3.3	1.2	1.4	2.0	1.5
Gross fixed capital formation	-1.1	-3.1	6.5	4.3	5.3	4.5	3.9	3.4	10.3	9.9	15.5	13.9	13.1	10.6	-5.6	-8.2	-1.5	-1.1	-4.6	-5.9
Exports	4.7	5.2	3.2	3.2	8.4	8.7	4.9	4.3	10.2	9.3	7.7	6.1	0.6	0.3	2.8	2.8	2.9	2.7	4.2	5.3
Imports	1.6	0.7	4.9	4.4	5.8	4.9	5.7	5.6	8.8	8.0	12.4	11.3	8.5	8.0	-1.8	-1.6	3.2	2.5	0.0	0.3
Employed persons	-0.2	-0.3	0.5	0.2	1.4	1.3	2.1	2.1	2.0	2.1	2.9	2.9	2.5	2.5	0.8	0.6	0.4	0.5	0.5	0.4
Total hours worked	0.3	0.4	0.3	0.0	1.2	1.0	0.9	0.8	1.6	1.6	2.6	2.5	2.4	2.4	0.7	0.4	-1.1	-0.8	-1.0	-0.8

[1] Estimated by the quarterly national accounts
Source: Statistics Norway.

ture has been adjusted with an increase of more than 1 percentage point for the years 1996 and 1999. For 1996 the increase in the new estimates is primarily due to new calculations of household purchases of automobiles. The new final consumption figures for 1999 are based on more detailed and extensive source data than in the previously published preliminary figures.

The volume growth for gross fixed capital formation was revised upwards for all years from 1991 to 1999. The revised figures show strong volume growth (over 10 per cent) for the years 1996-1998, with a diminishing of negative volume growth in 1999. For 1999, the negative growth displayed in previous preliminary figures has been somewhat subdued by the revision. The significant decrease in investments in manufacturing, at 24 per cent in the earlier figures, has been reduced to a decrease of only half as much, or 12 per cent, for 1999.

The revised figures show higher growth rates for exports and imports in 1997 than previously published. The growth of exports was adjusted upwards by 1.6 percentage points while the growth of imports was adjusted upwards by 1.1 percentage points for the year 1997. In the other years, the difference between the new and former growth rates was under 1 percentage point.

New price indices

In the revision, new, improved price indices for many products within the market industries have been introduced affecting the volume estimates. The methodological basis for the constant price calculations has not, however, been changed.

New price indices on goods have been established for manufacturing beginning in 1995, replacing earlier figures from the producer price index. In addition, there are new quality adjusted indices for the goods price index for PC equipment and software, tractors, trailers and washing machines. New Norwegian price indices, as calculated by Statistics Norway (from 2001 for PC equipment and software, from 1998 for tractors and trailers, from 2000 for washing machines), are linked back each year with quality adjusted indices for USA from the Bureau of Labor Statistics. These indices from the Bureau of Labor Statistics were also used in calculating special indices related to foreign trade.

New price indices for exports and imports of goods from the External Trade Statistics (ETS) have been incorporated in all years after 1991. For most goods in the ETS, the prices are either directly observed or calculated with the help of representative goods. The grouping of the representative goods are now set up according to the national accounts product standard instead of, as previously, according to the UN's statistic nomenclature for foreign trade (SITC Rev.3). This alteration led to a selection of representative goods within a more price homogeneous product group. The calculation models were supplemented with special indices for goods that have weak coverage in the traditionally chosen representative goods.

A new assessment and revision of the national accounts' use of data from the consumer price index was undertaken. For many product groups, new representative goods were chosen. These affect many service industries and the constant price calculations for household consumption expenditure.

The price indices for bank services were revised back to 1991, both for paid bank services and financial intermediation services indirectly measured (FISIM).

Revised figures for 2000 and 2001

New preliminary figures were calculated for 2000 and 2001 with revised level figures for 1999 as the projection's base year. The new figures show only small revisions in the GPD growth rates, at constant prices, for 2000 and 2001. For Mainland-Norway, the growth rate has now been estimated at respectively 1.9 and 1.2 per cent. This was a minor adjustment of only 0.1 and 0.2 percentage points increases from the previous figures. Household consumption expenditure was also increased both years, while the general government consumption growth was decreased in 2000 and increased in 2001.

Gross fixed capital formation shows a volume decrease in both years before and after the revision, though, for 2001 the decrease was less than previously released figures. Both exports and imports growth were adjusted upwards in 2000, while both were adjusted downwards in 2001. Particularly, the growth in service exports and service imports from 2000 to 2001 was adjusted downwards. The foremost reasons being that the level in 2000 was increased and that new information was included for 2001.

The production activity in Mainland-Norway, defined as value added at constant prices measured in basic value, now shows a growth of 2.0 per cent in 2000 and 1.6 per cent in 2001. The growth estimates were decreased by 0.1 percentage points in 2000 and 0.3 percentage points in 2001. In 2000, the goods-producing industries and general government estimates have been decreased, while the growth estimates in the service industries have been upwardly adjusted. In 2001, the goods-producing industries figures changed insignificantly, while the service industry estimates grew somewhat faster than previously calculated.

Total employment development has been adjusted very little for 2000 and 2001. Total employed persons growth figures are now estimated at 0.4 per cent in 2000 and 0.5 per cent in 2001. Change in total hours worked was decreased from -0.8 per cent to -1.1 per cent for 2000, mainly due to more complete absence statistics.

New structural figures for the industries

The incorporation of figures from the new structural statistics, and particularly new methods for collecting data for structural statistics, have led to many changes in the national accounts figures. The Central Register of Establishments and Enterprises has implemented extensive revisions over the last years, forming the basis for the data collection. Changes have particularly influenced the figures for transport, business services and construction. Figures from the structural statistics for manufacturing had already been incorporated into 1996 and 1997 national accounts.

For the transport and communications industries, the new statistics have contributed to increase the value added for post and telecommunications by approximately 6 per cent in 1997. In the 1997 figures for other transport industries, value added has been decreased by approximately 16 per cent in 1997, and operating surplus has been decreased by more than 8 billion, considerably lower than previously estimated. Mainly, it is the incorporation of figures from the structural statistics for land transport and services connected to transport which led to the new estimates within the transport industries. No structural statistics have been published for the ocean transport industry, however, new calculations for export services have contributed to a minor increase in value added for this industry.

In the hotels and restaurants industry, value added is increased by 20 per cent in 1997, due to both the incorporation of structural statistics and the addition of unregistered output. About 10 per cent of value added in this industry is attributed to unregistered output in 1997.

Value added for the business service industry, including the activity within the central government, has been increased by approx. 7 per cent from the previously published figures for 1997. Output and intermediate consumption have had greater increases of respectively 15 and 25 per cent. The new calculations have increased output for the real estate industry, where there has been a large increase in the numbers of units registered in the Central Register of Establishments and Enterprises (due to outsourcing, etc). Furthermore, after the incorporation of structural statistics, the figures for computer and related activities and research and development are significantly higher. The revisions within the business service industry back to 1991 were executed, utilising different sources of data for the different sub-industries within the business services industry, such as tax statistics, employment statistics, etc.

In the construction industry, including the activity within the central and local government, the revisions have increased value added by 10 per cent in 1997. Operating surplus for this industry is also higher than previously published. Construction work connected to road building and maintenance in the governmental sector has, from 1991, been transferred from market producers to the central government.

In wholesale and retail trade, including repair of motor vehicles, output has been increased by approximately 4 per cent. This is mainly due to the incorporation of information from the structural statistics and information from trade margins surveys. The relative-

Table 2. Value added by kind of main activity at basic values. Revision results 1997. Million NOK

	New figures	Old figures	Difference in million NOK	Difference in per cent
Gross domestic product[1]	1 111 349	1 096 170	15 179	1.4
Agriculture, hunting and forestry	16 216	14 134	2 082	14.7
Fishing and fish farming	7 644	7 568	76	1.0
Oil and gas extraction incl. services	170 022	170 355	-333	-0.2
Oil and gas extraction	163 566	163 899	-333	-0.2
Service activities incidental to oil and gas	6 456	6 456	0	0.0
Mining and quarrying	2 188	2 163	25	1.2
Manufacturing	121 906	120 782	1 124	0.9
Food products, beverages and tobacco	17 951	17 752	199	1.1
Textiles,wearing apparel, leather	2 300	2 280	20	0.9
Wood and wood products	4 854	4 806	48	1.0
Pulp, paper and paper products	5 086	5 004	82	1.6
Publishing, printing, reproduction	13 642	13 569	73	0.5
Refined petroleum, chemical and mineral products	12 917	13 198	-281	-2.1
Basic chemicals	7 119	6 755	364	5.4
Basic metals	9 037	8 921	116	1.3
Machinery and other equipment n.e.c	31 472	31 144	328	1.1
Building of ships, oil platforms and moduls	12 754	12 623	131	1.0
Furniture and other manufacturing n.e.c	4 774	4 730	44	0.9
Electricity and gas supply	24 410	24 092	318	1.3
Water supply	1 654	1 930	-276	-14.3
Construction	45 906	41 715	4 191	10.0
Wholesale and retail trade, repair of motor vehicles	100 712	104 305	-3 593	-3.4
Hotels and restaurants	16 019	13 298	2 721	20.5
Transport via pipelines	13 107	13 107	0	0.0
Ocean transport	20 030	19 094	936	4.9
Other transport industries	40 026	47 680	-7 654	-16.1
Post and telecommunications	21 887	20 601	1 286	6.2
Financial intermediation	39 864	37 857	2 007	5.3
Dwellings (households)	60 239	65 236	-4 997	-7.7
Business services	72 987	68 166	4 821	7.1
Public administration and defence	54 328	50 729	3 599	7.1
Education	45 312	44 176	1 136	2.6
Health and social work	81 407	81 701	-294	-0.4
Other social and personal services	31 590	28 394	3 196	11.3
Total industries (basic values)	987 454	977 083	10 371	1.1
Mainland-Norway (basic values)	784 295	774 527	9 768	1.3
FISIM[2]	-30 689	-30 012	-677	2.3
Value added tax and investment levy	108 239	104 800	3 439	3.3
Other taxes on products, net	46 345	44 299	2 046	4.6
Mainland-Norway (market values)	908 190	893 614	14 576	1.6
General government	174 314	166 019	8 295	5.0
Central government	54 037	48 603	5 434	11.2
Civilian central government	41 887	36 508	5 379	14.7
Defence	12 150	12 095	55	0.5
Local government	120 277	117 416	2 861	2.4

[1] Gross domestic product is measured at market values, while value added by industry is measured at basic values
[2] Financial Intermediation Services Indirectly Measured
Source: Statistics Norway.

ly strong increase in intermediate consumption, contributed to a lower value added than previously published in the national accounts. However, operating surplus in retail and wholesale trade is considerably higher than previously published (approx. 6 billion in 1997) because of a decrease in the consumption of fixed capital.

In 1997, value added in financial intermediation has been increased by 2 billion, or 5 per cent in 1997. This is due to the introduction of revised accounting statistics in service activities for financial intermediation (insurance arbitration, securities brokers etc.).

Table 3. Compensation of employees by kind of main activity. Revision results 1997. Million NOK

	New figures	Old figures	Difference in million NOK	Difference in per cent
Compensation of employees	516 523	509 605	6 918	1.4
Agriculture, hunting and forestry	3 534	3 533	1	0.0
Fishing and fish farming	2 773	2 782	-9	-0.3
Oil and gas extraction incl. services	13 979	13 510	469	3.5
Oil and gas extraction	10 223	10 299	-76	-0.7
Service activities incidental to oil and gas	3 756	3 211	545	17.0
Mining and quarrying	1 262	1 262	0	0.0
Manufacturing	86 884	86 884	0	0.0
Food products, beverages and tobacco	13 651	13 651	0	0.0
Textiles,wearing apparel, leather	1 808	1 808	0	0.0
Wood and wood products	3 757	3 757	0	0.0
Pulp, paper and paper products	3 174	3 174	0	0.0
Publishing, printing, reproduction	10 255	10 255	0	0.0
Refined petroleum, chemical and mineral products	7 567	7 567	0	0.0
Basic chemicals	3 096	3 096	0	0.0
Basic metals	5 192	5 192	0	0.0
Machinery and other equipment n.e.c	24 022	24 022	0	0.0
Building of ships, oil platforms and moduls	10 782	10 782	0	0.0
Furniture and other manufacturing n.e.c	3 580	3 580	0	0.0
Electricity and gas supply	6 029	5 991	38	0.6
Water supply	246	346	-100	-28.9
Construction	31 913	30 639	1 274	4.2
Wholesale and retail trade, repair of motor vehicles	69 554	71 459	-1 905	-2.7
Hotels and restaurants	12 776	11 882	894	7.5
Transport via pipelines	178	178	0	0.0
Ocean transport	8 125	8 125	0	0.0
Other transport industries	27 477	26 004	1 473	5.7
Post and telecommunications	12 173	13 052	-879	-6.7
Financial intermediation	17 015	17 223	-208	-1.2
Dwellings (households)	303	303	0	0.0
Business services	48 057	41 861	6 196	14.8
Public administration and defence	42 643	41 657	986	2.4
Education	41 407	41 105	302	0.7
Health and social work	71 773	73 017	-1 244	-1.7
Other social and personal services	18 422	18 792	-370	-2.0
Mainland-Norway	494 241	487 792	6 449	1.3
General government	149 521	146 069	3 452	2.4
Central government	43 644	40 211	3 433	8.5
Civilian central government	34 346	31 313	3 033	9.7
Defence	9 298	8 898	400	4.5
Local government	105 877	105 858	19	0.0

Source: Statistics Norway.

The primary industries have been only modestly revised, excepting forestry, where value added has been substantially increased. A change in definition of forestry production is the primary cause for this change. Production is no longer measured as only the felling of timber; now the net growth in cultivated forests has been added to the calculation of production. The situation in Norway from 1991 is that the increment is almost twice the felling of forest. The change in definition in forestry, in accordance with international guidelines, was established as part of an international attempt to enhance the treatment of natural resources and the environment in the national accounts, see Sørensen et al. (2001).

A result of the revision has been an increase in total output and total intermediate consumption, which, in general, has increased more than total value added. In 1997, total output increased by 3 per cent and total intermediate consumption increased by more than 5 per cent, while total value added has only increased by 1 per cent. This structural change was mainly due to the new calculations of business services and other service activities.

New dwelling calculations

The production of dwelling service estimates has been decreased by approximately 7 per cent in 1997. The production of rental services has been distributed

among production of paid rent (market output) and imputed rent by owner-occupiers (production for own use). Part owners in housing cooperatives are, as established previously, considered owner-occupiers. New calculations of imputed rent (based on average rent per square meter) by owner-occupiers have been carried out based on survey data on actual rents for 1998, 1999 and 2000.

It has been decided, for the future, that the consumer price index and the consumer expenditure survey should classify part owners in housing cooperatives with owner-occupiers in one line with the national accounts. Thus enabling a more coordinated treatment of part owners in housing cooperatives in Statistics Norway's statistics.

Employment and compensation of employees

Total compensation of employees revision was approximately NOK 7 billion or 1.4 per cent in 1997. The incorporation of structural statistics has produced new figures for many industries. The compensation of employees for business services has had the largest revision at approximately 15 per cent. Construction, hotels and restaurants, and other transport industries (specifically land transport) have higher compensation of employee figures than previously estimated. Compensation of employees in central government has been revised because construction connected to road building and maintenance has been reclassified from market producers to a new government construction industry introduced into the national accounts. In addition, the deficit in the Public Service Pension Fund has been redefined from transfers to compensation of employees.

Employee compensation in wholesale and retail trade, including repair of motor vehicles, is lower than previously estimated. Information other than the structural statistics has also been incorporated into the new compensation calculations for wholesale and retail trade (for example, employment statistics and data from wage surveys). Estimates for the compensation of employees in health and social work were decreased according to new accounting statistics within the non-profit institutions group.

Average wage and salary levels, measured as wages and salaries per full-time equivalent employee, had minor changes in the revision. This means that the national accounts figures for the annual wage and salary increase, for individual industries and in total, were generally consistent with previously published figures for the period of 1991-1999.

New estimated industry figures for employed persons, full-time equivalent persons, and hours worked were consistent with the revised figures for compensation of employees and wages and salaries. In general, there has been redistribution within service industries and construction employment, while the primary industries, oil industries and manufacturing have approximately the same employment figures as before. The employment estimates have been reduced for wholesale and retail goods and for health and social services. Business services received the largest adjusting increase, with approximately 23 000 more employees in 1997. Since employment in 1990 was not changed, average yearly employment growth in business services increased by approximately 6 per cent in the period 1990-1997, instead of 4 per cent as previously calculated. In 1998 and 1999, employment in business services increased respectively 11 and 10 per cent.

As a result of the national accounts revision, total number of employed persons and hours worked increased slightly (0.1 to 0.6 for the years 1991-1999). Employees accounted for the increase, while the number of self-employed (approx. 8 per cent of the total employment in 1997) decreased slightly. The total number of employed persons in the national accounts is approximately equal to the Labour Force Surveys (LFS), and below the sampling error of the LFS.

Increased tax figures

In the national accounts, figures for investment taxes and accrued value added tax, on the basis of tax rates and relevant transactions (output, intermediate consumption, gross investments and consumption), have been calculated. Increased figures for production, household consumption expenditures and intermediate consumption have resulted in higher figures for investment and accrued value added taxes. In 1997, the adjustment increased figures by approximately NOK 3.4 billion or 3.3 per cent. Accrued value added tax and investments levies also include estimations of taxes that are not paid (because of bankruptcy, unregistered production, etc.), and therefore, would, in general, be larger than official account registered values. Accrued value added tax and investments levies are on average more than 3 per cent higher than time-adjusted taxes paid, for the period 1990-2000.

Some methodological improvements in the calculation of other product taxes have been implemented (among others, stamp duties paid on transfer of ownership of used dwellings are redefined as taxes on products instead of other taxes on production). New product groupings for petroleum products have been introduced corresponding to energy account classifications (see Statistics Norway (2002)), which result in better quality estimates of energy taxes in the national accounts.

Household consumption expenditure

Household consumption expenditure estimates as a whole were increased by 1-2 per cent in the revised years. A new classification based on a new interna-

Table 4. Household final consumption expenditure. Revision results 1997. Million NOK

	New figures	Old figures	Difference in million NOK	Difference in per cent
Household consumption expenditure	504 795	495 077	9 718	2.0
Food and non-alcoholic beverages	76 521	76 031	490	0.6
Alcoholic beverages and tobacco	24 718	24 923	-205	-0.8
Clothing and footwear	30 020	30 094	-74	-0.2
Housing, water, electricity, fuels	104 277	108 487	-4 210	-3.9
Furniture, household equipment	31 765	31 363	402	1.3
Health	13 239	13 358	-119	-0.9
Transport	77 654	73 258	4 396	6.0
Communication	9 478	10 015	-537	-5.4
Recreation and culture	60 935	54 657	6 278	11.5
Education	2 401	2 289	112	4.9
Hotels and restaurants	33 262	29 413	3 849	13.1
Miscellaneous goods and services	35 016	35 882	-866	-2.4
Direct purchases abroad by resident households	21 742	21 283	459	2.2
Direct purchase in Norway by non-resident households	16 233	15 976	257	1.6

Source: Statistics Norway.

tional standard COICOP (Classification Of Individual COnsumption by Purpose) has also been implemented. In Table 4, new 1997 consumption figures are compared with previously calculated 1997 figures, which had been organised for international reporting before the revision of figures. The main categories - now 12 categories as opposed to the previous 10 - are only minorly adjusted. Food, beverages and tobacco products have, however, been divided into two main categories: food and non-alcoholic beverages and alcoholic beverages and tobacco products. Another change is in the growth of information and communication technology: communication services have been established as its own main category separated from miscellaneous goods and services.

There are three main categories where the consumption figures have been significantly increased, when measured in absolute figures: recreation and culture increased by NOK 6.3 billion, transport by 4.4 billion and hotels and restaurants by 3.8 billion. A decrease of 4.2 billion for housing, water and electricity was the main negative deduction from the consumption figures. The revisions in service consumption were for the most part a consequence of revisions incorporated into the production of these services. The decrease in housing, water and electricity consumption figures was due to lower estimates of imputed rents.

The use of the consumer expenditure survey has been improved and thereby provided a smoother time series for the estimation of annual changes and an improved estimate of the level of goods consumption expenditure for individual groups. There has also been an assessment of the household consumption level based upon the structural statistics for wholesale and retail trade with the use of industry information on goods content in the trade margins survey of 1996. In addition, the level for purchase of own motor vehicles has been increased as a result of better methods for estimating the price developments on motor vehicles.

Lower production by non-profit institutions

For non-profit institutions' output, employment and total consumption, the estimates were decreased by approximately 15 per cent in 1997. The decrease was largest for health services, where accounting statistics for private institutions connected to patient care were introduced. The social service production estimate has been decreased due to the incorporation of information from new accounting statistics for aid organisations.

General government consumption expenditures

General government consumption expenditure estimates have been, as a whole, increased by 4 per cent in 1997. The composition of consumption by function has been revised according to the new international standard for general government outlays - COFOG (Classification Of Functions Of the Government). The total of main categories in COFOG was reduced from 14 to 10, notably economic affairs have now been gathered into one main category. Environmental protection has now been established as its own category. The function group of social protection consists of the earlier health and social work groups. Research and development has been distributed among the main categories.

Central government consumption was increased by more than 7 per cent in 1997 estimates. This is in part due to definitional changes and in part to a large increase in the calculated consumption of fixed capital. Social benefits in kind estimates were increased caused by, among other things, medical rehabilitation being regrouped from social benefits to purchase of goods. In addition, the deficit in the Public Service Pension Fund has been redefined from transfers to

Table 5. Gross capital formation. Revision results 1997. Million NOK

	New figures	Old figures	Difference in million NOK	Difference in per cent
Total gross capital formation	264 561	275 049	-10 488	-3.8
By main category				
Gross fixed capital formation	245 695	252 094	-6 399	-2.5
Changes in inventories	18 866	22 955	-4 089	-17.8
By industry				
Oil activity	62 249	62 249	0	0
Ocean transport	13 461	13 016	445	3.4
Manufacturing and mining and quarrying	18 966	17 910	1 056	5.9
Other goods production	17 039	16 603	436	2.6
Housing services (households)	37 008	30 394	6 614	21.8
General government activity	37 254	37 952	-698	-1.8
Other service industries	59 718	73 970	-14 252	-19.3
By type of assets				
Oil platforms etc.	32 135	32 135	0	0
Oil exploration, drilling, pipelines for oil and gas	27 939	27 939	0	0
Building and construction	100 409	95 027	5 382	5.7
Ships and boats	15 973	16 266	-293	-1.8
Other transport equipment	14 302	24 289	-9 987	-41.1
Machinery and equipment	54 937	56 438	-1 501	-2.7

Source: Statistics Norway.

compensation of employees, and a revision of boundary between central government and market construction within the communications and transport industries has modified the figures. New consumption of fixed capital within the local government estimates has contributed to an increase in consumption figures approximating 2 per cent in 1997.

Investments

Gross fixed capital formation has been in total decreased by more than NOK 6 billion, or 2.5 per cent for the reference year 1997. For Mainland-Norway, the downward adjustment was 7 billion (4 per cent). Investments in general government had only small revisions. Dwelling investments were increased by nearly NOK 7 billion, or 22 per cent, because of new information on renovation of housing and transaction costs related to the purchase or sale of dwellings.

Another industry with significant increases in investments was business services (including central government activities) with 6.5 billion higher investments for 1997, as well as an increase of 1 billion for investments in manufacuring and construction. The increases in manufacturing investments are linked to the purchase of PCs and other office equipment that are now included in gross fixed capital formation. Previously, a portion of these purchases was attributed to intermediate consumption. Two industries have had substantial decreases in investments in 1997: miscellaneous transport, with a decrease of 3 billion and wholesale and retail trade, including repair of motor vehicles, with a decrease of NOK 18 billion (for a total of less than half of the previous estimate). The introduction of figures from the new structural statistics has been the main contributor to these changes.

The new 1997 figures for gross fixed capital formation by type of assets show an increase of more than 5 billion (nearly 6 per cent) in estimates for constructions excepting oil activity. The investments in oil activity have not been revised. The investment figures for other transport equipment have been decreased by 10 billion. Structural statistics showing significantly lower figures have been the foremost reason for the decrease in motor vehicle investment figures, which is related to the upward adjustment of motor vehicle consumption.

Capital stocks and consumption of fixed capital

Consumption of fixed capital for all industries has now been calculated by a geometric method, that is to say that the capital consumption is calculated as a fixed per cent of the remaining net capital stock. The capital stock has been re-estimated based on this new assumption and on new information on gross fixed capital formation. The change has led to a larger revision in the consumption of fixed capital for general government than for other industries. The estimate on the consumption of fixed capital for the general government increased by approx. 4.8 billion, or more than 30 per cent, in 1997. As output in general government is calculated as the sum of costs including the consumption of fixed capital, the new estimates have correspondingly increased within output and consumption as well.

Table 6. Production and income. Main aggregates. Revision results 1997. Million NOK

	New figures	Old figures	Difference in million NOK	Difference in per cent
Gross domestic product	1 111 349	1 096 170	15 179	1.4
Primary incomes payable to non-residents, net	11 831	10 950	881	8.0
Gross national income	1 099 518	1 085 220	14 298	1.3
Consumption of fixed capital	164 112	167 146	-3 034	-1.8
National income	935 406	918 074	17 332	1.9
Current transfers payable to non-residents, net	9 868	9 796	72	0.7
Disposable income for Norway	925 538	908 278	17 260	1.9
Final consumption expenditure	754 625	739 189	15 436	2.1
Saving for Norway	170 913	169 089	1 824	1.1
Capital transfers, net	1 291	1 256	35	2.8
Acquisitions of patents, licences, etc, net	558	558	0	0.0
Net acquisitions of non-financial assets	100 449	107 903	-7 454	-6.9
Net lending	68 615	59 372	9 243	15.6

Source: Statistics Norway.

The service lives (or useful lives) of capital have been reassessed in light of recently published statistics from other countries. The service life for hardware, office equipment, etc. has been revised, and is now 8 years up to and including 1990 and 5 years from 1991. Based on information from NOR Energi (an association of Norwegian energy producers), the service life for construction in the power supply industry has been reduced from 90 to 70 years. Furthermore, the service life of buildings in the fish farming industry has been reduced from 50 to 20 years. And finally, the service life of software etc. (except oil drilling) has been increased from 3 to 4 years. This is in line with service lives for this type of asset in other countries.

External balance

The most important change affecting external balance estimates is the increase in figures for exports of services beginning in 1995. The revisions are based on an analysis of statistics from Norges Bank (Central Bank of Norway), which is the main source for information regarding international trade in services. The foreign exchange statistics are based on registration of payments between residents and non-residents, and specify what the payments concern. More in-depth surveys have detected a biased relationship between payments for goods and payments for services in the foreign exchange statistics, especially regarding exports after 1995. This bias has been adjusted for in the new figures for exports of services.

For 1997, total value of exports of services has been increased by more than 12 billion, or 12 per cent, of which finance and business services comprise 7.5 billion. Imports of goods and services have been increased by 2.5 billion. Hence, Norway's total export surplus toward foreign countries has increased by 10.5 billions for 1997.

Wages to foreign countries and from foreign countries have been moderately revised with an addition of, respectively, 1 and 0.5 billion in 1997. Other items on the balance of income and current transfers have been less affected by the new calculations. The current external balance has been increased by 10 billion in 1997.

Institutional sector accounts

Figures back to 1991 have also been estimated for institutional sector accounts. Institutional sector accounts describe all economic transactions involving the institutional sectors: production, income generation, income distribution, use of disposable income, saving and net lending.

Total gross domestic product (GDP) for 1997 has been revised and increased by NOK 15.2 billion, or 1.4 per cent. Sectors of corporations and general government have been estimated with higher value added, while the figures for households and non-profit organizations have been revised downwards.

1997 disposable income for Norway has been adjusted by a 17.3 billion (1.9 per cent) increase over earlier calculations. This revision resulted in a positive adjustment for disposable income in non-financial corporations and in general government of respectively 17.7 and 6.1 billion. Disposable income in financial corporations and in the household sector have been decreased by respectively 2 and 4.6 billion. Total saving was revised upwards by 1.8 billion or 1.1 per cent in 1997. Net acquisitions of non-financial capital have been decreased by 7.4 billion or 6.9 percent, and net lending has been revised upwards by 9.2 billion or 15.6 per cent.

General government

The figures for general government have generally been increased in the revision. Disposable income estimates in 1997 have been increased by NOK 6.1 billion. Government final consumption expenditure has, however, been revised with an increase of 9.1 billion, which has led to lower saving in this sector. Net acquisitions of non-financial capital have been

decreased by 6.4 billion. This was partly counteracted by increased capital transfer to other sectors, so that net lending is approximately the same as in old figures.

The upward adjustment in the tax income, especially taxes on production including value added tax, has been a bit stronger than the increase in GDP estimates, but, nevertheless, has only led to a slightly higher total tax per cent of GDP (still approx. 43 per cent in 1999).

Financial corporations

The revisions for this sector are relatively small, though for the sub-sectors new data material and new calculations have been incorporated, covering this sector much better than before.

Non-financial corporations

The revised business accounting statistics for non-financial corporations are based upon important changes in the business and corporation tax questionnaire introduced in 1999. Tax statistics for non-personal taxpayers have also improved the quality of the figures for this sector. Incorporation of these new statistical sources has provided access to more details, leading to quality improvements in the national accounts figures for years before 1999.

The incorporation of accounting statistics from 1999 has lead to a better foundation on which to base revisions in the national accounts. Value added in 1997 has been adjusted by 12 billion up to 662.3 billion. Disposable income, which is equal to saving in this sector, has been increased by 17.7 billion with a result of 40.9 billion. Net acquisition of non-financial capital has been revised by 6.8 billion down to 67 billion, and therefore this sector still has a negative net lending.

Households and non-profit institutions

Calculations of income and expenditure figures for this main sector are more strongly based on data from registers than before. The statistics from tax returns, which give total data for several figures, has been incorporated since 1993.

In general, this sector has experienced a reduction in overall income and an increase in expenditures for the year of 1997. This has lead to a downward revision of the household savings rate.

Value added in the household sector proper has been reduced by NOK 9.8 billion to 142.3 billion in 1997. The sources for these revisions were a decrease in value added within the housing industry and a decrease in value added for the self-employed. A decrease in compensation of employees in this sector has, however, moderated the negative effect on operating surplus, adjusted by 5.4 billion down to 89.3 billion in 1997.

The primary income, which indicates the household remuneration of work effort and capital, has been decreased by almost 1 billion with a revised figure of 606.8 billion in 1997. This decrease was the result of reduced operating surplus, the increase in the wages by 6 billion and the decrease in income from capital plus the increase of capital expenditure.

Disposable income, which appear after transfers (as, for instance, pensions and benefits from the government) have been added to primary income and taxes, and levies and transfers to other sectors have been subtracted, have been decreased by 4.6 billion to 537.3 billion in 1997. Behind this revision lies a downward adjustment of the benefits from the general government by 2.5 billion and an upwards adjustment of employers' social security contributions and members fee by almost 1 billion. Saving, which appear after final consumption expenditure has been subtracted from disposable income, and corrected for savings in funds, has been downwards adjusted by 10.9 billion to 15.4 billion in 1997. The underlying components for this revision were the decrease in disposable income and the increase in household and non-profit institutions consumption expenditure of 6.3 billion.

The revision in disposable income and in saving has reduced the saving share from 4.8 to 2.8 per cent in 1997.

Net lending, which is saving minus net acquisition of non-financial capital and capital transfers, has been decreased by 15.9 billion resulting in -3.5 billion in 1997. These revisions were mainly the result of the decrease in saving, the increase in net acquisitions of non-financial capital at 5.9 billion, and the small decrease in capital transfer to other sectors.

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Table 7. Institutional sectors. 1997. Million NOK

	General government	Financial corporations	Non-financial corporations	Households and NPISHs	Resident sectors, total	Rest of the world
Production						
Output, producers' prices	253 989	60 596	1 365 975	234 256	1 914 816	-
Imports	-	-	-	-	-	368 701
- Intermediate consumption	79 675	20 726	703 635	91 986	896 022	-
- Exports	-	-	-	-	-	460 864
= Gross value added	174 314	39 870	662 340	142 270	1 018 794	-
= Imports surplus	-	-	-	-	-	-92 163
- Consumption of fixed capital	22 269	2 771	106 133	32 939	164 112	-
- Compensation of employees	149 521	17 071	320 191	29 740	516 523	2 040
- Taxes on production and imports	7	104	54 812	1 692	56 615	-
+ Subsidies	-	1 085	20 461	11 442	32 988	-
= Operating surplus	2 517	21 009	201 665	89 341	314 532	-94 203
Allocation of primary income						
Operating surplus	2 517	21 009	201 665	89 341	314 532	-94 203
+ Wages and salaries	-	-	-	513 589	513 589	4 974
+ Taxes on production and imports	179 859	-	-	-	179 859	-
+ Property income received	47 343	107 540	33 430	42 369	230 682	46 367
- Subsidies	32 988	-	-	-	32 988	-
+ Adjustment for FISIM	-	-30 689	-	-	-30 689	-
- Property income paid	23 916	79 901	97 229	38 533	239 579	37 470
= Primary income	172 815	17 959	137 866	606 766	935 406	-80 332
Secondary distribution of income						
Primary income	172 815	17 959	137 866	606 766	935 406	-80 332
+ Employer's social contributions	63 800	17 084	2 854	118	83 856	-
+ Current taxes on income and wealth, oil activities	29 205	-	-	-	29 205	-
+ Current taxes on income and wealth, except on oil activities	201 476	-	-	-	201 476	207
+ Social benefits	-	-	-	173 579	173 579	26
+ Current transfers to NPISHs	-	-	-	27 407	27 407	-
+ Other current transfers	204 080	18 241	9 885	11 305	243 511	19 993
- Employer's social contributions	-	-	-	83 856	83 856	-
- Current taxes on income and wealth, oil activities	-	-	29 205	-	29 205	-
- Current taxes on income and wealth, except on oil activities	-	2 834	24 114	174 393	201 341	342
- Social benefits	158 809	11 763	2 854	118	173 544	61
- Current transfers to NPISHs	14 872	-	2 485	10 050	27 407	-
- Other current transfers	164 591	24 449	51 010	13 499	253 549	9 955
= Disposable income	333 104	14 238	40 937	537 259	925 538	-70 464
Use of disposable income						
Disposable income	333 104	14 238	40 937	537 259	925 538	-70 464
+ Adjustment, households pension funds	-	-	-	5 320	5 320	-
- Adjustment, households pension funds	-	5 320	-	-	5 320	-
- Consumption expenditure, households and NPISHs	-	-	-	527 135	527 135	-
- Consumption expenditure, central government	92 947	-	-	-	92 947	-
- Consumption expenditure, local government	134 543	-	-	-	134 543	-
= Saving	105 614	8 918	40 937	15 444	170 913	-70 464
Capital account						
Saving	105 614	8 918	40 937	15 444	170 913	-70 464
+ Capital transfers, net	-4 765	-6	3 662	-182	-1 291	1 291
- Net acquisitions of non-financial assets	14 543	676	66 985	18 803	101 007	-558
= Net lending / Net borrowing	86 306	8 236	-22 386	-3 541	68 615	-68 615

Source: Statistics Norway.

Macroeconomic effects of different ways of using the real return on the Norwegian Government Petroleum Fund*

Per Richard Johansen and Inger Holm

The new guidelines for economic policy presented by the Norwegian Government in March 2001 permit an increased use of petroleum revenues. At the same time the regulation on monetary policy was changed from an exchange rate target to an inflation target. In this article the macroeconomic effects of different ways of using the extra revenues compared to a balanced reference path are studied using a large-scale macroeconometric model for Norway. The calculations show that the effects are very different, depending on whether the revenues are used for increased activity in the public sector, for income tax reductions for individuals or for lower indirect taxes on goods and services. This is in line with traditional multiplier analysis. The calculations show further that interest rates and hence exchange rates may stay unaltered compared to the reference path, due to an implicit increase in the inflation target. In this sense, the new fiscal and monetary policy guidelines appear to be well adapted to each other.

Introduction

In connection with the presentation of the Long-Term Programme in March 2001 (Report no. 30 to the Storting, 2000-2001), the Norwegian Government introduced new fiscal policy guidelines that will result in a higher non-oil budget deficit in the years ahead than planned earlier (Report no. 29 to the Storting, 2000-2001). The guidelines imply that the structural, non-oil budget deficit over time will increase in step with the expected higher real return on the Government Petroleum Fund. The Fund will nevertheless increase as a result of transfers of central government oil and gas revenues.

The Government's proposal received broad political support, and may therefore be assumed to be a guideline for fiscal policy in the coming Storting (the parliament) period. However, the political parties appear to have different perceptions as to what extent the budget weakening shall be used either to increase spending or to reduce revenues. The various ways of weakening the budget will have different macroeconomic effects on the Norwegian economy. In this article it is our intention to shed light on these effects. We look at three different policy changes: higher spending on public consumption and investment, reduced income taxes and reduced indirect tax rates. We first calculate the effect of a given budget weakening relating exclusively to each of these alternatives. We then calculate the effects of a combined package, with an equal emphasis on each of the alternatives.

The calculations are made using Statistics Norway's macroeconomic model MODAG and cover the period 2002-2010. Even though we have chosen to concretize the policy changes in a way that will demonstrate the typical aspects of each type of change, it must be emphasized that all concrete policy measures have their own special effects and that other ways of concretizing the changes may produce different results.

An important consequence of increasing the "use of petroleum revenues" today is that, other things equal, there will be less to use in the future, i.e. a lower budget surplus today must be matched by reduced deficits in the future. (According to the scenarios published in the Long-Term Program, the reversal seems to take place in 2027.) It is assumed that this question was considered when the new guidelines were drawn up; our analysis is confined to the medium-term

Per Richard Johansen is Head of Research at Unit for macroeconomics (per.richard.johansen@ssb.no)

Inger Holm is Advisor at Unit for macroeconomics (inger.holm@ssb.no)

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Table 1. Structural, non-oil surplus, bill. NOK, current prices

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
New guidelines[1]	-20,4	-25,2	-34	-41,9	-49,2	-56,6	-64	-71,3	-78,5	-85,4
Baseline scenario[2]	-20,4	-21,3	-22,4	-23,9	-24,6	.	.	.	.	.
Estimated effect of new guidelines	-	-3,9	-11,6	-18	-24,6	.	.	.	.	.

[1] According to the Revised National Budget for 2001, Report no. 2 to the Storting (2000-2001), p. 39-40.
[2] The structural, non-oil surplus for 2001 is calculated applying annual growth of 4.8 per cent, equivalent to estimated trend growth in GDP of 2¼ per cent and price inflation of 2½ per cent.

macroeconomic implications of different ways of advancing this phasing in of petroleum revenues.

A main concern among Norwegian politicians is the effects of increased use of petroleum revenues on inflation and competitiveness of Norwegian companies. It is important to point out in this connection that it cannot be an objective in itself to determine a way to use the revenues that has minimal effects on the Norwegian economy. If avoiding effects were the main objective, we could either refrain from using the revenues or give them away to other countries. The point of increasing "the use of petroleum revenues" must be that there are aims we want to achieve, and the benefits of these achievements must be compared with their (positive or negative) macroeconomic effects.

In conjunction with the presentation of the new fiscal policy guidelines, the Government also approved a new regulation of monetary policy. Even though the new regulation states that the objective of monetary policy shall be to contribute to consumer price inflation of about 2.5 per cent, the consequences for the setting of interest rates are still unclear. This depends not only on how interest rates actually influence inflation over time, but also how Norges Bank (Central Bank of Norway) perceives the relationship and how it should be used to achieve the target. Moreover, it will depend on how the new regulation and Norges Bank's application of this regulation influence market participants' expectations and behaviour, particularly with respect to the exchange rate. At the moment, we do not have sufficient observations of these conditions to model them, and have instead chosen to carry out the calculations applying two different, but known alternatives: one alternative in which both interest rates and the exchange rate are held constant, and another alternative in which interest rates are set in line with the earlier monetary policy regulation, which aimed at maintaining a stable krone exchange rate against European currencies. It must be emphasized that neither of these alternatives reflects the current monetary policy, but are meant to provide a basis for a discussion concerning how interest rates and exchange rates may be influenced by changes in fiscal policy.

The orientation and dimension of the shifts

As we shall calculate the effects of the new guidelines, we must have some idea of what the former guidelines entailed. We have chosen to look at the effects of the new guidelines in relation to a baseline scenario in which the structural, non-oil Government deficit accounts for the same percentage of mainland GDP as in 2001. In the Revised National Budget presented in May 2001, the Ministry of Finance estimated the structural, non-oil deficit for 2001 at NOK 20.4 billion, i.e. 1.9 per cent of mainland GDP. In the baseline scenario, this deficit increases in value by estimated trend growth in mainland GDP in current prices. The Revised National Budget also contained estimates of the structural, non-oil deficit in the years ahead if the new guidelines are applied. We have apportioned the shifts in such a way that the budget deficit increases by an amount equivalent to the difference between these estimates and the baseline scenario.[1] Moreover, the baseline scenario is designed in such a way that it primarily is intended to reflect reasonable trends in the Norwegian economy, with a stable unemployment rate of 3.5 per cent, which is close to the level recorded by Norway in recent years.

The calculations are made by changing the three different types of fiscal instruments each year in the coming Storting period (2002-2005), with the budget deficit increasing in relation to the baseline scenario as shown in the bottom line in table 1. Policy then remains unchanged in real terms up to 2010 (i.e. unchanged in real terms in relation to the orientation in 2005 as the direct and indirect tax system is adjusted for inflation), which means that the budget balance in these years may develop differently from that which follows from the new fiscal policy guidelines and differently from one scenario to another. In this way, we both determine the potential for policy changes in the coming Storting period as a result of the new guidelines and reveal their consequences for the following five years.

Increasing public spending or reducing revenues will generally influence the level of activity in the economy, and hence have an effect on the budget balance through automatic stabilizers, such as higher tax revenues as a result of a broader tax base or reduced ex-

[1] In Parliamentary Bill no. 1, Amendment no. 4 (2001-2002) the estimated path for future real return was slightly adjusted downwards. At the same time, however, the estimate of the structural, non-oil deficit in 2001 was reduced, leaving the scope for more expansionary policy according to the new rule almost unchanged.

Table 2a. Higher expenditure on public consumption and investment, deviation from the baseline scenario

Bill. NOK, current prices	2002	2003	2004	2005	2006	2007	2008	2009	2010
with unchanged interest and exchange rates									
Budget balance	-3,9	-11,6	-18	-24,6	-28,2	-29,1	-31,3	-33,9	-36,4
Expenditure impetus[1]	11,6	28,4	41,7	59,3	66,4	72,9	78,7	83,5	87,3
Automatic stabilizer effect	7,7	16,8	23,7	34,7	38,2	43,8	47,4	49,6	50,9
Automatic stablizer effect as a % of the impetus	*0,66*	*0,59*	*0,57*	*0,59*	*0,58*	*0,6*	*0,6*	*0,59*	*0,58*
with interest rate response, given exchange rate									
Budget balance	-3,9	-11,6	-18	-24,6	-28,8	-30,7	-33,3	-36	-38,3
Expenditure impetus[1]	11,2	26,8	38,4	53,7	59,9	65,4	70,2	73,9	76,7
Automatic stabilizer effect	7,3	15,2	20,4	29,1	31,1	34,7	36,9	37,9	38,4
Automatic stabiliser effect as a % of the impetus	*0,65*	*0,57*	*0,53*	*0,54*	*0,52*	*0,53*	*0,53*	*0,51*	*0,5*

[1] The expenditure impetus is distributed between consumption and investment on the basis of their value in 1997-prices in the base year.

Table 2b. Civilian public consumption and investment, deviation from the baseline scenario

Per cent, constant prices	2002	2003	2004	2005-2010[1]
with unchanged interest and exchange rates	3,1	6,7	8,7	11,1
with interest rate response, given unchanged exchange rate	3	6,3	8	10,1

[1] The increase in per cent is kept unchanged through the period.

penditure on unemployment benefits as a result of lower unemployment. The magnitude of these effects will vary from one fiscal measure to another. This means that the initial fiscal impetus must be of varying strength if the effective weakening of the budget is to be the same. The magnitude of these effects will also depend on the interest rate (and exchange rate) response to the fiscal measures.

Higher expenditure on consumption and investment

In the scenario with higher public expenditure on consumption and investment, we have limited the spending increase to civilian purposes. All expenditure items for both central and local government (measured at constant prices) are increased by the same percentage rate, irrespective of whether they relate to expenditure on wages or purchases of goods and services. The calculations show that in order to increase the budget deficit by a little less than NOK 4 billion in 2002, expenditure can be increased by about NOK 11 1/2 billion measured at current prices (equivalent to about NOK 7 1/2 billion in 1997 prices, or 3.2 per cent at constant prices), as these increases in the next round contribute to generating net revenues of about NOK 7 1/2 billion through automatic stabilizers.

Table 2a shows that roughly half of higher expenditure on civilian public consumption and investment later strengthens public budgets via automatic stabilizers in the model. The slightly weaker stabilizer effects in the scenario where monetary policy aims at maintaining an unchanged exchange rate imply that there is less scope for spending increases in this scenario. Since the real economic effects of the fiscal impetus decline over time, partly as a result of higher inflation accompanied by deteriorating competitiveness and possibly a higher interest rate, the subsequent effects on public budgets will also decline somewhat over time. The percentage increase in civilian public consumption and investment (measured at constant prices) in this scenario is shown in table 2b.

Reduced income taxes

In this scenario, we have chosen to reduce income taxes. From table 3a, we see that the subsequent effects on the budget increase over time the first few years. This is because households increase consumption only gradually when income rises; after some time, however, consumption is adapted to the new income level.

The reason that the feed-back effect of reduced income taxes is substantially lower throughout the period than with higher public consumption and investment is that the latter measure has a direct impact on employment in the public sector and on public expenditure on goods and services, and this results in higher tax revenues. A corresponding direct effect on employment is not recorded when the higher budget deficit is used for tax reductions.

If the tax relief is distributed as an equal percentage increase in the size of the personal allowance (tax-free allowance) and the threshold for applying the surtax on higher incomes, table 3b shows the changes for which there is scope for income earners in tax class 1. For tax class 2, there is scope for changing the amounts by the same percentage change.

Reduced indirect taxes

There are a number of indirect taxes in the Norwegian tax system, many of which are introduced for purely fiscal reasons, but many are also based on the desire to increase market prices and thereby reduce consumption of the taxed products for health or environmental reasons, etc. Instead of either reducing all these taxes, or alternatively selecting some taxes that should be excluded from the reduction, we have chosen to concentrate the entire reduction on the value

Table 3a. Reduced income tax, deviation from the baseline scenario

Bill. NOK, current prices	2002	2003	2004	2005	2006	2007	2008	2009	2010
with unchanged interest and exchange rates									
Budget balance	-3,9	-11,6	-18,1	-24,7	-24,3	-24,6	-25,9	-27,2	-28,3
Tax reduction impetus	4,5	13,9	23,1	32,7	34,1	35,3	36,6	37,9	39,2
Automatic stabilizer effect	0,6	2,3	5	8	9,8	10,7	10,7	10,7	10,9
Automatic stabilizer effect as a % of the impetus	*0,13*	*0,16*	*0,21*	*0,25*	*0,29*	*0,3*	*0,29*	*0,28*	*0,28*
with interest rate response, given exchange rate									
Budget balance	-3,9	-11,6	-18	-24,6	-24,9	-25,6	-27,1	-28,3	-29,4
Tax reduction impetus	4,4	13,7	22,5	31,5	32,7	33,9	35,1	36,3	37,6
Automatic stabilizer effect	0,5	2,1	4,5	6,9	7,8	8,3	8	8	8,2
Automatic stabilizer effect as a % of the impetus	*0,12*	*0,15*	*0,2*	*0,22*	*0,24*	*0,25*	*0,23*	*0,22*	*0,22*

Table 3b. Tax-free allowance and threshold for surtax on higher incomes, the current amount and amount in the calculations

NOK, related to the income level in 2001	2002	2003	2004	2005 - 2010[1]
Current amount				
Tax-free allowance, tax class 1	28 000	28 000	28 000	28 000
Threshold for surtax, tax class 1	289 000	289 000	289 000	289 000
Alternative with unchanged interest and exchange rates				
Tax-free allowance, tax class 1	30 600	34 800	39 300	44 300
Threshold for surtax, tax class 1	307 100	349 100	394 200	445 100
Alt. with interest rate response, given unchanged exchange rate				
Tax-free allowance, tax class 1	30 600	34 700	38 900	43 600
Threshold for surtax, tax class 1	307 100	347 900	390 700	437 500

[1] The amounts are kept unchanged through the period.

Table 4a. Reduced VAT rate, deviation from the baseline scenario

Bill. NOK, current prices	2002	2003	2004	2005	2006	2007	2008	2009	2010
with unchanged interest and exchange rates									
Budget balance	-3,9	-11,6	-18	-24,6	-24,8	-24,4	-25,2	-26,5	-27,5
VAT reduction impetus	4,6	13,3	20,9	29,7	30,8	31,3	31,7	32,3	32,8
Automatic stabilizer effect	0,7	1,7	2,9	5,1	6	6,9	6,5	5,8	5,3
Automatic stabilizer effect as a % of the impetus	*0,14*	*0,12*	*0,14*	*0,17*	*0,19*	*0,22*	*0,21*	*0,18*	*0,16*

Table 4b. VAT rate in the calculations

Per cent	2002	2003	2004	2005-2010[1]
with unchanged interest and exchange rates	23,1	21,5	20,4	19,1

[1] The rate is kept unchanged through the period.

added tax (VAT), which after being broadened in July 2001 covers most goods and services. The VAT rate on food is reduced by half of the reduction in the full VAT rate. In this case, the subsequent effect on the budget balance - according to table 4a - is somewhat weaker than in the case with a reduction in the income tax. The explanation for this is that when indirect taxes are reduced, some of the increase in income at first accrues to enterprises through lower wage growth and only part of this will later be transferred to households. The portion that is retained by enterprises will strengthen their financial position, but in the model used will not have a direct impact on their demand.

The current VAT rate is 24 per cent. The reduced VAT rates for which there is scope in this scenario are shown in table 4b.

For the calculations involving a lower VAT rate, we have refrained from showing the scenario in which the interest rate is set in keeping with the former monetary policy regime, i.e. with a view to stabilizing the exchange rate. The reason for this is that in this scenario inflation, measured by consumer prices, is lower than in the baseline scenario the first few years, which under the former monetary policy regime implied that interest rates would be reduced. However, in this case lower inflation is due to the direct effects of lower indirect taxes on prices, and according to the monetary policy regulation Norges Bank shall not take account of these direct effects when setting interest rates.

Macroeconomic effects

Tables 5-7 provide a summary of the main macroeconomic effects of the three alternative ways of weakening the budget balance, as this follows directly from calculations using the MODAG model. It must be emphasized that the work on this model is a continuous research project where we know from experience that the model's description of the functioning of the

Norwegian economy can change over time. There are thus no absolute truths concerning the effects of such policy measures. There may also be effects that the model does not take sufficiently into account, for example because the model is quantified on the basis of macroeconomic time series and not microeconomic cross-section observations. The data may also be obtained from a period with a regulatory or policy regime that differs from what we have had the opportunity to observe or incorporate, cf. the recent revision of monetary policy.

It should also be pointed out that the measures have long-term effects that may deviate from the effects in the medium term. The long-term effects, which are often in focus when economists discuss the effects of various fiscal measures, are partly safeguarded in the model, but the model relationships indicate that they use a long time to be manifested. By studying developments up to 2010, however, we will often see the direction these effects are taking towards the end of the period.

Production and employment

As seen above from the discussion concerning the dimension of the various shifts, the effects on the level of economic activity of a given weakening of public budgets are greatest in the scenario with higher public consumption and investment (even though the effects begin to decline towards the end of the period, while the effects increase in the other two scenarios). With an unchanged interest rate, mainland GDP in the course of the Storting period expands by nearly 4 per cent more than in the baseline scenario, and the deviation from the baseline scenario then remains at this level in the following five years. With an interest rate response as under the former monetary policy regime, the increase in the period to 2005 is slightly lower and slows considerably in the following years. This is because the increase in the level of activity in this scenario is so strong that it has a clear impact on inflation and thus interest rates. A substantial portion of the increase in output directly reflects increased activity in the public sector; the impact on value added in enterprises is about one percentage point lower than for mainland Norway as a whole. The reversal in the years after 2005 is also stronger.

The situation is the reverse in the scenario with reduced income taxes. Since the level of activity in the public sector is unchanged, the increase for enterprises here is greater than for mainland Norway as a whole. Moreover, the effect rises over time. The latter applies to an even greater extent in the scenario with a lower VAT rate; here the effects in the first few years are modest, but they gradually pick up to the level in the income tax scenario.

The various time profiles for production are found again in employment measured in man-hours, but the difference in level between the expenditure shift on the one hand and the income tax reduction shift on the other is more pronounced here. This is because production in the public sector is more labour-intensive than in enterprises. Moreover, the difference between the two tax relief shifts is less in the long term, because hourly wages decline in relation to the baseline scenario in the VAT shift whereas they increase in the income tax shift. This means that enterprises tend to use more labour and fewer product inputs in the VAT shift while the reverse applies in the income tax shift.

The labour market and wages

The differences between the various scenarios are considerable for the labour market and wage determination. The strong employment growth in the expenditure scenario translates into a pronounced decline in unemployment up to 2005, when the unemployment rate is reduced by over one percentage point in relation to the baseline scenario, i.e. unemployment (measured by the Labour Force Survey) in this scenario is reduced to a little less than 2 1/2 per cent of the labour force. In the MODAG model, wages are determined by striking a balance between the level of producer real wages (adjusted for productivity) and the level of the unemployment rate. The effects of a decline in unemployment on wages are greater the lower the level of unemployment is. Since a rise in wages results in an increase in prices in the next round and thereby reduces real wages, with a subsequent need for a further rise in nominal pay, it takes a long time before wages reach their new equilibrium level. The expenditure shift thus shows that wages rise in relation to the baseline scenario through most of the period even though the decline in unemployment is reversed somewhat during the last few years. Although the increase in wage growth gradually slows, wages in 2010 are as much as 10 per cent above the level in the baseline scenario. The increase in consumer prices-real wages is about 5 1/2 per cent.

In this scenario, the effect on the labour supply is also pronounced; the labour force increases by a good 75 000 or nearly 20 000 a year, an increase that must thus come in addition to the increase in the baseline scenario. By way of comparison, the actual increase in the labour force has been less than 20 000 a year in the last few years. Higher real wages contribute to increasing the labour supply for all occupational groups. In addition, also higher demand for labour in the public sector contributes to an increase in labour supply by young people and women, a phenomenon particularly observed in the 1970s when local government employment rose sharply. It may be more difficult to achieve a corresponding effect on the labour supply today given the current high level of labour force participation rates. On the other hand, it may be the case that the need for an increase in the labour supply measured by number of persons is overesti-

mated as the model presupposes that in the public sector the increase in number of persons shadows the increase in man-hours. If the demand for labour turned out to be as strong as in this scenario, it is not inconceivable that both the shortage of labour and higher real wages will result in an increase in average working hours. A large number of employees in the public sector now work part-time and Statistics Norway's Labour Force Surveys show that many part-time workers want to increase their working hours (67 000 underemployed in the second quarter of 2001). To the extent that the higher demand for labour will be focused on persons with special qualifications, so that a substantial portion of the increase in wages benefits these groups, the immigration of workers – who often want to work full time – may also increase.

The increase in the number employed will be substantially lower in the two tax relief scenarios. This is partly because of considerably lower growth in employment measured in man-hours and partly because the entire increase takes place in the private sector where average working hours are higher than in the public sector. In the scenario with lower income taxes, the unemployment rate will fall by about two tenths, and with a VAT reduction by only one tenth in the latter part of the period. The difference between these two scenarios is slightly greater with regard to the labour supply because the income tax reduction contributes to boosting real disposable wages – and hence the labour supply – more than in the case with a reduction in indirect taxes. With an income tax reduction, wages will rise marginally, while a reduction in indirect taxes will result in a decline in wages in relation to the baseline scenario because the level of prices falls. This is because direct taxes have very small effects on wage determination according to the model, which is also in line with a number of different analyses of Norwegian data.

Inflation and interest rates

With the new inflation target for monetary policy, the discussion concerning an increased use of petroleum revenues has particularly focused on the effects on inflation and interest rates. Given the way the model describes the functioning of the Norwegian economy, the inflationary impetus of a more expansionary fiscal policy will primarily come through wages (cost push) and only to a limited extent through higher demand in product markets (demand pull). Given the substantial difference in wage developments between the scenarios, the effect on prices will therefore also differ. In the expenditure scenario, the effect on consumer prices increases gradually to a good 4 per cent in relation to the baseline scenario, which results in a maximum increase in the annual inflation rate of 0.7 percentage point. Inflation increases by an average 0.5 percentage point over the period.

How Norges Bank will respond to this increase in inflation will depend on the inflation rate in the baseline scenario. Under the earlier monetary policy regime, the objective of monetary policy was to maintain a stable krone exchange rate against European currencies, which Norges Bank interpreted to mean that over time inflation had to be close to the level in the euro area. Monetary policy in these countries has an inflation target of 0-2 per cent, but actual inflation is higher than this at the moment even though it is gradually slowing. If we assume that inflation in these countries is reduced to 2 per cent in coming years and that the baseline scenario includes a corresponding inflation rate in Norway, the scenario with an increase in spending will thus result in an annual inflation rate of about 2.5 per cent, a result that will be in line with the new monetary policy regulation's target. In that case, a tightening of monetary policy in relation to the baseline scenario will be unnecessary. However, this then presupposes that the increase in the (implicit) inflation target is looked upon as part of the policy change.

In the calculations, the exchange rate is kept unchanged so that import prices are the same in all the calculations. If higher inflation were to weaken the krone exchange rate, import prices will increase and contribute to amplifying the increase in inflation. Generally, a given increase in import prices has the same impact on consumer prices as an equivalent increase in wages. It might then be necessary for Norges Bank to raise interest rates. In the alternative including an interest rate response, we show the interest rate increase that would have been required to prevent a depreciation of the krone exchange rate, as was the case under the earlier monetary policy regime. We see that interest rates increase by up to 0.8 percentage point in relation to the baseline scenario. The expansionary fiscal policy in this scenario not only results in higher inflation, but it also leads to a steadily stronger deterioration in the current account of the balance of payments. This also contributes to an increase in interest rates.

Even though the increase in interest rates will have a tightening effect on the economy, there is little difference between the two interest rate scenarios; in the first two years, a higher interest rate actually results in slightly higher inflation. The reason for this is that, according to the model, higher interest rates initially result in an increase in house rents, which is an important component in the consumer price index. In the first few years this effect (more than) offsets the effects of lower price increases for other goods and services. This effect is not likely to prevent Norges Bank from raising the interest rate if this should be deemed necessary in order to reduce inflationary pressures. Moreover, the monetary policy regulation explicitly states that the Bank shall not take account of the direct effects of interest rate changes on con-

sumer prices, and this may refer to the effects on house rents as a result of higher interest rates. Because the effect of higher house rents on inflation is temporary inflation in this scenario is reduced to the level in the baseline scenario towards the end of the period.

Even though the exchange rate is assumed to remain stable in the scenario with an interest rate response, we cannot overlook the possibility that an increase in domestic prices will nevertheless push up import prices because higher domestic prices will reduce competitive pressures for importers. This effect is not incorporated in the model, but we saw tendencies of this during the strong period of expansion in the mid-1980s. In that event, interest rates will have to be increased more than that implied by the interest rate response scenario. However, a sharper rise in interest rates may contribute to an appreciation of the krone and this in itself will contribute to reducing inflation, an effect which thus comes in addition to the direct contractionary effects of a higher interest rate.

In the scenario with a reduction in income taxes, interest rates would also have to be increased under the earlier monetary policy regime with an exchange rate objective even though the increase is only half the increase in the increased spending scenario. Again, this is due to a steadily stronger deterioration in the current account balance in relation to the baseline scenario. With an inflation target for monetary policy, however, an increase in interest rates should be unnecessary. This at least applies with an inflation rate of 2 per cent or lower in the baseline scenario; then there will be scope for a reduction in interest rates rather than an increase in interest rates if the new inflation target of 2.5 per cent is to be achieved.

In the scenario with a lower VAT rate, the effect on consumer prices is the opposite of that of the other two scenarios, and inflation falls the first few years by about one percentage point. Towards the end of the period, however, this is reversed and in 2010 inflation is slightly higher than in the baseline scenario. The reason for this is that lower indirect taxes initially result in a direct reduction in the price level, which in isolation generates a downward moving wage-price spiral in the years immediately thereafter and that the effect on inflation of the expansionary impact of a reduction in indirect taxes does therefore not become evident until after the period of indirect tax reductions is over in 2006.

Under the earlier monetary policy regime, a slower rise in prices as a result of reduced indirect taxes would have resulted in a reduction in interest rates even though the current account balance deteriorates to some extent in this scenario as well. However, under the current regime with an inflation target this is not automatically the case since, as noted earlier, the regulation states that the direct effects of lower indirect taxes shall not be taken into account when evaluating the inflation target. In practice the entire decline in inflation of 0.6 percentage point in 2002 reflects these direct effects, so that underlying inflation is not affected. In 2003-2005, the direct effects of indirect tax reductions are even greater, but because the indirect effects via wage-price spirals begin to have an impact, the effect on underlying inflation will nevertheless be marginally negative (2-3 tenths). This means that it is not until the end of the period that underlying inflation begins to rise in relation to the baseline scenario, but still with only a modest effect within our period. Since Norges Bank is to set its key rate with a view to achieving the inflation rate two years ahead, it is thus not until the end of the period that any increase in interest rates would be relevant. If the (implicit) increase in inflation is included as part of the measure, there may also in this scenario be a slight reduction in interest rates rather than an increase early in the period.

Households and public consumption

As mentioned in the introduction, the reason for "increasing the use of petroleum revenues" must primarily be that there are measures we want to implement, possibly at the expense of other measures. In the scenario with higher spending on public consumption and investment, the purpose is to increase the scale of public services offered to the population. In this scenario, there is scope for gradually increasing public consumption by up to 9-10 per cent in relation to the baseline scenario. Because this measure results in a sharp increase in activity levels in the economy, it also contributes to a substantial increase in household consumption. With unchanged interest rates, household consumption gradually rises by a good 5 per cent. The increase is noticeably lower with an interest rate response as under the former monetary policy regime, i.e. a good 3 per cent. The reason for this is that higher interest rates primarily have an effect on the economy through household budgets and behaviour (in the calculations we have assumed that the higher return on households' insurance claims due to higher interest income, etc. does not affect their current consumption). If the interest rate change under the new monetary policy regime were to be even stronger, the effect on household consumption will be correspondingly lower. Whereas higher public consumption and investment contribute to increasing the demand for goods and services, this has no effect on the supply side of the economy in the model. For example, no attempt has been made to take into account how investment in education or roads may influence efficiency in the private sector.

In the scenario with reduced income taxes, there is little difference in private consumption between the alternatives with unchanged interest rates and with an interest rate response. The reason for this is that

the inflation effects in this scenario are small, resulting in a limited interest rate response. The increase in household consumption will be appreciably lower than in the scenario with higher expenditure on public consumption and investment as well as an unchanged interest rate, but the increases will be more in line with each other in the alternatives with an interest rate response.[2]

If the increase in the non-oil budget deficit is used to reduce the VAT rate, the effects on household consumption are substantially weaker the first few years because the expansionary effect on the economy is curbed when part of the increase in income remains with enterprises and therefore does not influence household income. However, this measure contributes to strengthening enterprises' competitiveness, a factor that gradually has expansionary effects on the economy. Towards the end of the period, the effect on household consumption is thus the same in all the scenarios shown with the exception of – possibly the least realistic – the scenario with higher public consumption and investment and an unchanged interest rate.

Competitiveness and enterprises exposed to competition

When measures that stimulate domestic demand are introduced, higher domestic demand will to varying degrees be allocated towards different types of enterprises. In order to satisfy higher demand, enterprises will increase their demand for labour. In the spending increase scenario, a substantial increase in employment in the public sector will also be required. The increased need for labour may either be covered by replacing labour with other factors of production (resulting in higher labour productivity), by recruiting the unemployed or by increasing labour force participation rates. The mechanism behind these adjustments is that the shortage of labour pushes up (real) wages. This increase in wages affects virtually all enterprises, but for enterprises that are sheltered from foreign competition the higher wage costs will largely be passed on in the form of higher prices without demand being reduced correspondingly. On the other hand, for enterprises exposed to international competition – where manufacturing firms account for the largest group – price increases will largely translate into reduced demand in that demand shifts towards foreign competitors that have not experienced the same increase in prices and costs. The result is a shift in the industry structure, from activities that are exposed to competition to sheltered activities.

We see this effect most clearly in the scenario with higher public consumption and investment since the impact on unemployment and wages is strongest here. Admittedly, value added in manufacturing increases slightly the first few years in this scenario, but this is due to the strong direct effects of higher domestic demand. As wages gradually increase in this scenario, competitiveness deteriorates and output starts to fall. At the end of the period, output shows a decline of a good 3 per cent in relation to the baseline scenario.

We also find a clear shift in the industry structure in the scenario with reduced income taxes. Manufacturing production increases throughout the period, but substantially less than in other industries (and thereby less than for all enterprises). Moreover, the upswing is reversed towards the end of the period, reflecting the gradually more important negative effects of higher wages on competitiveness. In the scenario with reduced VAT rates, however, the shift effect is almost invisible until the very end of the period. The reason for this is that the increase in domestic demand – particularly in the first part of the period – is lower in this scenario than in the other two and that wages in the first few years decline as a result of the reduction in the VAT rate, a factor that strengthens manufacturing industry's competitiveness. Gradually, as the decline in wages is reversed and domestic demand continues to expand, the shift effect is also evident here. Manufacturing production at the end of the period is nevertheless higher than in the baseline scenario.

The differing developments for manufacturing industry and other mainland enterprises are also found in the effects on the operating surplus of the two sectors. With higher public expenditure, the operating surplus in other enterprises improves markedly, while the operating surplus for manufacturing industry deteriorates. In the income tax scenario, the increase for other mainland enterprises is smaller, while the effect for manufacturing industry is positive in the first part of the period. Towards the end of the period, however, manufacturing industry's operating surplus deteriorates in relation to the baseline scenario. In the VAT reduction scenario, on the other hand, the operating surplus for manufacturing industry increases throughout the period in relation to the baseline scenario, even though the effect is reversed towards the end of the period. The increase for manufacturing industry is gradually greater than for mainland enterprises, measured in NOK; the difference is even greater measured as a percentage increase since the operating results in manufacturing industry are initially smaller than in other mainland enterprises as a whole.

Balance of payments and financial balances

The calculations show that using the weakening of the budget balance in the coming Storting period to in-

2 The reason for the slightly negative effect on public consumption in the income tax reduction scenario is that an increase in the level of activity contributes to boosting demand for some fee-financed public services, and by definition this contributes to reducing public consumption when public expenditure on wages and purchases of goods and services (measured at constant prices) is held constant.

crease public consumption and investment will be somewhat more costly the following five years than to reduce income taxes or VAT. With an unchanged interest rate, the cumulated difference in budget balance between these alternatives amounts to about NOK 30 billion, or NOK 5 billion a year in average for the period 2006 - 2010. Part of the difference reflects a higher price level in the first scenario.

When the budget balance is to weaken through higher public consumption and investment, the balance of payments deteriorates by virtually the same amount. In the first few years, the "leakage" is a little smaller because it takes time before deteriorating competitiveness for enterprises has an impact on the balance of payments. The deterioration in the balance of payments is appreciably smaller with an income tax reduction and substantially smaller with a cut in the VAT rate. In this case, the short-term effect is also considerably smaller than the medium-term effect because domestic demand only picks up gradually in this scenario.

The fact that higher spending on public consumption and investment has such a negative impact on the balance of payments and enterprises' financial situation was an important argument when the Norwegian "Solidarity Alternative" was established in its time. The idea was that moderate income settlements would prevent real wages from increasing as sharply as in our calculations. This would allow us to achieve both higher production of welfare services and lower unemployment without being accompanied by a deterioration in the balance of payments and enterprises' financial situation. In one respect this problem is no longer an issue with the new fiscal policy guidelines. Some contraction of the exposed sector is now a desired consequence; without it Norway would not be able to accelerate the use of petroleum revenues.

The combined scenario

The three scenarios discussed above are extreme in the sense that each of them uses the scope for fiscal policy expansion solely for one measure. First, there are probably not many political parties that will have such one-sided policy priorities. Second, Norwegian politics consists of compromises between parties, a factor that will increase the likelihood that various measures are combined. In order to shed light on the effects of a combined policy package, we have computed the effects of a fourth scenario, composed of equal parts of each of the first three scenarios. The macroeconomic effects are shown in table 8. Here, we will confine our comments to two aspects:

As long as fiscal policy expansion is taking place (i.e. in the years 2002-2005), mainland GDP growth with an unchanged interest rate will be about 1/2 per cent higher than in the baseline scenario. If this policy is continued in the following years, trend growth in mainland GDP will be higher than the 2 1/4 per cent assumed so far.

Inflation will be lower than in the baseline scenario the first few years, but higher in subsequent years. Measured excluding the direct effects of indirect taxes, it may also be marginally higher in the first few years. On the other hand, if the (implicit) increase in the inflation target is to be seen as part of the measure, there will be no need to increase interest rates in relation to the baseline scenario, even if import prices also rise somewhat. In this sense, the new fiscal and monetary policy guidelines appear to be well adapted to each other.

Table 5. Increased expenditure on government consumption and investment, deviation from the baseline scenario

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Gov. consumption and investment (bill. 1997-NOK)									
with unchanged interest and exchange rates	7.7	17.1	22.5	29.2	29.3	29.4	29.6	29.8	30.1
with interest rate respons, given exchange rate	7.5	16.1	20.7	26.5	26.7	26.8	27.1	27.3	27.6
Government consumption (pct)									
with unchanged interest and exchange rates	2.7	6.0	7.8	9.8	9.8	9.8	9.8	9.8	9.9
with interest rate respons, given exchange rate	2.7	5.7	7.1	8.9	8.9	8.9	9.0	9.0	9.1
Private consumption (pct)									
with unchanged interest and exchange rates	0.8	1.6	2.5	3.8	4.4	5.1	5.3	5.4	5.4
with interest rate respons, given exchange rate	0.7	1.3	1.9	2.9	3.2	3.5	3.6	3.6	3.6
GDP mainland Norway (pct)									
with unchanged interest and exchange rates	1.0	2.1	2.9	3.9	4.1	4.2	4.2	4.0	3.9
with interest rate respons, given exchange rate	0.9	1.9	2.5	3.3	3.3	3.3	3.1	3.0	2.8
Gross product in companies (pct)									
with unchanged interest and exchange rates	0.6	1.3	1.9	2.7	2.9	3.1	3.0	2.9	2.7
with interest rate respons, given exchange rate	0.6	1.2	1.5	2.1	2.1	2.1	2.0	1.8	1.6
Gross product in manufacturing (pct)									
with unchanged interest and exchange rates	0.3	0.4	0.3	0.1	-0.6	-1.2	-1.9	-2.6	-3.1
with interest rate respons, given exchange rate	0.3	0.4	0.2	-0.1	-0.8	-1.4	-2.0	-2.6	-3.1
Man-hours worked (pct)									
with unchanged interest and exchange rates	0.9	1.9	2.6	3.4	3.5	3.5	3.5	3.4	3.4
with interest rate respons, given exchange rate	0.9	1.8	2.3	3.0	3.0	3.0	2.9	2.8	2.7
Unemployment rate (percentage points)									
with unchanged interest and exchange rates	-0.6	-1.0	-1.0	-1.2	-1.0	-0.9	-0.9	-0.8	-0.8
with interest rate respons, given exchange rate	-0.6	-0.9	-0.9	-1.1	-0.8	-0.8	-0.7	-0.7	-0.6
Labour force (1000 persons)									
with unchanged interest and exchange rates	9.7	29.6	48.1	64.5	73.6	76.0	77.2	77.5	77.9
with interest rate respons, given exchange rate	9.4	28.1	44.1	57.4	64.2	65.0	65.2	64.6	64.4
Wage per hour (pct)									
with unchanged interest and exchange rates	0.9	2.4	4.1	6.1	7.5	8.6	9.4	9.9	10.1
with interest rate respons, given exchange rate	0.8	2.3	3.8	5.5	6.6	7.5	8.0	8.3	8.3
Consumer real wage per hour (pct)									
with unchanged interest and exchange rates	0.7	1.9	2.9	4.2	4.9	5.3	5.5	5.6	5.4
with interest rate respons, given exchange rate	0.7	1.7	2.5	3.5	3.9	4.1	4.2	4.1	4.0
Consumer prices (pct)									
with unchanged interest and exchange rates	0.1	0.6	1.1	1.8	2.5	3.2	3.7	4.1	4.4
with interest rate respons, given exchange rate	0.2	0.6	1.2	1.9	2.7	3.3	3.7	4.0	4.2
Consumer price inflation (percentage points)									
with unchanged interest and exchange rates	0.1	0.4	0.6	0.7	0.7	0.6	0.5	0.4	0.3
with interest rate respons, given exchange rate	0.2	0.5	0.6	0.7	0.7	0.6	0.5	0.3	0.1
3 mth interest rate (percentage points)									
with unchanged interest and exchange rates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
with interest rate respons, given exchange rate	0.2	0.3	0.5	0.7	0.8	0.8	0.8	0.7	0.6
Operating surplus manufacturing (bill. NOK)									
with unchanged interest and exchange rates	0.0	-0.3	-1.0	-1.8	-2.9	-3.9	-4.9	-5.8	-6.6
with interest rate respons, given exchange rate	0.0	-0.4	-1.1	-1.9	-2.9	-3.8	-4.7	-5.5	-6.0
Operating surplus other companies (bill. NOK)									
with unchanged interest and exchange rates	0.5	0.5	1.2	2.6	4.3	7.0	9.6	12.3	15.0
with interest rate respons, given exchange rate	0.6	0.9	2.0	4.1	6.2	9.0	11.5	13.8	15.9
Current account (bill. NOK)									
with unchanged interest and exchange rates	-3.9	-9.0	-14.3	-22.0	-26.1	-30.7	-33.8	-36.0	-37.3
with interest rate respons, given exchange rate	-3.7	-8.0	-12.0	-17.9	-20.3	-23.3	-25.1	-26.3	-27.2
Government budget balance (bill. NOK)									
with unchanged interest and exchange rates	-3.9	-11.6	-18.0	-24.6	-28.2	-29.1	-31.3	-33.9	-36.4
with interest rate respons, given exchange rate	-3.9	-11.6	-18.0	-24.6	-28.8	-30.7	-33.3	-36.0	-38.3
Households' net financial investments (bill. NOK)									
with unchanged interest and exchange rates	1.7	7.4	11.7	14.4	16.2	14.2	14.1	14.3	14.6
with interest rate respons, given exchange rate	1.3	6.6	10.8	13.4	16.5	16.5	18.1	19.7	21.0

Table 6. Reduced income taxes, deviation from the baseline scenario

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Taxfree allowances/threshold for surtax (pct)									
with unchanged interest and exchange rates	6.3	20.8	36.4	54.0	54.0	54.0	54.0	54.0	54.0
with interest rate respons, given exchange rate	6.2	20.4	35.2	51.4	51.4	51.4	51.4	51.4	51.4
Government consumption (pct)									
with unchanged interest and exchange rates	0.0	-0.1	-0.1	-0.2	-0.3	-0.3	-0.3	-0.4	-0.4
with interest rate respons, given exchange rate	0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3
Private consumption (pct)									
with unchanged interest and exchange rates	0.2	0.9	1.8	2.9	3.4	3.7	3.8	3.9	4.1
with interest rate respons, given exchange rate	0.2	0.8	1.7	2.6	3.0	3.1	3.1	3.3	3.4
GDP mainland Norway (pct)									
with unchanged interest and exchange rates	0.1	0.4	0.8	1.3	1.6	1.8	1.9	1.9	2.0
with interest rate respons, given exchange rate	0.1	0.4	0.8	1.2	1.4	1.5	1.5	1.6	1.6
Gross product in companies (pct)									
with unchanged interest and exchange rates	0.1	0.5	1.0	1.6	2.0	2.2	2.3	2.3	2.4
with interest rate respons, given exchange rate	0.1	0.4	0.9	1.4	1.7	1.8	1.9	1.9	2.0
Gross product in manufacturing (pct)									
with unchanged interest and exchange rates	0.0	0.2	0.4	0.6	0.8	0.8	0.8	0.7	0.6
with interest rate respons, given exchange rate	0.0	0.2	0.4	0.5	0.6	0.6	0.6	0.5	0.5
Man-hours worked (pct)									
with unchanged interest and exchange rates	0.0	0.1	0.3	0.6	0.8	1.0	1.0	1.1	1.1
with interest rate respons, given exchange rate	0.0	0.1	0.3	0.5	0.7	0.8	0.9	0.9	0.9
Unemployment rate (percentage points)									
with unchanged interest and exchange rates	0.0	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2
with interest rate respons, given exchange rate	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Labour force (1000 persons)									
with unchanged interest and exchange rates	0.1	1.5	5.0	9.8	15.3	18.6	20.6	21.6	22.3
with interest rate respons, given exchange rate	0.1	1.4	4.7	9.1	13.8	16.3	17.6	18.2	18.8
Wage per hour (pct)									
with unchanged interest and exchange rates	0.1	0.2	0.3	0.5	0.7	0.9	1.2	1.4	1.5
with interest rate respons, given exchange rate	0.1	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.3
Consumer real wage per hour (pct)									
with unchanged interest and exchange rates	0.1	0.2	0.3	0.5	0.6	0.7	0.7	0.8	0.8
with interest rate respons, given exchange rate	0.1	0.2	0.3	0.4	0.4	0.4	0.4	0.5	0.5
Consumer prices (pct)									
with unchanged interest and exchange rates	0.0	0.0	0.0	0.0	0.1	0.3	0.5	0.6	0.7
with interest rate respons, given exchange rate	0.0	0.0	0.0	0.1	0.3	0.5	0.6	0.7	0.8
Consumer price inflation (percentage points)									
with unchanged interest and exchange rates	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.1
with interest rate respons, given exchange rate	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.0
3 mth interest rate (percentage points)									
with unchanged interest and exchange rates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
with interest rate respons, given exchange rate	0.0	0.1	0.2	0.3	0.4	0.3	0.3	0.3	0.2
Operating surplus manufacturing (bill. NOK)									
with unchanged interest and exchange rates	0.0	0.1	0.3	0.4	0.4	0.3	0.1	-0.1	-0.2
with interest rate respons, given exchange rate	0.0	0.1	0.2	0.3	0.2	0.1	-0.1	-0.2	-0.3
Operating surplus other companies (bill. NOK)									
with unchanged interest and exchange rates	0.1	0.7	1.8	3.0	4.0	5.0	5.9	7.2	8.5
with interest rate respons, given exchange rate	0.2	0.8	2.1	3.5	4.9	5.9	6.9	8.0	9.1
Current account (bill. NOK)									
with unchanged interest and exchange rates	-0.7	-2.8	-6.4	-10.5	-13.2	-14.8	-15.5	-16.5	-17.5
with interest rate respons, given exchange rate	-0.7	-2.7	-5.9	-9.3	-11.3	-12.3	-12.7	-13.6	-14.4
Government budget balance (bill. NOK)									
with unchanged interest and exchange rates	-3.9	-11.6	-18.1	-24.7	-24.3	-24.6	-25.9	-27.2	-28.3
with interest rate respons, given exchange rate	-3.9	-11.6	-18.0	-24.6	-24.9	-25.6	-27.1	-28.3	-29.4
Households' net financial investments (bill. NOK)									
with unchanged interest and exchange rates	3.4	9.5	13.1	16.4	13.5	12.1	12.4	11.8	11.3
with interest rate respons, given exchange rate	3.3	9.2	12.5	15.8	13.9	13.5	14.5	14.4	14.1

Table 7. Reduced VAT rate, deviation from the baseline scenario

	2002	2003	2004	2005	2006	2007	2008	2009	2010
VAT rate (percentage points) with unchanged interest and exchange rates	-0.9	-2.5	-3.6	-4.9	-4.9	-4.9	-4.9	-4.9	-4.9
Government consumption (pct) with unchanged interest and exchange rates	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.2
Private consumption (pct) with unchanged interest and exchange rates	0.2	0.4	0.4	0.8	1.1	1.6	2.2	2.7	3.2
GDP mainland Norway (pct) with unchanged interest and exchange rates	0.1	0.2	0.2	0.4	0.6	0.9	1.2	1.4	1.7
Gross product in companies (pct) with unchanged interest and exchange rates	0.1	0.2	0.2	0.5	0.7	1.0	1.4	1.7	2.0
Gross product in manufacturing (pct) with unchanged interest and exchange rates	0.0	0.1	0.2	0.4	0.7	1.0	1.2	1.3	1.3
Man-hours worked (pct) with unchanged interest and exchange rates	0.0	0.0	0.0	0.1	0.2	0.3	0.5	0.6	0.7
Unemployment rate (percentage points) with unchanged interest and exchange rates	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.1
Labour force (1000 persons) with unchanged interest and exchange rates	-0.1	0.2	1.1	2.4	4.6	6.5	8.9	11.5	13.8
Wage per hour (pct) with unchanged interest and exchange rates	0.0	-0.3	-0.8	-1.3	-1.7	-1.5	-1.2	-0.8	-0.3
Consumer real wage per hour (pct) with unchanged interest and exchange rates	0.6	1.3	1.8	2.5	2.4	2.6	3.0	3.3	3.6
Consumer prices (pct) with unchanged interest and exchange rates	-0.6	-1.6	-2.6	-3.7	-4.0	-4.1	-4.0	-3.9	-3.7
Consumer price inflation (percentage points) with unchanged interest and exchange rates	-0.6	-1.1	-1.0	-1.1	-0.3	-0.1	0.0	0.1	0.2
Operating surplus manufacturing (bill. NOK) with unchanged interest and exchange rates	0.2	0.5	0.9	1.5	1.9	2.1	2.2	2.2	2.1
Operating surplus other companies (bill. NOK) with unchanged interest and exchange rates	0.6	1.4	1.7	2.0	1.4	1.0	1.0	1.4	2.3
Current account (bill. NOK) with unchanged interest and exchange rates	-0.7	-1.3	-1.4	-2.8	-3.8	-6.2	-9.2	-11.7	-14.2
Government budget balance (bill. NOK) with unchanged interest and exchange rates	-3.9	-11.6	-18.0	-24.6	-24.8	-24.4	-25.2	-26.5	-27.5
Households' net financial investments (bill. NOK) with unchanged interest and exchange rates	2.8	8.5	13.2	16.9	15.7	13.1	11.0	9.4	7.8

Table 8. Combined scenario, deviation from the baseline

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Gov. consumption and investment (bill. 1997-NOK)									
with unchanged interest and exchange rates	2.5	5.6	7.4	9.6	9.6	9.6	9.5	9.5	9.5
Taxfree allowances/threshold for surtax (pct)									
with unchanged interest and exchange rates	2.0	6.3	10.5	14.8	14.8	14.8	14.8	14.8	14.8
VAT rate (percentage points)									
with unchanged interest and exchange rates	-0.3	-0.8	-1.2	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6
Government consumption (pct)									
with unchanged interest and exchange rates	0.9	2.0	2.5	3.2	3.2	3.2	3.1	3.1	3.1
Private consumption (pct)									
with unchanged interest and exchange rates	0.4	0.9	1.6	2.5	2.9	3.4	3.7	3.9	4.2
GDP mainland Norway (pct)									
with unchanged interest and exchange rates	0.4	0.9	1.3	1.9	2.1	2.3	2.4	2.5	2.5
Gross product in companies (pct)									
with unchanged interest and exchange rates	0.3	0.7	1.0	1.6	1.8	2.1	2.2	2.3	2.4
Gross product in manufacturing (pct)									
with unchanged interest and exchange rates	0.1	0.2	0.3	0.4	0.3	0.2	0.1	-0.1	-0.3
Man-hours worked (pct)									
with unchanged interest and exchange rates	0.3	0.7	1.0	1.4	1.5	1.6	1.7	1.7	1.7
Unemployment rate (percentage points)									
with unchanged interest and exchange rates	-0.2	-0.4	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4
Labour force (1000 persons)									
with unchanged interest and exchange rates	3.2	10.4	18.1	25.8	31.4	34.0	35.8	37.1	38.2
Wage per hour (pct)									
with unchanged interest and exchange rates	0.3	0.7	1.1	1.6	1.9	2.4	2.8	3.2	3.5
Consumer real wage per hour (pct)									
with unchanged interest and exchange rates	0.4	1.1	1.6	2.3	2.4	2.7	2.9	3.0	3.1
Consumer prices (pct)									
with unchanged interest and exchange rates	-0.1	-0.4	-0.5	-0.7	-0.5	-0.3	-0.1	0.2	0.3
Consumer price inflation (percentage points)									
with unchanged interest and exchange rates	-0.1	-0.2	-0.2	-0.2	0.2	0.2	0.2	0.2	0.2
Operating surplus manufacturing (bill. NOK)									
with unchanged interest and exchange rates	0.1	0.1	0.1	0.1	-0.1	-0.3	-0.7	-1.0	-1.4
Operating surplus other companies (bill. NOK)									
with unchanged interest and exchange rates	0.4	1.0	1.7	2.7	3.4	4.3	5.4	6.8	8.3
Current account (bill. NOK)									
with unchanged interest and exchange rates	-1.7	-4.3	-7.3	-11.5	-14.0	-16.7	-18.9	-20.8	-22.4
Government budget balance (bill. NOK)									
with unchanged interest and exchange rates	-3.9	-11.6	-18.0	-24.6	-25.9	-26.3	-27.6	-29.2	-30.7
Households' net financial investments (bill. NOK)									
with unchanged interest and exchange rates	2.6	8.4	12.5	15.7	14.9	13.1	12.4	11.8	11.1

Special tax rules for old-age pensioners*

Dag Rønningen and Dennis Fredriksen

Anticipated developments in the Norwegian population imply a steady increase in the number of retired persons per economically active person. In addition, each old-age pensioner will receive a higher pension as a result of increased pension entitlements. Assuming that pension entitlements and benefits are indexed in step with wages, old-age pensioners average disposable income will increase considerably more in the period towards 2030 than that of the rest of the population. These developments result in large increases in social security expenditures. One may therefore ask if it is desirable to continue to give old-age pensioners special privileges through the tax system. The present tax rules let old-age pensioners pay lower taxes than the economically active through the so-called rule of limitation for taxes, lower social security contributions, and a special tax allowance for age and disability. In this article we show how much these special tax rules reduce taxes paid by old-age pensioners, and analyse the distribution of these tax reductions up to the year 2030. The analysis is an update of Gravningsmyhr (1995), but within a somewhat different context. Our results show that an average old-age pensioner's tax reductions amount to NOK[1] 11,700 in 1995, and increase to NOK 13,200 in 2030 (deflated by nominal wages with 1999 as the base year). Income inequality among old-age pensioners is reduced if pensioners are required to pay the same social security contribution rate as workers, whereas a removal of the tax limitation rule contributes to an increase in income inequality both in 1995 and 2030. Abolishing the special tax deduction for age and disability has little effect on the income distribution for old-age pensioners. The three special tax rules together lead to a more equal distribution of income among old-age pensioners in 1995 and 2030, but the tax reductions reduce income inequality less in 2030 than in 1995. Our results correspond with the results in Gravningsmyhr (1995).

Introduction

It is expected that in the years to come there will be a large increase in the number of retired people per economically active person. At the same time old-age pensioners will have earned better pension entitlements. A large increase in the number of old-age pensioners receiving higher pension benefits will lead to a large increase in public expenditures related to old-age pensions. This may give reason to ask whether it is desirable to continue giving old-age pensioners privileges through the tax system. Presently old-age pensioners pay lower taxes than economically active persons through three special tax rules:

Dag Rønningen is Senior Executive Officer at Unit of labour market and Firm behaviour (dag.ronningen@ssb.no)

Dennis Fredriksen is Reseach Fellow at Unit of fiscal sustainability (dennis.fredriksen@ssb.no)

i) lower social security contributions
ii) a special tax allowance for age and disability
iii) the rule of limitation for taxes

These rules apply to other pensioners than the old-age pensioners as well. In this article though, we only study the effects for old-age pensioners.

There may be several reasons why old-age pensioners should pay lower taxes than economically active persons. One of the motives behind the introduction of the National Insurance Act was a desire that pension income should be reasonable relative to earlier income from employment, see “Ot.prp. nr 17 1965-66” and Magnussen (2002). Each of the three special rules can also be explained separately. The special tax allowance for age and disability is meant as a compensation for higher health expenditures for older people than economically active. Pension income does not give pension entitlements, which makes it reasonable

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[1] One NOK is 0,13 Euro (19 April 2002).

that old-age pensioners pay lower contributions to social security. The rule of limitation for taxes is motivated by an objective that old-age pensioners with only minimum pension shall not pay taxes. "St.meld. nr. 35 1994-95" expressed that one wanted to narrow the gap between the taxation of pensioners and the taxation of economically active with medium and higher incomes. This has so far not happened.

We calculate the amount of the tax reductions and its distribution by income of old-age pensioners towards 2030. In that way we will be able to illustrate the effects of the tax reductions in the light of the ageing of the population and the strong increase in the incomes of the old-age pensioners in this period. We look into the income distribution effects both among the old-age pensioners and the whole population.

This article is based on a project for the Ministry of Finance, where we have performed the same analysis as in Gravningsmyhr (1995), but with a different model tool, the microsimulation model MOSART, see Rønningen and Fredriksen (2002).

Three special tax rules that imply lower taxes for old-age pensioners[2]

i) lower social security contributions

There are three levels for social security contribution rates. For income that does not give pension entitlements the rate is 3 per cent. Persons below 70 years of age pay the low contribution rate on pension income, benefits derived from a surrendered property and life annuity from employment. The low contribution rate applies to all personal income for persons of 70 years of age and older. For all income from work where employers' social security contributions are imposed, a medium contribution rate of 7.8 per cent is paid. For income from self-employment the social security contribution rate is 10.7 per cent.[3]

ii) A special tax allowance for age and disability

From 70 years of age one has the right to a special tax allowance because of age. Persons between the age of 67 and 70 can choose to be full-time or part-time pensioners. One gets the special tax allowance for age according to the degree of pension taken out. The main rule for married couples with joint assessment is that they together receive one full tax allowance for age. If only one of the married is entitled to the tax allowance for age, the tax allowance for age is given to that person.[4] There is also a tax allowance for disability that is given according to specific rules.

iii) The rule of limitation for taxes

Everyone 70 years of age or older are covered by the rule of limitation for taxes. In addition the rule covers tax payers below 70 years of age who have received i) old-age pension, ii) early retirement, iii) disability pension or temporary disability pension which gives rights to full special tax allowance for disability, iv) survivor pension and v) transitional benefit under the National Insurance Act. The basis of calculation is general income after correction for possible wealth, but before deduction of the special tax allowance for age and disability. The earning limits before tax is to be paid are in 2002 NOK 81,000 for a single person, and NOK 131,700 for married couples. The motivation for the rule of limitation for taxes is that pensioners with minimum pension shall not pay taxes. The intention of the tax system is however that pensioners, apart from lower social security contributions and the special tax allowance for age and disability, shall pay taxes according to their income as other taxpayers. The tax benefits from the rule of limitation of taxes are therefore reduced as the income rises. This implies that the marginal tax rate is higher than for ordinary incomes. When the income after deductions, but before the special tax allowance for age and disability, exceeds the earnings limits, the tax can amount to maximum 55 per cent of the excess income. A basic tax allowance of 22 per cent, ensure that most of the old-age pensioners will have a marginal tax rate of 42.9 per cent. The rule of limitation for taxes does not apply to surtax on higher income and taxation of wealth. A taxpayer can be assessed of taxes under the ordinary tax rules, or under the rule of limitation of taxes, and one will always be assessed under the rules that give the lowest taxes.

Assumptions underlying the analysis

We use the microsimulation model MOSART to calculate the tax reductions from the special tax rules. MOSART is a dynamic microsimulation model for projections of the population, labour force, education level and public pension benefits, and it is suited to calculate the consequences of the special tax rules for old-age pensioners with regard to the amount of the tax benefits and the distributional effects over time. The projections are conducted by simulation of the whole life course for each person in a representative sample of the population with regard to migration, deaths, births, marital status, education, labour force participation and retirement. The events that may happen for a person in a year are drawn with transition probabilities that depend on personal characteristics. The MOSART model is documented in Fredriksen (1998).

[2] The description of the tax rules is taken from Lignings-ABC 2001(Taxation ABC 2001).

[3] In MOSART there is no distinction between income from self-employment and wage income. The high rate of 10.7 per cent is therefore not included in the model.

[4] In MOSART the special tax allowance for age is modeled simpler than described here. Single pensioners get one whole tax allowance, while married get half a tax allowance each.

Box 1. Important assumptions in MOSART, base year 1999

Net immigration	10 000 per year
Life expectancy	Increases 4-5 years towards 2050
Fertility rate	1.8
Educational activities	As in 1999
Number of new disability pensioners	As the mean 1995-1999
Early retirement	As in 2000
Labour force participation	As in 1999
Prices, wages, basic pension unit	As in 1999

We show the effects of the tax benefits towards 2030, with emphasis on a comparison between 1995 and 2030. The growth of the number of people in different age groups is in accordance with projections of the population development from Statistics Norway. The rules for earning pension entitlements are assumed to be unchanged for the whole period. The pension entitlements and benefits (i.e. the basic pension unit) grow at the same rate as the wages. The special tax allowance for age and disability grows at the same rate as the basic pension unit. The most important assumptions are shown in box 1.

We have not performed any sensitivity analyses with regard to the assumptions underlying the projections. An important assumption is that the basic pension unit grows at the same rate as the wages. This has not happened so far. The adjustment of the basic pension unit at a lower rate than wages implies that supplementary pension becomes smaller. At the same time the minimum pension has increased through the adjustment of the special supplement. However, we assume that the basic pension unit grows at the same rate as the wages in the entire period from 1995 to 2030. The share of old-age pensioners on minimum pension decreases a lot towards 2030, because more of the old-age pensioners will have earned more pension entitlements. This development means that the lower social security contributions and the special tax allowance for age and disability will get more significant, while the rule for limitation of taxes gets less significant for the old-age pensioners. On the other hand, if the basic pension unit continues to be adjusted at a lower rate than the wages, the rule for limitation of taxes will be more important, while the lower social security contributions and the special tax allowance for age and disability get less important than in our projections. Another important assumption is that the distribution of labour income is stable. An increased inequality of labour income may have consequences for the impact of the special tax rules.

The population development towards 2030

Table 1 gives a picture of the shares of the population living in households with old-age pensioners and households with other pensioners. Households with old-age pensioners are defined as households with at least one old-age pensioner, while households with other pensioners are the rest of the households in the population with at least one disability pensioner, a special contractual pension scheme (AFP), survivors' pensioner or rehabilitation pensioner. We see that the share of households with old-age pensioners decreases somewhat from 1995 to 2010, and then increases strongly towards 2030. The main reason behind the development in the number of old-age pensioners in the period towards 2030 is increased longevity. Those retiring in the period towards 2010 were born in the 1930s and the beginning of the1940s. These are small cohorts even though the birth rates increased already around 1935 onwards. The birth rate increased strongly just after the war, and together with large cohorts born in the 1950s and 1960s and the increased longevity this will lead to a strong increase in the number of old-age pensioners towards 2030. The share of other pensioners increases strongly between 1995 and 2010, which is specifically caused by a large increase in the number of disability pensioners. This comes from an increase in the number of people in the age groups with many disability pensioners. In 1995 15.7 per cent of the population lived in households with at least one old-age pensioner, and in our projections this share increases to 20.7 per cent of the population in 2030. In 2030 we estimate that somewhat more than 41 per cent of the population will live in households with at least one pensioner. The figures in table 1 are in accordance with the projections in Gravningsmyhr (1995). The differences can to a large degree be attributed to sample uncertainty and somewhat different methods used to project the households. In addition we use a more recent population projection.

Table 1. Shares of the population in households with pensioners. In per cent

	1995	1999	2010	2030
Households with old-age pensioners	15.7	15.2	14.7	20.7
Households with other pensioners	14.0	16.6	21.4	20.6

Source: Statistics Norway.

The development of incomes for old-age pensioners towards 2030

Table 2 shows the development in pension income and disposable income. Pension income are income from the National Insurance Fund, occupational pension is not included in the pension income. All figures are in 1999-NOK. We see that the old-age pensioners receive both higher pension income and disposable income in the whole period from 1995 to 2030. The disposable income rises 64 per cent from 1995 to 2030. The strong growth in income for old-age pensioners arises from better pension entitlements for old-age pensioners in this period. For the whole population the mean increase in disposable income is 33 per cent in the same period with no growth in wages.

Table 2. Mean own pension income per person by pension status. Mean own disposable income in parenthesis. 1999-NOK

	1995	1999	2010	2030
The whole population	18 700 (111 000)	23 100 (129 700)	28 200 (137 000)	37 100 (147 500)
Old-age pensioners	83 300 (121 100)	100 000 (143 700)	114 600 (165 500)	130 600 (199 300)

Source: Statistics Norway.

Table 3. Mean tax reductions per person in households with at least one old-age pensioner, as a consequence of different tax rules. 1999-NOK

	1995	1999	2010	2030
Lower social security contributions	2 300	2 900	4 500	7 200
Rule of limitation for taxes	2 800	3 300	2 100	900
Special tax allowance for age and disability	1 200	1 500	2 000	2 900
Total tax reductions	11 700	13 200	12 800	13 200

Source: Statistics Norway.

Mean tax benefits, 1995-2030

Higher pension incomes and changes in the composition of the population will influence the "costs" associated with maintaining the special tax rules, and be important for the distributional impact of the rules. We calculate the tax reductions as the difference between tax payment with the present rules and tax payment in absence of the tax benefits. Above we gave a brief description of the three special tax rules for old-age pensioners that lead to lower taxes for them than for economically active. We should emphasize that the rule of limitation for taxes and the special tax allowance for age and disability also apply to other groups than retired persons. In table 3 we show the mean amount of the tax benefits for each of the years 1995, 1999, 2010 and 2030 for households with at least one old-age pensioner. The tax reductions for the household are measured per person, and all figures are in 1999-NOK. We can see that the tax reductions from lower social security contributions increase in the whole period. As a consequence of rising pension incomes the tax reductions from lower social security contributions will increase. The rule of limitation for taxes shows the opposite development. Higher incomes for the old-age pensioners lead fewer people to be affected by this rule, and its importance decreases. For the special tax allowance for age and disability the impact will be the same as for the lower social security contributions. Higher incomes lead to increased tax reductions from the special tax allowance for age and disability, as we can see from table 3. We can otherwise see that all the tax reductions together amount to more than the sum of each and one of the tax reductions separately. This comes from the interaction between the special tax rules. For instance, if the lower social security contributions were removed, the taxes would not increase for those covered by the rule of limitation for taxes. The rule of limitation for taxes will cover for a possible removal of one of the other special tax rules. The mean value of the total tax reductions increases from 1995 to 1999. The value of the total tax reductions is the same in 1999 and 2030, while the value is a little less in 2010.

The distributional effects of the special tax rules

The distributional effects of the special tax rules in years ahead are illustrated by "constructed" measures for household income. The reason is that it is problematic to compare the incomes between households of unequal size. A household with more members needs larger income than a smaller household to attain the same level of consumption. This should be considered when the distribution of the benefits is calculated. One can let each person in the household count with the same weight, so that in a household with four persons with a total income of NOK 400, 000, each of them dispose of NOK 100, 000. In that case we assume that it is no large-scale operational benefits for a household with more persons than for a household with only one person. Another possibility is to use the total disposable household income as a target for income. It is reasonable to assume that there will be some degree of large-scale benefits for larger households, but these are not unlimited. We have chosen to calculate the household's equivalence income as the household's total disposable income divided by the square root of the number of persons in the household (Buhmann et.al. 1988).

The distribution of the tax benefits by level of income for old-age pensioners for 1995 and 2030 is shown in table 4 and 5. The tables divide the households in ten groups according to rising equivalence income. The first decile consists of the ten per cent of the households with the lowest equivalence income. The next ten per cent of the households is in the second decile. The tenth decile consists of ten per cent of the households with the highest equivalence income. The tables show that lower social security contributions and the special tax allowance for age and disability first and foremost are beneficial for the households with high incomes. This is due to the fact that the tax reductions of the lower social security contribution increase more than proportionally with the income because of the tax-free allowance, and the special tax allowance for age and disability is beneficial first after the income has reached the limits where the rule of limitation for taxes apply. The tax reductions from the rule of limitation of taxes are largest for the households with low income.

Table 4 and 5 show that the tax reductions from lower social security contributions increases from 1995 to 2030. This is due to higher incomes for the old-age pensioners. The benefit from the rule of limitation for taxes increases for those with the lowest incomes. Old-age pensioners with higher incomes receive lower

Table 4. Decile table for the tax reductions, 1995, the households sorted according to the equivalence income. Households of old-age pensioners. 1999-NOK

Desil	Mean equival. income	Tax reductions from lower social sec.	Tax reductions from the rule of limit. of taxes	Tax reductions from a special tax allowance	All special tax rules
1	77 900	0	2 500	0	9 900
2	88 700	0	4 300	0	12 600
3	100 200	0	6 300	0	14 900
4	109 600	200	6 700	200	15 700
5	119 800	300	5 200	400	14 700
6	131 100	800	4 400	900	14 300
7	143 200	1 600	3 400	1 400	13 600
8	162 100	3 700	1 000	2 700	12 100
9	189 000	6 300	200	3 500	12 100
10	261 000	11 200	200	3 600	15 300

Source: Source: Statistics Norway.

Table 5. Decile table for the tax reductions, 2030, the households sorted according to the equivalence income. Households of old-age pensioners. 1999-NOK

Desil	Mean equival. income	Tax reductions from lower social sec.	Tax reductions from the rule of limit. of taxes	Tax reductions from a special tax allowance	All special tax rules
1	119 900	200	6 000	200	15 500
2	148 700	1 300	1 800	1 200	12 700
3	168 800	4 400	500	3 500	12 100
4	186 200	6 800	100	4 100	12 300
5	203 800	7 900	0	4 200	12 700
6	222 700	9 000	0	4 100	13 400
7	244 900	10 400	0	4 000	14 400
8	271 200	11 200	0	3 900	15 100
9	313 800	13 400	0	3 700	17 100
10	422 200	19 000	0	3 600	22 400

Source: Statistics Norway.

tax reductions from the rule of limitation for taxes in 2030 than in 1995. For the special tax allowance for age and disability the tax reductions increase most for those with medium incomes towards 2030. All together the old-age pensioners at the lower end and the high end of the income distribution are the ones who get increased tax reductions towards 2030, while the tax burden for old-age pensioners with medium incomes will be about unchanged according to the projections.

Another way of describing the effects of the tax reductions is to use summary measures for measuring income inequality before and after the tax reductions are included in the income. The Gini coefficient is a summary (aggregated) measurement of income inequality. It is between 0 and 1, where higher Gini coefficient implies larger income inequality. A Gini coefficient of zero means that all income is evenly distributed, whereas a coefficient of one means that one person or household receives all income in the society. If the inequality, measured by the Gini coefficient are reduced by one per cent, this will be the same reduction of inequality as we would have achieved if we reduced everybody's income proportionally by one per cent – and distributed as an equal amount to everybody. This means that everybody with incomes above average give away more than they receive, while the ones with incomes less than average receive more than they give away (Aaberge 1997).

The Gini coefficients for 1995 are cited in table 6, whereas table 7 shows corresponding coefficients for 2030.[5]

Table 6 and 7 show that the inequality among old-age pensioners increases if the tax limitation rule is removed, while the inequality is reduced if the advantage of the low contribution to social security is removed. The low contribution to social security as well as the tax limitation rule have less effect on the difference in income in 2030 than in 1995. The old-age pensioners in the lower part of the income distribution have higher tax reductions from the low social security contribution in 2030 than in 1995 – since their incomes increased considerably in this period. The low social security contribution contributes therefore less to create inequality in the income distribution among the pensioners in 2030 than in 1995. The tax limitation rule will also have less effect on the

[5] The Gini coefficients are calculated with the use of a "inequality programme" developed by Rolf Aaberge and Tom Vennemo in Statistics Norway.

Table 6. Inequality in disposable income for different populations, 1995, measured by the Gini coefficient. Percentage change in relation to the present rules in parenthesis

	All special tax rules	Excluding social sec. contributions	Excluding tax limitation	Excluding special deduction	No special tax rules
Total population	0.280	0.279 (-0.4)	0.284 (1.4)	0.280 (0.0)	0.293 (4.6)
Old-age pensioners	0.204	0.195 (-4,4)	0.216 (5,9)	0.201 (-1.5)	0.224 (9.8)

Source: Statistics Norway.

Table 7. Inequality in disposable income for different populations, 2030, measured by the Gini coefficient. Percentage change in relation to the present rules in parenthesis

	All special tax rules	Excluding social sec. contributions	Excluding tax limitation	Excluding special deduction	No special tax rules
Total population	0.252	0.249 (-1.2)	0.254 (0.8)	0.252 (0.0)	0.256 (1.6)
Old-age pensioners	0.202	0.197 (-2.5)	0.207 (2.5)	0.204 (1.0)	0.212 (5.0)

Source: Statistics Norway.

income distribution among pensioners in 2030 as a result of the fact that several of the old-age pensioners have increased their income so much – that the rule will not any longer apply to them. For the special deduction the effect on the income differences is different for the two years. The effect is however quite insignificant in both 1995 and 2030.

The inequality among the old-age pensioners increases if all the tax advantages are removed, and the inequality increases more if only the tax limitation rule is removed. This can be explained by the fact that the low social security contribution and the special deduction are advantages that apply to all pensioners when the tax limitation rule is removed. Those who sorted under this rule – would without it gain advantages of a low social security contribution and a special deduction. When all three tax rules are applied – only pensioners with income above the limits to pay taxes according to the tax limitation rule – gain tax reductions from the low social security contribution and the special deduction.

The effects of the three tax rules on the income distribution for the entire population operate the same way as among the old-age pensioners, but the effects are smaller. The income distribution for the entire population will become more even from 1995 to 2030. This may inter alia be due to an increased portion of old-age pensioners, and that their income increase relative to other groups in the population. Since the old-age pensioners have a more even income distribution than the rest of the population, this contributes to the fact that the difference in income for the entire population is reduced.

Conclusion

Old-age pensioners have three special tax rules that result in lower taxes than for the economically active. In this article we have calculated these tax reductions and looked at the distribution effects. The main results are the following:

- Under the condition that the basic pension increases in step with wages the old-age pensioners will receive disposable income that on average will increase by 64 per cent from 1995 to 2030; on average the disposable income for the entire population will increase by 33 per cent in the same period without any wage increase.
- The average tax reduction for an old-age pensioner was NOK 11,700 in 1995 and will increase to NOK 13,200 in 2030 (both figures measured in 1999-NOK).
- The low social security contribution is most beneficial for old-age pensioners with the highest income, and contributes to increase income. The tax limitation rule gives most tax reductions to those with low incomes, and contributes to reduce the inequality in income among the old-age pensioners both in 1995 and 2030. The special deduction for age and disability is most beneficial for those with highest income in 1995, whereas those in the middle of the income distribution will have most tax reductions from the special deduction in 2030. The effect of the special deduction for income inequality among old-age pensioners is rather small.
- Altogether the three advantages offer greater equality in the income distribution among old-age pensioners both in 1995 and 2030. The effect of the special tax rules in the income distribution will be less from 1995 to 2030. This is due to a relatively

strong increase of income among old-age pensioners, something that will result in the fact that more old-age pensioners in the lower part of the income distribution get advantages from the lower contribution rate to social security. This contributes to create less inequality in income. At the same time the tax limitation rule will cover less old-age pensioners in 2030 than in 1995.

- The tax limitation rule is most favorable in regard to reduction of income inequality among old-age pensioners, but the effect will be less from 1995 to 2030. For those with the lowest income the tax reductions from this tax rule will increase from 1995 to 2030.

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Research publications in English
New titles

Social and Economic Studies

Nico Keilman, Dinh Quang Pham and Arve Hetland: **Norway's Uncertain Demographic Future.** SES 105, 2002. 90 pages.

The demographic future of any population is uncertain, but some of the many possible trajectories are more probable than others. Therefore, an exploration of the demographic future should include two elements: a range of possible outcomes, and a probability attached to that range. Together, these two constitute a prediction interval for the population variable concerned. This report presents the findings of a research project, the aim of which was to compute prediction intervals for the future population of Norway broken down by age and sex to the horizon 2050.

We estimate that the odds are four against one (80 per cent chance) that Norway's population, now 4.5 million, will number between 4.3 and 5.4 million in the year 2025, and 3.7-6.4 million in 2050. This illustrates that uncertainty increases with time. There is a clear trade-off between greater accuracy (higher odds) and higher precision (narrower intervals). Odds of 19 against one (95 per cent chance) result in a wider interval: 4.1-5.7 million in 2025, and 3.2-7.3 million in 2050. The probabilistic population forecasts of the youngest and the oldest age groups show largest uncertainty, because fertility and mortality are hard to predict. As a result, prediction intervals in 2030 for the population younger than 20 years are so wide, that the forecast is not very informative. International migration shows large prediction intervals around expected levels, but its impact on the age structure is modest. In 2050, uncertainty has cumulated so strongly, that intervals are very large for virtually all age groups, in particular when the intervals are judged in a relative sense (compared to the median forecast). According to our statistical model, the expected accuracy of the total population size forecast published by Statistics Norway is somewhat below two-thirds on the long run, and a little above that level on the short run.

The results have been obtained on the basis of stochastic simulation of each of the three components of population change; fertility, mortality, and international migration. Simulation of the components relied heavily on three complementary methods:

- time series analysis for the historical development of key demographic indicators, such as the TFR, the life expectancy, and numbers of immigrants and emigrants;
- an analysis of historical forecast errors, assembled on the basis of forecasts produced by Statistics Norway since 1969;
- and finally expert judgement, which was used, for instance, to restrict the prediction interval for the TFR or that for the numbers of immigrants and emigrants to a reasonable range.

The predictions for each component were calibrated in such a way that the median coincided with the Medium Variant value of the 1999-based official population forecast of Statistics Norway.

The time series predictions indicated that assumptions on future TFR as employed by Statistics Norway in its official population forecasts have estimated coverage probabilities of only 46, 31, and 24 per cent in the years 2010, 2030, and 2050. The official mortality (i.e. life expectancy) assumptions have higher expected accuracy in 2050 (just over 60 per cent), but lower accuracy in the beginning of this century (just over a third in the period 2000-2010).

Reports

Lasse Sigbjørn Stambøl: **Qualification, mobility and performance in a sample of Norwegian regional labour markets.** Reports 2002/6, 2002. 46 pages.

This report presents an analysis of structural change and differing performance of local labour markets in Norway in the 1990s broken down into two periods representing recession and economic upswing respectively. The performance of regional labour markets is basically analysed in three settings. Firstly performance is investigated through the ability of the local labour market to adapt to and facilitate structural change in the local economy by use of some specified labour market mobility measures. Secondly the ability to increase the input of, and the returns to human capital investments in different sectors of the regional economy is analysed by using changes in average educational levels, and changes in incomes. Finally we discuss how the local labour markets perform through different activation rates to employment, both from gross streams within the local labour markets, and through job recruitment from net internal migration. Most local labour market mobility measures are compared with their corresponding national average measures. The analysis is limited to a sample of nine Norwegian labour market regions.

Gross labour market mobility and local cross sector exchange generally grew from the trough of recession years at the beginning of the 1990s up to a peak during the economic upswing period of 1996-97. Whilst central regions experienced a "brain-drain" through the migration process during the recession period, this situation was clearly reversed during the upswing period. The local mobile employed exhibited a significantly higher income growth compared with the non-mobile employed, and employed migrants showed an even higher increase in income than the local mobile employed. The analysis does not reveal a clear tendency of better general local performances within larger regional labour markets compared to that of medium sized and smaller regional centres. This is due to the fact that highly competitive job-migrants contributed significantly to total regional labour market performance, and particularly in some of the most central regions.

Discussion Papers

Rolf Aaberge: **Characterization and Measurement of Duration Dependence in Hazard Rate Models.** DP no. 319, 2002. 29 pages.

As is known from the economic literature, the notion of negative/positive duration dependence defined in terms of a decreasing/increasing hazard function can solely be used as a basis for revealing whether negative/positive duration dependence is present or not. However, when concern is directed to comparison and measurement of the extent of duration dependence in duration distributions alternative definitions and methods are called for. To this end we propose a stronger as well as a weak-

er version of the standard definition of duration dependence and demonstrate that these definitions form a useful basis for developing appropriate duration dependence orderings and summary measures of duration dependence.

Øystein Døhl: **Energy Flexibility and Technological Progress with Multioutput Production. Application on Norwegian Pulp and Paper Industries.** DP no. 318, 2002. 38 pages.

We analyse the energy flexibility and technological change in the pulp and paper industry by applying a multi-output production function. The pulp and paper industry mostly consists of heterogeneous firms. They produce a wide range of different goods with different technologies. We take the heterogeneity into consideration in two ways. First, we disaggregate the industry into three sub-sectors according to their products. Second, in each sub-sector our model accounts for the heterogeneity between firms. We apply a specific flexible cost function, which makes sure that the curvature conditions hold. In our model, the energy flexibility occurs in different ways. On one hand producers may invest in technologies, which make them able to switch between different energy sources. On the other hand they can change their output mix towards less energy intensive products when the energy prices increase.

Erik Biørn and Terje Skjerpen: **Aggregation and Aggregation Biases in Production Functions: A Panel Data Analysis of Translog Models.** DP no. 317, 2002. 40 pages.

An applied econometric study of aggregation, based on an unbalanced panel data set for manufacturing plants is presented. Panel data are informative in examining aggregation of variables, parameters, and relationships empirically since they (i) allow estimation at both the micro and the macro level, and (ii) enable comparison of the time series properties of the exactly aggregated micro relationships with those obtained by performing aggregation by analogy. Numerical aggregation of Translog production functions for three manufacturing industries is considered. We show, under linear aggregation of inputs and output, that departures between geometric and arithmetic means of the inputs and correlation between the log-inputs, both their levels and time paths, contribute substantially to aggregation biases in the output volume and instability of the derived input and scale elasticities. Hence, the existence and stability of an approximate "macro Translog production function" over time can be questioned.

Annegrete Bruvoll and Karine Nyborg: **On the value of households' recycling efforts**. DP no. 316, 2002. 21 pages.

Do households' recycling efforts represent a social cost, which should be taken into account in cost-benefit analyses of alternative waste treatment systems? Some argue that it should not, since recycling efforts are to a large extent voluntary. We demonstrate that if the government can indirectly increase voluntary recycling efforts through appeals to the public or through similar means, then the use of these means does impose a cost on households. This cost can be higher or lower than the environmental gain resulting from the increased recycling. Norwegian data indicates a willingness to pay to let others take over the individual's sorting of household waste corresponding to a cost of about USD 87 per tonne, which is significant compared to the total treatment costs.

Tom Kornstad and Thor O. Thoresen: **A Discrete Choice Model for Labor Supply and Child Care.** DP no. 315, 2002. 28 pages.

A discrete choice model for labor supply and child care for mothers of preschoolers is presented. The mothers are assumed to make choices from a finite set of job possibilities and from a finite set of child care options. The options in the markets for child care are characterized by opening hours, fees and a number of quality attributes, such as mode of care. Similarly, jobs are characterized by a (fixed) wage rate, working hours and a number of variables related to job satisfaction. In the estimation of the model we take into account that the number of options available might vary across work/care combinations, and that some mothers are rationed in the market for care at day care centers. The model is employed to simulate the female labor supply effects of the Norwegian home care allowance reform

Reprints

John K. Dagsvik: **Discrete Choice in Continuous Time: Implications of an Intertemporal Version of the IIA Property.** Reprint no. 217, 2002. 15 pages.

Reprint from Econometrica, Vol. 70, No.2, March 2002, 817-831.

Brita Bye: **Taxation, Unemployment, and Growth: Dynamic Welfare Effects of "Green" Policies.** Reprint no. 216, 2002. 19 pages.

Reprint from Journal of Environmental Economics and Management, Vol. 43, 2002, 1-19.

John K. Dagsvik, Tom Wennemo, Dag G. Wetterwald and Rolf Aaberge: **Potential demand for alternative fuel vehicles.** Reprints no. 215, 2002. 24 pages.

Reprint from Transportation Research Part B, 36, 2002, 361-384.

Helge Brunborg: **Contribution of statistical analysis to the investigations of the international criminal tribunals.** Reprints no. 214, 2002. 12 pages.

Reprint from Statistical Journal of the United Nations Economic Commission for Europe, 18, 2001, 227-238.

Documents

Torstein Arne Bye: **Climate Change and Energy Consequences.** Documents 2002/9, 2002. 15 pages.

Although the relationship between economic growth and pollution is not simple, increased production and consumptions seems to be an important drag factor for environmental problems. Economic modeling of these links, description of climate impacts and policy analyses of economic instruments to decouple the link is highly presented in the literature. Except from fossil fuels and nuclear energy, most of the primary energy sources are captures directly from short-term natural conditions. An interesting climate change factor that is not debated in the literature then is the link between climate change and primary energy supply. This is the background for this paper taking into account that Norway is a country not only filled up of fossil fuels but also capturing a lot of energy from the water falls and having a big potential in the forests, the long coast (wind) and large areas (sun etc.).

Randi Kjeldstad and Marit Rønsen: **Welfare Rules, Business Cycles and the Employment of Single Parents.** Documents 2002/7, 2002. 24 pages.

In spite of the frequent focus on work and welfare among single parents, surprisingly little has been known of their actual labour market attachment over time. In this article we use a specially prepared data set from the Norwegian Labour Force surveys to illuminate the labour force participation of single parents - mothers as well as fathers - since the 1980s. As a contrast, the development of single parents is compared to the development among married and cohabiting parents. Two conditions are assumed to be of particular significance to the labour force participation of single parents; on the one side changes in welfare benefit regulations, and on the other side changing macro-economic labour market conditions. The analysis shows that both conditions are significant, the latter however more so than the former. It appears therefore, that favourable economic conditions in the labour market are more likely than stringent welfare rules to lead to savings in public welfare expenditures on single parents.

Bengt J. Eriksson, Anne B. Dahle, Ronny Haugan, Lars Einar Legernes, Jogeir Myklebust and Erik Skauen: **Price Indices for Capital Goods. Part 2 - A Status Report.** Documents 2002/6, 2002. Sidetall 91.

The project "Price Indices for Capital Goods - Part One" started at Statistics Norway in early 1998. The project was partly financed by Eurostat and aimed at studying how the products labelled "capital goods" had been treated concerning price statistics in different countries. The analysis was of the descriptive kind and ended with suggestions on how to treat the problems in this area in a new project with normative ambitions. The results from "Part one" are presented in Lunde, Røgeberg and Sandberg (2000).

In late 1999, the part two of the project started. This report provides a status for the work done in this area. In addition - another reason for writing this document has been to share the findings with a broader audience, especially at Statistics Norway. The intention is to improve the quality in the price statistics and in the national accounts at Statistics Norway. The report also points out some general statistical problems, common to all smaller country.

Pål Boug, Ådne Cappelen and Anders Rygh Swensen: **Expectations and Regime Robustness in Price Formation: Evidence from VAR Models and Recursive Methods.** Documents 2002/5, 2002. 46 pages.

The forward-looking linear quadratic adjustment cost (LQAC) model has received attention when modelling prices. Empirical evidence supporting the model seems, however, ambiguous. This paper evaluates the empirical performance of the LQAC-model using Norwegian export price data within a VAR framework. We find that the LQAC-model is severely at odds with the data and that a conditional equilibrium correction (EqCM) model explains the export price behaviour more accurately both from a statistical and an economic point of view. Our findings may rule out a large class of expectations based models and not just the particular LQAC-model in the formation of export prices. We also demonstrate that the EqCM-model performs well post-sample despite the fact that monetary policy in Norway has changed from a fixed to a floating exchange rate regime following a recent introduction of inflation targeting. This regime robustness shows that the Lucas critique lacks force empirically in the problem at hand.

Roger Bjørnstad, Ådne Cappelen, Inger Holm and Terje Skjerpen: **Past and Future Changes in the Structure of Wages and Skills.** Documents 2002/4, 2002. 45 pages.

The Norwegian labour market is characterized by a compressed wage structure and low unemployment. We show that these features have been the case in spite of significant technological changes that favours demand for skilled labour. Using a large scale macroeconometric model we analyse to what extent this favourable development will continue and how the composition of the labour force by skills will influence wage dispersion and unemployment for various groups in the present decade.

Roger Bjørnstad: **The Major Debates in Macroeconomic Thought - a Historical Outline.** Documents 2002/2, 2002. 22 pages.

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