

# Economic Survey

Volume 13

# 2/2003

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## Economic Survey

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***The next edition of Economic Survey will be published at the end of September 2003.***

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# Economic trends

In the past few years, the Norwegian economy has experienced a period of relatively moderate growth in domestic demand. Output has shown even weaker growth as a result of sluggish international developments and a loss of market shares due to a sharp rise in domestic costs and a strong krone. Fiscal policy has not made any considerable discretionary contribution to growth, even though automatic stabilizer mechanisms have led to an increase in the non-oil government budget deficit. Monetary policy has had a contractionary effect via high real interest rates and a wide interest rate differential against other countries, which contributed to the appreciation of the krone.

Over the last year, output growth appears to have come to a halt. At the same time, a tight monetary stance has led to a marked fall in inflation. Underlying inflation, as measured by the year-on-year rise in the CPI-ATE, was 1.2 per cent in May, markedly lower than the inflation target of 2.5 per cent. Unemployment has continued to rise, and manufacturing profitability is very weak. This has also contributed to a marked fall in wage growth.

Over the past half-year, this has led to a pronounced shift in monetary policy. Norges Bank has lowered its key rate by 2 percentage points, and money market rates have fallen to an even greater extent. Further interest rate cuts are expected ahead, with a marked narrowing of interest rate differentials between Norway and other countries. The krone has depreciated considerably in line with these developments, and the krone has fallen in value against the euro to a level that is now close to that prevailing during the days of the fixed exchange rate regime. The US dollar – and currencies that more or less shadow the dollar – has depreciated in the same period against the euro, however. The effective krone exchange rate therefore remains stronger than when the krone started to appreciate.

The shift in monetary policy has had little impact on developments in the real economy thus far in 2003. For 2003 and 2004 as a whole, the easing of monetary policy is expected to boost economic growth, because the interest rate cuts will stimulate domestic demand and the depreciation of the krone – combined with lower wage growth – will limit Norwegian enterprises' loss of market shares. Moreover, global growth is expected to pick up. Unemployment will continue to rise through the remainder of the year and into next year, but at a somewhat slower pace than projected earlier. Unemployment may then fall in 2005, even though output growth is expected to be somewhat lower again.

Underlying inflation will remain relatively low in the short term, but will gradually approach the inflation target over the next two years, primarily owing to higher import prices as a result of a weakening of the krone. Consequently, the decline in interest rates is assumed to be partly reversed through the winter 2004-2005, in line with an assumed corresponding reversal in international interest rates. The krone is assumed to remain at 8.20 against the euro throughout the projection period.

However, there is still considerable uncertainty. In the short term, the main element of uncertainty is linked to the assumption concerning a clear pick-up in growth in the US economy. Both fiscal and monetary policy are generating considerable impulses to the US economy. The euro area – unlike Norway – has chosen a non-cyclically adjusted budget measure for fiscal policy, which leaves little room for any substantial fiscal stimulus. For the large countries, it is more likely that a fiscal tightening will be necessary in spite of the downturn. Monetary conditions in the euro area will probably be eased somewhat, but still with a lag and hardly to an extent that is sufficient to counter the effects of the appreciation of the euro against the dollar. In the longer term, the uncertainty for Norway is primarily linked to petroleum activity. We assume that petroleum investment will show a marked fall through 2004 and into 2005. Petroleum activity has made a highly positive contribution to growth in the Norwegian economy over the past 30 years. A scaling back of investment activity in the years ahead may therefore result in a comparable negative contribution to growth. On the other hand, historically there has been a clear tendency for estimates for petroleum investment to be revised upwards as the realisation date approaches.

\* Translated from Økonomiske analyser 3/2003 by Janet Aagenæs and Helle Snellingen.

## International economy

Global economic developments are weak. GDP growth is still low and unemployment is increasing on both sides of the Atlantic. High oil prices and considerable uncertainty in the period preceding the war in Iraq may have placed a damper on economic activity in the first quarter, but there are few signs of an upturn so far in the second quarter. As a result of a slower rate of inflation in both the euro area and in the US, the risk of deflation has increased in many countries, although the IMF still considers the risk of general deflation to be limited. In Germany, however, this risk is considered to be fairly substantial, and in Japan prices have fallen over the past four years. On the positive side, equity markets have picked up since the beginning of March, and oil prices have dropped. Geopolitical uncertainty has been reduced since the war in Iraq, but fears of terrorism and SARS are still constraining trade and tourism.

The US economy showed unsteady developments in 2002, and growth has been subdued in the last two quarters. Household consumption is still making a positive contribution, but growth has slowed. Investment declined in the first quarter this year. Unemployment is still rising, and has now passed 6 per cent. An expansionary economic policy has boosted growth, but large government budget deficits are a cause of concern. Monetary policy leeway has also been reduced. The imbalances in the US economy are a source of uncertainty concerning developments in the somewhat longer run. The probability of an imminent upturn in the US economy is now considered to be less than when our last report was published in March. It is assumed, however, that growth will pick up next year.

In the euro area, economic activity is still subdued, and Germany in particular is struggling with sluggish growth. Low inflation will contribute to higher real disposable income which along with low interest rates will underpin household consumption. A weak labour market environment points to the opposite, and may reduce consumption growth. Increased stimulus from fiscal policy is not expected in the period ahead. The appreciation of the euro is having an adverse impact on competitiveness and is reducing the potential for an export-led upturn. It is assumed that growth will edge up somewhat next year.

The Japanese economy is still struggling. It does not appear that domestic demand is generating higher growth, and appreciation tendencies since the end of 2002 are having an adverse impact on export industries. Unemployment is at a record-high level and rising, prices are moving down for the fifth consecutive year and GDP growth is close to zero.

### Developments in the oil market

The spot price of Brent Blend fell from about USD 34 per barrel in mid-March to USD 24 per barrel at the end of April. The oil price has edged up since then, and stood at about USD 27 in mid-June. As an average for the first five months of the year, the price has been a little less than USD 30 per barrel, compared with about USD 25 in 2002.

The most important reason for the fall in oil prices through March and April was the resolution of the conflict in Iraq with the toppling of the former regime in a relatively short time. Fears of a prolonged war and the possibility that oil production in other countries in the region would be affected were thereby removed.

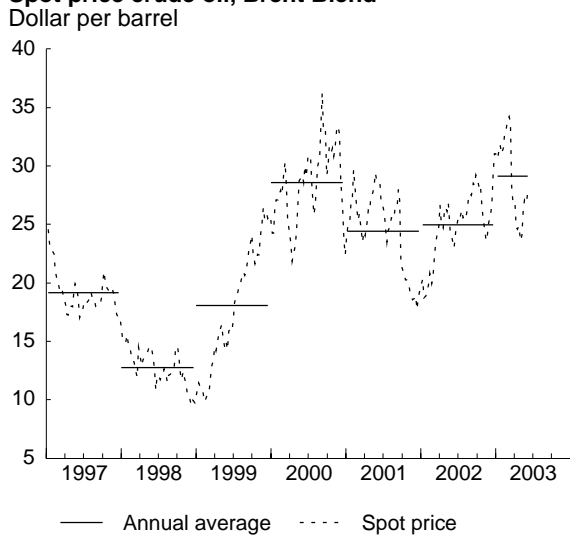
So far this year, OPEC has decided to increase production three times, by a total of 3.7 million b/d. This was partly to compensate for the halt in Iraqi exports of a little less than 2 million b/d. In addition, production in Venezuela was lower, particularly in the first quarter, as a result of unrest in connection with the strikes in December last year and January 2003. This affected oil exports to the US, and as a result US stocks of crude oil in January were at their lowest level for 27 years.

At the moment, Iraq is not covered by OPEC's quota system. Even though UN sanctions against Iraq have now been lifted, it is uncertain to what extent the country will manage to increase exports this year. If it is assumed that OPEC and Iraq maintain their production at a constant level in the period ahead, global stocks of crude oil may increase by more than 2.5 million b/d in the second and third quarters combined. This is a period when stocks in the OECD area usually increase by between 0.5 and 1 million b/d, first to replenish stocks of petrol for the summer season and then to ensure that supplies of heating oil are sufficient for the winter.

According to the International Energy Agency, stocks of crude oil and petrol in the OECD are now at their lowest level for more than 5 years. In particular, many analysts point to the low level of petrol stocks in the US prior to the driving season in coming months. It therefore appears that oil prices may remain high in the period ahead, while stocks of crude oil and finished products will be restored to normal levels.

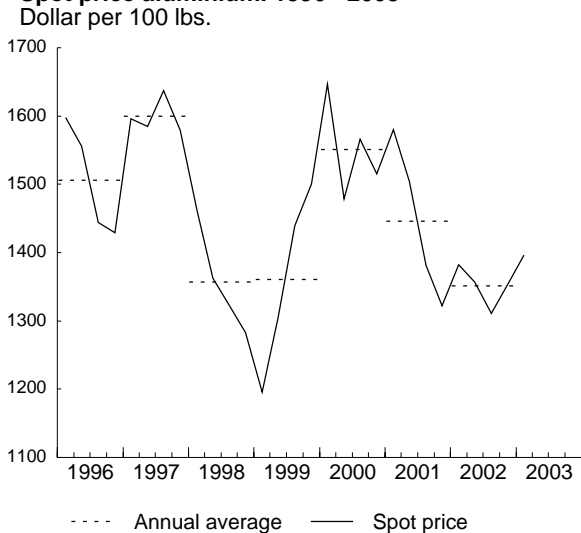
When stocks increase later in the second half of 2003, it is likely that OPEC will have to cut production to prevent the price from falling below the desired interval of USD 22-28. Irrespectively, oil prices have been

**Spot price crude oil, Brent Blend**



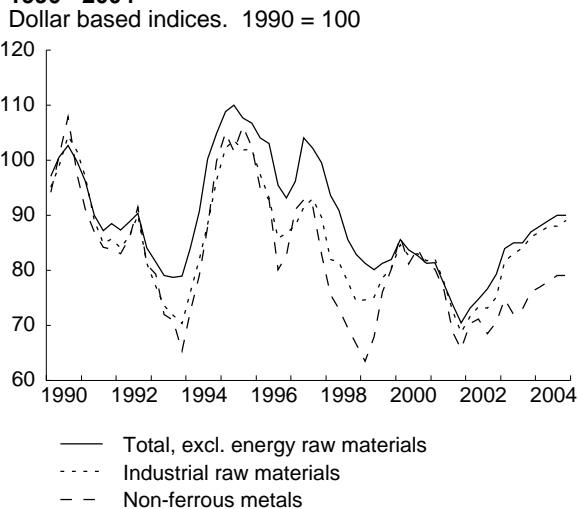
Source: Norges Bank.

**Spot price aluminium. 1996 - 2003**



Source: IMF.

**Commodity prices on the world market 1990 - 2004**



Sources: HWWA-Institut für Wirtschaftsforschung and AIECE.

particularly high over a longer period this year, and it appears that the average price for 2003 as a whole may be in the upper interval of OPEC's price band.

If it is assumed that in the next two years Iraq does not manage to increase production to a level that is significantly higher than the pre-war level, and that the cartel does not lose market shares to other producers, OPEC is likely to succeed in keeping the oil price within its price band. An oil price of USD 25 per barrel has been assumed throughout the projection period.

**Other commodity prices**

Commodity prices rose sharply in the first quarter. Measured in dollar terms, HWWA's commodity price index rose by 13 per cent from the previous quarter. Most of the rise in prices is ascribable to the increase in oil prices. The index for commodity prices, excluding energy products, rose by 6 per cent in the same period. This must be seen in connection with the sharp depreciation of the dollar against the euro. Measured in euros, the commodity price index rose by 6 per cent, and excluding energy products it fell by 2 per cent. The fall in oil prices in the wake of the war in Iraq has since pushed down commodity prices, towards the level prevailing last autumn, measured in dollars, and somewhat more measured in euros.

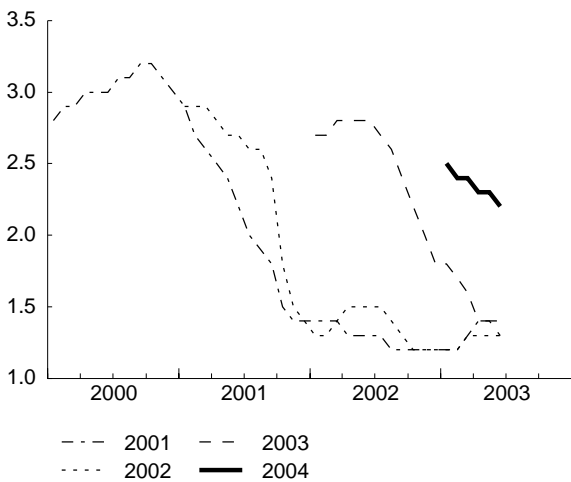
Aluminium prices moved on a sluggish trend through most of 2002, but rebounded in the fourth quarter and at the beginning of 2003. Growing geopolitical uncertainty contributed to stockbuilding and rising prices. Prices fell prior to the war in Iraq, but picked up again afterwards, and at the beginning of June were at approximately the same level as in February this year. It has been assumed that aluminium prices will remain at approximately the current level until end-2003, measured in dollar terms, and then edge up next year as a result of a pick-up in global demand.

**US**

Following the trough year 2001, with close to zero annual growth, growth edged up in 2002. However, developments were unsteady, and there are few signs that a new period of vigorous growth, as in the 1990s, is imminent. The first quarter of 2003 was the second consecutive quarter of GDP growth below 2 per cent. Growth was restrained by uncertainty, low consumer and business confidence in the economy and high oil prices. The sluggish developments appear to have persisted in the second quarter. Figures from the Bureau of Economic Analysis indicate that productivity growth is moving down.

Household consumption has been the most important growth factor during the period of sluggishness in the US economy over the last few years. In conjunction with high housing investment, this has contributed to high household debt. A sharp rise in house prices has

### GDP growth forecasts for Norway's main trading partners for 2001 - 2004 given on different dates



Source: Consensus Forecasts.

also given rise to concerns that a price bubble is developing in the housing market. Growth in consumer spending has been relatively low in the last two quarters, and purchases of consumer durables have fallen for two consecutive quarters. A weak labour market and high debt point to moderate consumption growth ahead. Unemployment has now passed 6 per cent, the highest level since 1995.

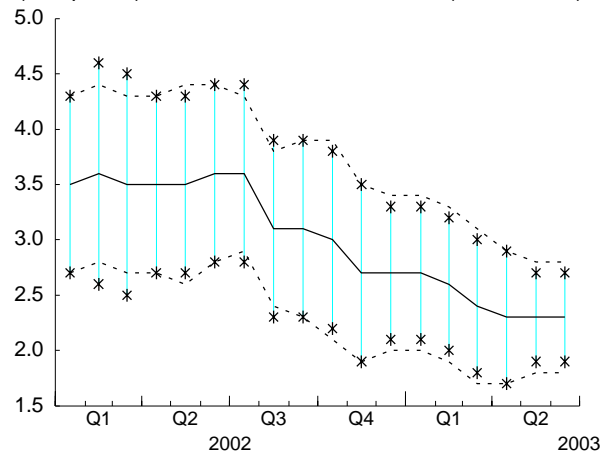
The weak economic environment is also reflected in industrial output, which fell in both March and April. Investment growth slowed through 2002, but rose slightly in the fourth quarter of last year. In the first quarter of 2003, investment fell by 3.3 per cent. Investment in machinery was the component that showed the most pronounced decline, while housing investment continued to make a positive contribution. The Bureau of Economic Analysis estimates that IT equipment has a life of less than four years, and a large share of the equipment acquired prior to the transition to the new millennium is ripe for replacement. This may contribute to a pick-up in investment in the period ahead.

Oil prices have fallen this spring and are expected to remain at approximately the current level in the period ahead. Both petrol prices and heating oil prices are moving down, which will benefit households, manufacturing and the transport industry. Equity prices have also increased in recent months. The S&P 500 index has risen by about 20 per cent since the beginning of March.

The imbalances in the US economy are fuelling concerns. The large government budget and current account deficits are not sustainable in the long term, but it appears that they will persist over the next few years. Reversing the government budgets now would entail an undesired tightening of fiscal policy. If there is a lack of confidence in fiscal policy, the expansion-

### GDP growth forecasts for the US for 2003 at different points in time

Average forecast (solid line) with +/- 2 standard deviation (star points) and +/- 2 "normal" deviation (dashed line)



Source: Consensus Forecasts.

ary effect might be offset by higher saving and reduced household consumption.

The US dollar has depreciated sharply since the beginning of 2002. On a trade-weighted basis, it depreciated by about 18 per cent, and by 32 per cent against the euro. In mid-June, one euro cost about USD 1.18. It is assumed that the dollar will remain at this level against the euro through the projection period. The depreciation of the dollar may partly be ascribed to the current account deficit and low interest rates. A weaker dollar will in the longer term contribute to higher exports and reduced imports, and to an improvement in the balance of trade. Higher foreign demand for US goods and services may help to sustain overall demand if household consumption declines. More expensive imports will also contribute to holding up the rise in prices, but may in the short run increase the trade deficit.

The year-on-year rise in prices was 2.2 per cent in April 2003. Core inflation, which has eased since the end of 2001, was 1.5 per cent. The IMF considers the risk of deflation in the US to be low. Interest rates in the US are now at their lowest level in more than 40 years. Since winter 2001, the key rate has been reduced from 6.5 to 1.25 per cent. The Federal Reserve has also supplied liquidity by buying bonds, and long rates are now at a record-low level. The depreciation of the dollar also entails an easing of monetary policy. There is still room for monetary policy relaxation – short rates can still be reduced somewhat and additional liquidity can be supplied to the market – but the Federal Reserve's scope for manoeuvre is now limited.

The recovery following the recession in 2001 has taken a longer time to materialize than expected. Sluggish growth so far this year shows that the turnaround has not taken hold. We do not expect a pro-

**Macroeconomic projections according to selected sources**

Annual change in per cent

	GDP-growth						Inflation (consumer prices)					
	1999	2000	2001	2002	2003	2004	1999	2000	2001	2002	2003	2004
<b>USA</b>												
NIESR	4.1	3.8	0.3	2.4	2.5	3.5	1.6	2.5	2.0	1.4	2.0	2.0
ConsF	4.1	3.8	0.3	2.4	2.3	3.6	2.2	3.4	2.8	1.6	2.4	2.0
EC	4.1	3.8	0.3	2.4	2.4	2.5	2.2	3.4	2.8	1.6	2.0	1.7
OECD	4.1	3.8	0.3	2.4	2.5	4.0	2.2	3.4	2.8	1.6	2.4	1.7
<b>Japan</b>												
NIESR	0.8	2.4	0.4	0.3	0.8	0.5	-0.5	-1.1	-1.5	-1.5	-0.7	-0.1
ConsF	0.8	2.4	0.4	0.3	0.8	0.8	-0.3	-0.7	-0.7	-0.9	-0.6	-0.6
EC	0.7	2.4	0.4	0.3	1.5	1.3	-0.3	-0.7	-0.6	-0.9	-0.6	-0.7
OECD	0.7	2.6	0.4	0.3	1.0	1.1	-0.3	-0.7	-0.7	-0.9	-0.9	-1.0
<b>EMU</b>												
NIESR	2.8	3.5	1.4	0.8	1.2	1.9	1.2	2.2	2.5	2.3	1.6	1.2
ConsF	2.8	3.5	1.4	0.8	1.0	2.0	1.1	2.2	2.7	2.3	2.0	1.6
EC	2.8	3.5	1.5	0.9	1.0	2.3	1.1	2.4	2.5	2.2	2.1	1.7
OECD	2.8	3.6	1.5	0.9	1.0	2.4	1.1	2.4	2.5	2.4	2.0	1.6
<b>Trading partners</b>												
NIESR	3.0	3.6	1.3	1.3	1.3	2.1	1.2	1.8	2.1	1.9	1.5	1.2
ConsF	3.1	3.5	1.3	1.3	1.4	2.3	1.3	2.2	2.5	2.0	2.1	1.8
EC	3.1	3.5	1.3	1.3	1.4	2.3	1.2	2.0	2.4	1.9	2.0	1.6
OECD	3.1	3.5	1.3	1.3	1.4	2.5	1.4	2.1	2.5	2.1	2.0	1.6

Sources: NIESR, EC and OECD from April and Consensus Forecasts from May 2003 . All the inflation projections from the NIESR apply to the consumption deflator.

nounced upturn in the US economy in the near future, but assume that growth will pick up next year. This is consistent with the projections in Consensus Forecasts.

**Europe**

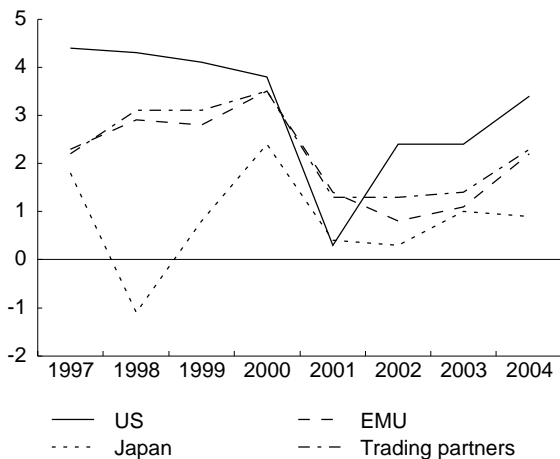
Economic developments remain weak in the euro area and there are few signs that a turnaround is imminent. Competitiveness has deteriorated as a result of the appreciation of the euro. A slower rate of inflation will contribute to higher real disposable income, which combined with low interest rates will underpin household consumption. Unemployment has continued to edge up and stood at 8.7 per cent in March. The sluggish labour market may dampen household demand.

The public budget deficit for the euro area as a whole rose to 2.2 per cent of GDP in 2002, against 1.6 per cent in 2001. The EU Commission projects a further increase, to 2.5 per cent, this year. Sluggish economic developments have contributed to the increase, but the structural deficit, which reflects the budget balance adjusted for cyclical factors, also increased according to calculations from the EU Commission. The increase in the structural deficit may in particular be ascribed to Germany and France. Along with Portugal, these countries are set to exceed the Stability and Growth Pact's budget deficit ceiling of 3 per cent of GDP. Italy is also at risk. The Stability and Growth Pact will limit the possibilities for a more expansionary fiscal policy in most euro area countries in the period ahead.

The European Central Bank has emphasized that its goal is an inflation rate that is close to the upper limit of the inflation target, which is 0-2 per cent, in order to have a buffer against deflation. Inflation has been above the target for some time, but is now moving down to less than 2 per cent. The subdued rise in prices in the service sector and non-energy-intensive manufacturing sectors has been offset by a sharp rise in energy prices. Lower oil prices in the wake of the war in Iraq, weak global growth and the strong appreciation of the euro are now pushing down inflation, and fears that the euro area will be facing deflation have increased this spring. The rise in prices varies considerably across member states. In Germany, inflation is low and it appears that it may fall further. Inflation in other countries, such as Portugal and Ireland, has been appreciably higher than the target for some time, but has also been edging down in these countries over the past six months.

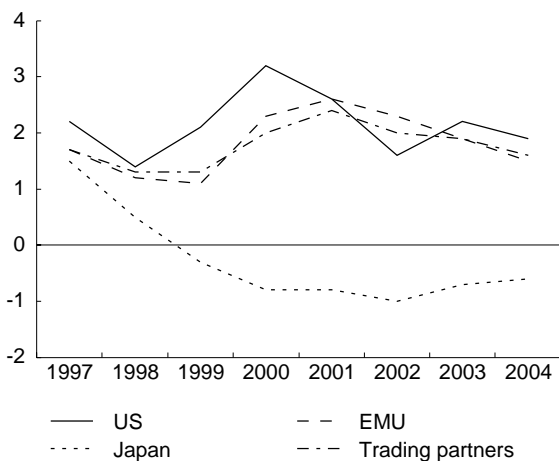
The sharp appreciation of the euro is having an adverse impact on the internationally exposed sector. Competitiveness has particularly deteriorated against the US and countries that have pegged their currency to the US dollar, such as China and to some extent Japan, but also against the UK. The appreciation is also increasing the risk of deflation through lower import prices. The European Central Bank has reduced its key rate by a total of 1.25 percentage points since December 2002, most recently by half a percentage point on 5 June. The key rate is now 2 per cent. The appreciation of the euro has negated a large part of the easing of monetary conditions provided by the

**GDP growth for the US, Japan, the euro area and Norway's trading partners**



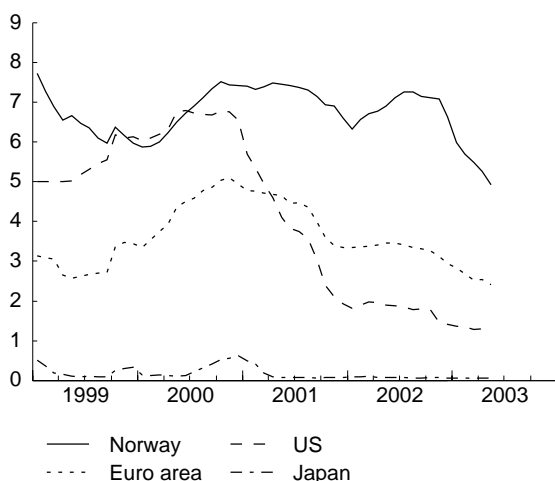
Sources: Average of projections from the NIESR in April 03, CF in May 03 and the EC and the OECD in April 03.

**Consumer price inflation for the US, Japan, the euro area and Norway's trading partners**



Sources: Average of projections from the NIESR in April 03, CF in May 03 and the EC and the OECD in May 03.

**International interest rates  
3-month Eurorate**



Source: Norges Bank.

interest rate cuts so far. Interest rates may therefore be reduced further in the period ahead.

In *Germany*, GDP contracted by 0.2 per cent in the first quarter after having stagnated in the fourth quarter of 2002. Compared with one year earlier, GDP expanded by 0.5 per cent. Retail trade fell in April, reflecting low consumer spending as a result of heightened uncertainty in the labour market and rising unemployment. Industrial output remains weak. Capacity utilization is low and an upswing in investment has not materialized. Unemployment continues to rise, reaching 10.7 per cent in May. Consumer and business confidence in the economy is low. The appreciation of the euro is affecting exports from the euro area and weakening the business sector's competitiveness. Domestic demand is also soft. Inflation is subdued and the appreciation of the euro will contribute to a low rate of inflation in the period ahead. Consumer prices fell by 0.1 per cent from April to May. The year-on-year rise in prices was 0.8 per cent. If the German economy experiences a deflationary spiral, there is a considerable risk of contagion effects on the rest of the euro area. The IMF considers the risk of deflation in Germany to be high.

The restructuring capacity of the German economy has proved to be limited during the international downturn. The need for structural reforms seems obvious, but it has proved difficult to gain acceptance for reforms both internally in the Government and in the Bundestag. Chancellor Gerhard Schröder has now managed to gain the backing of the Social Democrats for a proposal, called Agenda 2010, in which key points include cutbacks in social security schemes, such as sick pay and unemployment benefits, and a relaxation of job-protection rules. Such reforms may have an expansionary effect in the longer term without weakening government budgets. The proposals are to be deliberated in the Bundestag and Bundesrat in the near future, but have encountered considerable resistance, particularly from the trade unions. The probability that the reforms will be approved this year has increased, but the proposals may be watered down.

Large government budget deficits and high government debt are placing constraints on fiscal policy. The downturn has weakened the budget balance further as a result of reduced tax revenues and higher expenditure on unemployment benefits. Germany may breach the Stability and Growth Pact for the second consecutive year by exceeding the budget deficit ceiling of 3 per cent of GDP. Interest rates in the euro area have not been adapted to the cyclical situation in Germany and have contributed to sluggish growth and low inflation. The outlook is still weak, and GDP growth is set to be less than 1 per cent for the third consecutive year.



Germany accounts for one third of the euro area economy and is an important trading partner for most countries in the region. Sluggish growth thus has negative spillover effects on the rest of the euro area. Higher international demand is essential if growth is to pick up, but the appreciation of the euro is reducing the potential for an export-led recovery. 2003 is expected to be another year of weak growth in the euro area, but we assume that activity will pick up somewhat next year.

The *UK* has recorded higher economic growth than the euro area throughout the international downturn. Unemployment has remained low, down towards 3 per cent in the last two years. Buoyant household consumption, fuelled by the sharp rise in house prices, combined with public demand has been the most important driving force. However, growth has slowed somewhat since the beginning of the year, partly reflecting weak global demand and more moderate growth in consumer spending. The rise in house prices also appears to be slowing, which may contribute to curbing household consumption in the period ahead. Government spending will underpin domestic demand over the next few years. The authorities are planning to invest heavily in such sectors as health, education and transport.

Inflation has moved up since last summer. Towards the end of 2002, it exceeded the inflation target of 2.5 per cent, and passed 3 per cent in the first quarter. This largely reflects rising house rents and oil prices. Oil prices have since declined and the rise in house prices has abated somewhat in recent months. The pound has depreciated sharply since the beginning of the year, by about 9 per cent against the euro and 6 per cent on a trade-weighted basis. The depreciation will push up inflation through higher prices for imported goods. Lower consumption growth will have the opposite effect. Manufacturing has been struggling with weak productivity and developments in this sector have been unfavourable over a longer period. However, the depreciation of the pound will result in improved competitiveness, which will improve the outlook for manufacturing industry.

Like the *UK*, *Sweden* and *Denmark* have fared better than most countries in the euro area. In Sweden, sluggish international developments have led to falling exports, but private and public demand has helped to fuel growth. Investment exhibited a weak trend towards the end of 2002, but the projected upswing has not yet materialized. Following a period of high inflation as a result of a sharp rise in oil and electricity prices, inflation has been moving down since February, and the Swedish central bank reduced its key rate by 0.5 percentage point, to 3 per cent, on 4 June. GDP growth has also slowed in Denmark. Unemployment has risen from 5 to 5.8 per cent over the past year.

Competitiveness has deteriorated as a result of the appreciation of the Danish krone, which shadows the euro. In conjunction with low global demand, this is weakening the outlook for growth.

### **Japan**

The Japanese economy is still struggling. Prices have fallen over the last four years, and GDP growth is marginally positive. Domestic demand is not sufficient to generate higher growth. The Japanese central bank has intervened in the foreign exchange market repeatedly to prevent an appreciation of the yen against the US dollar, which particularly affects exports of cars and electronics to the US. The yen has nevertheless strengthened since the end of 2002. Structural problems in the financial sector and the labour market are still unresolved. Weak growth and a continued fall in prices are expected in the period ahead.

## Norwegian economy

Over the past year, output growth in the Norwegian economy appears to have come to halt. According to the quarterly national accounts (QNA), mainland GDP fell both in the fourth quarter of last year and the first quarter of this year, and the fall followed an underlying decline also during the preceding half-year. Low electricity production through the winter this year owing to low water reservoir levels is part of the explanation. Excluding electricity production, growth was still negative for total mainland output. The decline in output also applied to manufacturing, other

goods producing industries and the public sector. Only the private service sector exhibited growth.

The weak growth in output must be seen against the background of the global downturn and the tight monetary stance last year, which contributed to a high real interest rate after tax and a strong krone. For manufacturing, the appreciation of the krone came on top of high cost inflation over several years. At the same time, tight monetary conditions have contributed to a marked fall in inflation. Underlying inflation (the year-on-year rise in the CPI-ATE) was 1.2 per cent in May, con-

### Macroeconomic indicators 2001-2003

Growth from previous period unless otherwise noted. Per cent

	2001	2002	Seasonally adjusted			
			02.2	02.3	02.4	03.1
<b>Demand and output</b>						
Consumption in households and non-profit organizations	2.6	3.6	0.5	1.1	1.3	0.2
General government consumption	2.7	3.2	3.2	2.4	0.2	0.5
Gross fixed investment	4.2	3.6	8.0	7.6	6.4	0.4
- Mainland Norway	0.7	4.6	1.6	2.1	0.8	0.8
-Extraction and transport via pipelines	1.0	4.6	5.0	2.9	6.2	6.5
- Service activities incidental to extraction	..	..	..	..	..	..
Final domestic demand from Mainland Norway <sup>1</sup>	2.3	2.1	0.3	0.9	0.9	0.1
Exports	4.1	0.5	6.0	3.8	1.0	0.7
- Crude oil and natural gas	5.2	0.2	14.5	6.6	0.1	1.1
- Traditional goods	3.7	1.3	0.8	0.4	3.7	0.3
Imports	0.9	1.7	5.3	2.9	2.3	2.3
- Traditional goods	2.9	4.7	1.6	1.2	3.0	0.8
Gross domestic product	1.9	1.0	1.5	1.0	0.2	0.3
- Mainland Norway	1.7	1.3	0.6	0.5	0.6	0.6
<b>Labour market<sup>2</sup></b>						
Man-hours worked	1.0	0.9	0.8	0.1	0.4	0.2
Employed persons	0.5	0.2	0.2	0.0	0.2	0.2
Labour force	0.7	0.6	0.1	0.1	0.1	0.2
Unemployment rate, level <sup>3</sup>	3.6	3.9	3.9	3.8	4.1	4.1
<b>Prices</b>						
Consumer price index (CPI) <sup>4</sup>	3.0	1.3	0.4	1.4	2.2	4.5
CPI adjusted for tax changes and excluding energy products (CPI-A28ATE) <sup>4</sup>	2.6	2.3	2.6	2.4	2.0	1.8
Export prices, traditional goods	2.9	8.7	1.8	2.3	0.1	1.0
Import prices, traditional goods	0.2	8.0	2.4	0.8	0.9	0.8
<b>Balance of payment</b>						
Current balance, bill. NOK	238.5	200.6	52.0	46.5	47.2	54.0
<b>Memorandum items (Unadjusted, level)</b>						
Money market rate (3 month NIBOR)	7.1	6.9	6.9	7.2	7.0	5.7
Lending rate, banks <sup>5</sup>	8.8	8.4	8.3	8.7	8.6	7.6
Crude oil price NOK <sup>6</sup>	220.2	197.4	205.2	202.3	196.1	222.1
Importweighted krone exchange rate, 44 countries. 1995=100	100.2	91.6	92.5	89.1	87.7	88.8
NOK per euro	8.05	7.51	7.5	7.4	7.3	7.6

<sup>1</sup> Consumption in households and non-profit organizations + general government consumption + gross fixed capital formation in Mainland Norway.

<sup>2</sup> Figures for 2001 and 2002 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.

<sup>3</sup> According to Statistics Norway's labour force survey (LFS).

<sup>4</sup> Percentage change from the same period the previous year.

<sup>5</sup> By the end of the quarter.

<sup>6</sup> Average spot price, Brent Blend.

Sources: Statistics Norway and Norges Bank.

siderably lower than the inflation target of 2.5 per cent. Unemployment has continued to rise, and manufacturing profitability is very weak. This has also contributed to a marked fall in wage growth.

This has led to a pronounced shift in monetary policy over the past half-year. Interest rates have been reduced and are expected to fall further ahead, and the krone has appreciated.

The easing of monetary conditions has had little impact on developments in the real economy thus far in 2003, but is expected to boost growth in 2003 and 2004 in particular. The interest rate cuts are stimulating domestic demand and the weakening of the krone – combined with lower wage growth – is helping to curb Norwegian enterprises' loss of market shares. Unemployment will continue to rise through the remainder of the year and into next year, but at a somewhat slower pace than projected earlier. Unemployment may fall in 2005, even though output is expected to show somewhat weaker growth again.

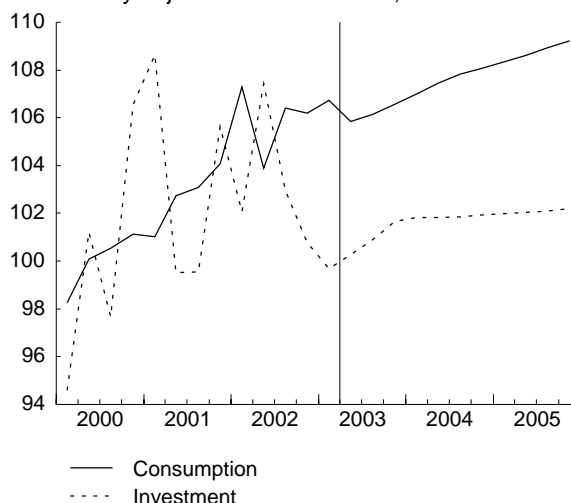
### Fiscal policy

The Revised National Budget for 2003 (RNB) provides an update of key fiscal indicators and gives an account of the Government's fiscal policy programme. The main elements of the Government's proposals were adopted by the Storting (Norwegian parliament) and budget limits were marginally increased. The Storting approved somewhat higher growth in social security spending, which we have incorporated into our projections.

The structural, non-oil central government budget deficit, which is linked to the guideline for fiscal policy, came to NOK 36.2 billion in 2002. This is almost NOK 9 billion in excess of the deficit estimated in the National Budget for 2003. The Government's revised budget proposal for 2003 entails a deficit of NOK 37.6 billion, which is a good NOK 13 billion higher than implied by a narrow interpretation of the fiscal guideline. The Storting's resolution entails a possible increase of close to NOK 1 billion in 2003. The fiscal policy guideline is not formulated in such a strict way that 4 per cent of the value of the Petroleum Fund – which corresponds to a good NOK 24 billion in 2003 – is the relevant absolute limit for fiscal policy in one given year. When the deficit for 2003 is projected to be 50 per cent higher, it nevertheless implies a substantial deviation from the long-term path for the structural, non-oil deficit. The estimates in the RNB also show that the deficit will not be in line with a strict interpretation of the guidelines until 2005, which means that fiscal policy will not generate any stimulus before 2006. The margin of manoeuvre in fiscal policy (i.e. an increase in the structural deficit) has already been exhausted in this Storting period.

The Government's proposal to maintain the structural, non-oil deficit from 2002 to 2003 (and probably in

**General government**  
Seasonally adjusted volume indices, 2000=100

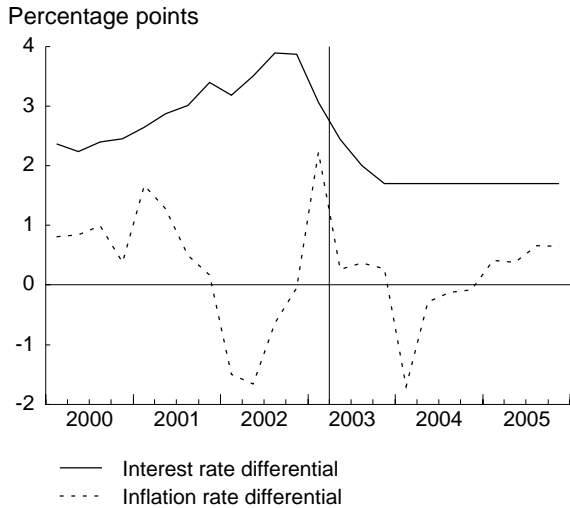


Source: Statistics Norway.

2004 and 2005 as well) must be seen against the background of the cyclical situation. Weak growth in the Norwegian economy, combined with rising unemployment, is reducing growth in tax revenues and some expenditure items are rising in excess of that implied by a cyclically neutral stance. The non-oil central government budget deficit is thus considerably higher than the structural deficit. A discretionary budget tightening to bring spending into line with the guideline in 2003 would have required a fiscal tightening of about 1 per cent of mainland GDP. This would have amplified the cyclical downturn. An easing of monetary policy with an effect on GDP corresponding to such a fiscal tightening would not have been feasible in today's situation where there has already been a pronounced expansionary shift in monetary policy, even though the budget deficit is larger than planned.

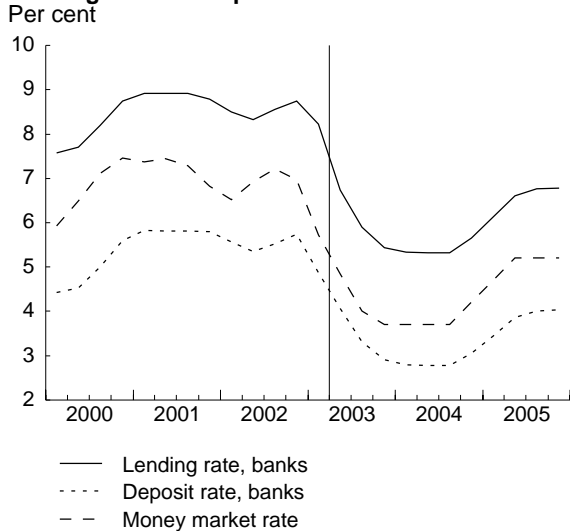
According to revised national accounts figures, public consumption grew by 3.2 per cent between 2001 and 2002. Growth slowed through last year and the national accounts figures for the first quarter show a fall in public employment, which is partly attributable to the conversion of the Norwegian Road Directorate into an independent company (Mesta). We project public consumption to grow by about 1½ per cent in 2003 and 2004. The increase in the number of man-hours worked in the public sector is expected to be relatively moderate in the period ahead, but somewhat stronger in 2003 due to a higher number of working days (calendar effect). The level of general government gross investment is projected to show a marginal increase from 2002 to 2005. In spite of some fiscal stimulus to the economy in recent years, there will be no additional impetus to demand from the public sector in 2003 and 2004. However, there is real growth in transfers to households via a real increase in social security payments to pensioners, etc., which provides room for increased household consumption. Lower prices for day-care places will also provide an impulse via trans-

**Interest rate and inflation differential between NOK, and the euro**



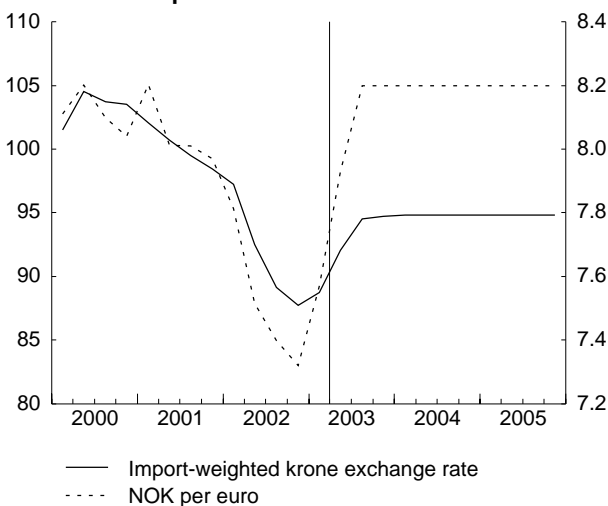
Sources: Norges Bank and Statistics Norway.

**Lending rate and deposit rate**



Source: Norges Bank.

**Development in import-weighted krone exchange rate and NOK per euro**



Source: Norges Bank.

fers to households. The Government’s proposal implies a reduction to an average NOK 2500 per place via higher transfers from 1 August this year.

**Lower interest rates and a weaker krone**

Since December 2002, Norges Bank has reduced the key rate by 2 percentage points. Since the most recent interest rate cut on 30 April, the key rate has stood at 5 per cent. At the beginning of June, the central bank governor signalled that the key rate would be lowered to a further extent than expected earlier. This was followed by a marked fall in money market rates and the krone depreciated. After Statistics Norway published on 10 June lower inflation figures than expected for May, interest rates fell further. Three-month money market rates have fallen from 7.1 per cent at the beginning of December to 4.2 per cent in mid-June. This is the lowest level recorded since 1998. The FRA market has now priced in a further interest rate reduction to about 3 per cent in the fourth quarter.

The import-weighted exchange rate weakened by about 11 per cent from mid-January to mid-March this year, following a marked appreciation in the two previous years. It appears that major foreign investors have changed their view of krone exchange rate developments ahead, and the period of a record-strong krone may have come to an end. Interest rate cuts, which have reduced the interest rate differential against other countries, and expectations of further monetary policy easing ahead, have contributed to this. The import-weighted exchange rate appreciated somewhat from mid-March to the end of May, primarily reflecting a sharp fall in the value of the US dollar. Against the euro, the krone was relatively stable in the same period. Since the beginning of June, the krone has depreciated by about 4 per cent both against the import-weighted index and the euro. The krone/euro exchange rate was 8.20 on 12 June. We assume that the krone will remain at this level to the end of the projection period.

The international interest rate level is low. The European Central Bank cut its key rate by a half percentage point to 2 per cent on 5 June, and in the US the key rate is 1.25 per cent. Interest rates may be reduced further in the period ahead. We assume that the three-month euro rate – which is normally higher than the key rate – will fall to 2 per cent as from the third quarter of this year. This increases the likelihood of further interest rate cuts in Norway. The interest rate differential against trading partners has narrowed since last autumn, reflecting the sharp interest rate decline in Norway. The interest rate differential is expected to continue to narrow.

Low activity levels and the absence of inflationary pressures are providing Norges Bank with room for further rate cuts. Developments in the krone are an important factor behind the size of the rate cuts. The

depreciation of the krone so far this year represents a substantial monetary policy easing. If the krone continues to show a marked fall, the need for substantial interest rate cuts will be reduced. On the other hand, a strong krone will increase the need for lower interest rates. Our projections are based on the assumption that three-month money market rates will fall to 3.7 per cent in the third quarter – i.e. that Norges Bank's key rate (sight deposit rate) is lowered to 3.5 per cent – and that money market rates subsequently remain at that level in the period to autumn. This represents a smaller interest rate decline than that priced into the FRA market in mid-June. According to our assessment, it would appear that the markets have not taken full account of the expansionary effects of the shift in monetary policy, or that global developments are expected to be considerably weaker than assumed in this report.

According to our calculations, underlying inflation will gradually move up to the inflation target two years ahead. In order to avoid an overshooting of the inflation target, we have assumed that money market rates will start to edge up from the fourth quarter of 2004, by a total of 1.5 percentage points, to 5.2 per cent in the second quarter of 2005. A corresponding increase in euro interest rates are expected in the same period, as economic growth in the euro area is assumed to edge up to trend growth. This assumption of an interest rate increase in Norway and the euro area is naturally conditional on economic developments ahead, both as regards the expected international recovery, and in Norway's case in particular the prospects for demand components that are less interest-rate sensitive, such as petroleum investment in the longer term.

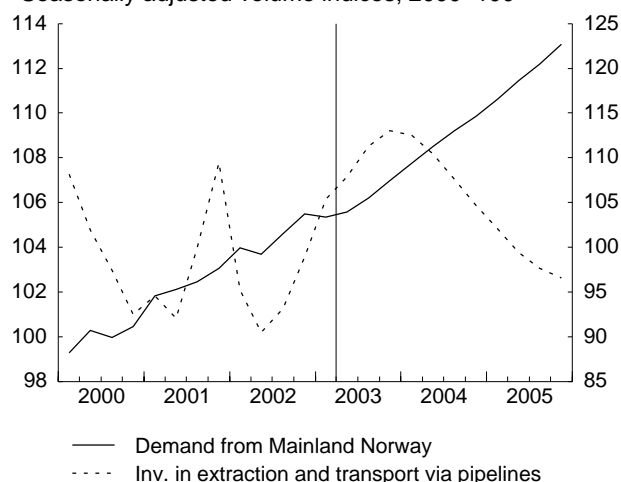
With these interest rate and exchange rate assumptions, monetary policy will be considerably more expansionary than assumed in our last report. In 2003, the interest rate reduction will be 1.5 percentage points lower than previously assumed, while the import-weighted exchange rate will be only 1 per cent weaker. A more expansionary monetary policy this year and next than previously assumed implies, in isolation, stronger domestic demand in 2004 and 2005, particularly for housing investment and household consumption. Owing to lags between output and employment and interaction with the labour supply, the extra contribution to a reduction in unemployment will be moderate, however.

### High level of petroleum investment both this year and next

At current prices, the preliminary estimate for crude oil and natural gas production is NOK 295.4 billion in 2002, i.e. a marked decrease compared with the previous year. The decline reflects lower prices than in 2001, while volume – despite the production cuts implemented in the first half of last year – remained

### Demand from Mainland Norway and investment in petroleum activities

Seasonally adjusted volume indices, 2000=100



Source: Statistics Norway.

virtually unchanged. Seasonally adjusted figures show that production increased around the turn of the year. At constant prices, production showed a small rise between the third and fourth quarter, followed by a further rise of over 3 per cent in the first quarter of this year. This is a good 8 per cent higher than the same quarter one year earlier. However, about half of the production cuts last year were implemented in the first quarter, so that underlying production growth was somewhat lower.

Petroleum activity is expected to show a weak trend ahead, so that value added for the industry for the year as a whole is expected to be on a par with the preceding year. Oil production is expected to fall, while gas production is expected to increase. Value added for the industry is expected to show a small increase in 2004 and 2005, with annual growth of close to 3 and 1 per cent, respectively. Gas production is projected to increase further through 2004 and 2005, while oil production is expected to increase through 2004, and fall through 2005. These projections are in line with the estimates published in the Revised National Budget.

Oil prices tended upwards through 2002, averaging USD 25 per barrel, or the equivalent of NOK 200 per barrel. The oil price is assumed to remain constant at USD 25 per barrel. Given our assumptions concerning the US dollar, this implies an average price of a good NOK 185 per barrel in 2003, moving down to NOK 175 in 2004 and 2005.

According to preliminary national accounts figures, gross investment in extraction and pipeline transport at current prices came to NOK 53.4 billion in 2002, i.e. a fall in value terms of more than 6 per cent compared with last year. The seasonally adjusted quarterly figures showed that the volume decline that was recorded in the first half of last year was gradually reversed to an increase. Investment for the first quarter

of this year is projected to be a good 6 per cent higher than in the fourth quarter, and more than 10 per cent higher than in the same quarter one year earlier.

Annual figures also show that the falling trend for investment in field development continued in 2002, but reduced investment in connection with exploration is also part of the explanation for the decline. In recent years, there has been a trend increase in investment in fields in operation, a trend that levelled off in 2002, however. Investment in on-shore installations, particularly Snøhvit, rose substantially through 2002, but not to an extent that could prevent an overall decline.

At current prices, gross investment in production and pipeline transport is expected to increase this year, and is estimated to be 16.4 per cent higher than last year. The main contribution comes from investment in on-shore installations. The estimates are in line with Statistics Norway's last investment intentions survey, and are somewhat lower than the estimate in our March economic survey. One reason for this is that a number of the postponed exploration projects, which we assumed would be postponed from 2002 to 2003, have now been postponed for an indefinite period. The assumed reductions in exploration activity also increase the uncertainty surrounding our projections for both 2004 and 2005. Investments relating to Snøhvit will be fully realised, including on-shore installations, pipeline transport, and field development. Investments in on-shore installations will be very high during the projection period. For this year and next, we expect a resumption in the trend with high investments linked to fields in operation. For 2004, the overall investment level is expected to be slightly below the level for this year, with a decline from 2003 of close to 1 percentage point. For 2005, investment is projected to fall by 10 per cent, reflecting the phasing out of investments linked to the development of new fields, and a generally lower investment level.

### **Interest rate reductions fuel consumption growth**

Revised national accounts figures show that consumption growth for households and non-profit institutions was 3.6 per cent in 2002, at constant prices. In the light of the record-high growth in household real disposable income of 6.7 per cent, this is low. Seasonally adjusted figures indicate that consumption growth was lowest in the second quarter, with some increase in the last six months of the year. Figures for the first quarter of this year show a small decline at constant prices, and seasonally adjusted consumption is projected to be 0.2 per cent lower than in the fourth quarter of 2002. The weak growth in consumption in the first quarter is primarily attributable to continued high borrowing rates, high electricity prices and increased uncertainty as to future income growth. The high level of electricity prices has led to a sharp reduction in household real disposable income between the fourth

quarter of 2002 and the first quarter of 2003. An unclear economic situation, with rising unemployment, has probably increased household uncertainty as to their future income, which may have reduced their willingness to spend.

The seasonal adjustment underlying the figures for the first quarter is shrouded in considerable uncertainty, because experience shows that it is difficult to determine the impact of the Easter holiday. Seasonally adjusted consumption may therefore have been underestimated for the first quarter. The goods consumption index, which showed a seasonally adjusted increase of 2.8 per cent between March and April, would indicate that this may be the case. The rate of growth in consumption recorded for April may thus just as well reflect seasonal adjustment problems and other normal random effects as a sharp increase in underlying consumption growth.

The outlook for real income growth ahead is mainly conditional on consumer price expectations, wage income developments and net capital income. The consumer price index is projected to rise by 2.8 per cent between 2002 and 2003, compared with only 1.3 per cent last year. The wage settlement appears to be moderate in relation to last year's nominal wage growth of 5.4 per cent, but the carry-over from last year still implies wage growth of 4.5 per cent. Employment is expected to edge down between 2002 and 2003. Net capital income includes interest income from deposits and debt interest. The interest rate cuts will reduce debt expenditure by more than deposit income, which points to an increase in net capital income. However, the high dividend payments in 2002 are not likely to recur this year, and this contributes to a decline in household capital income. The overall contribution from these two sources is expected to result in a decline in household net capital income between 2002 and 2003, which will restrain growth in disposable income. All in all, household real disposable income is projected to grow by 1.4 per cent in 2003.

Growth in household real disposable income is projected at 4.5 per cent in 2004 and 2.2 per cent in 2005. The reversal in electricity prices implies that consumer price inflation will be low from 2003 to 2004, which pushes up real income growth in 2004. Wage growth is projected to be somewhat lower in 2004 and 2005 compared with this year. Developments in net capital income are expected to make a positive contribution to real disposable income in 2004 as a result of lower debt service and higher share dividends. In 2005, higher interest rates push down real disposable income.

Consumption growth is projected at 3.4 per cent in 2003, at constant prices. This is high in relation to the projected growth in real disposable income, and the saving ratio is projected to fall from 7.2 per cent in

2002 to 5.4 per cent this year. Consumption is expected to pick up partly because the bulk of this winter's high electricity bills have now been paid and interest rates are falling. The interest rate decline will, in isolation, push up consumption because saving becomes less attractive. Moreover, it is likely that households in a net debt position use a larger share of their income for consumption than those who are in a net asset position, which means that the effect of the interest rate decline will be amplified. Similarly, it is assumed that dividend recipients will use a small share of their income for consumption, and the expected fall in dividends is thus expected to have a limited restraining effect on consumption growth.

For 2004, consumption is projected to show volume growth of 4.0 per cent. This is higher than the figure for this year, and reflects high real income growth, low interest rates and some growth in household wealth. In 2005, consumption growth is projected to slow to 2.9 per cent, reflecting an expected increase in interest rates and lower real income growth.

### Reversal in the decline in housing investment

After rising since mid-1998, housing investment fell last year. According to seasonally adjusted national accounts figures at constant prices, housing investment fell steadily by a little more than 2 per cent from quarter through 2002. It appears that the decline started to slow somewhat in the first quarter of 2003.

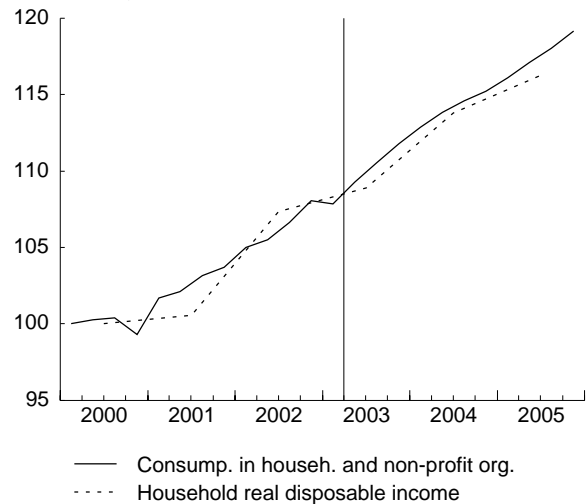
Housing starts are a leading indicator of housing investment since investments are made throughout the entire construction phase. Housing start figures, as measured in square metres, show that housing starts dropped through 2001 and have since remained approximately flat. For housing investment to hold up and eventually show a rise, housing start figures must increase. We assume that the sharp interest rate reduction will stimulate housing investment. Housing investment is projected to expand during the second half of 2003. Nevertheless, housing investment is projected to fall by 3.7 per cent between 2002 and 2003 as a result of a negative carry-over from 2002. Housing investment is projected to expand by 3.7 per cent in 2004 and 4.1 per cent in 2005.

The rise in house prices has been weak over the past 12 months, and house price inflation is projected at a low 0.7 per cent this year. Higher interest rates last year, in conjunction with rising unemployment, are important explanatory factors. As interest rates fall, the housing market is expected to pick up, and house prices are projected to rise by 5.1 per cent in 2004 and 3.4 per cent in 2005.

### Continued weak growth in mainland business investment

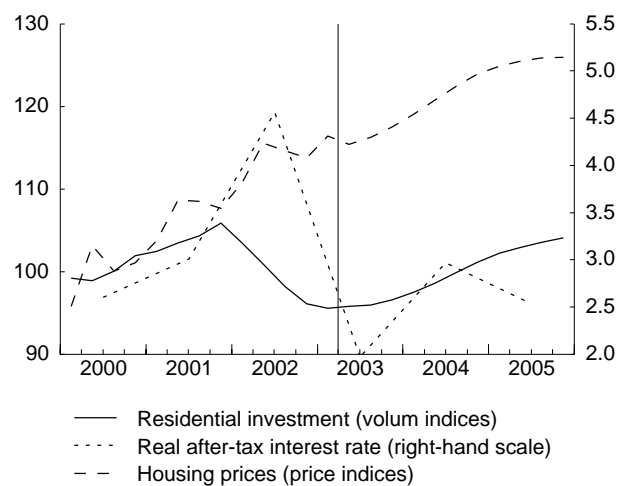
According to preliminary national accounts figures, mainland business investment is estimated at close to

**Income and consumption in households**  
Seasonally adjusted volume indices, 2000=100



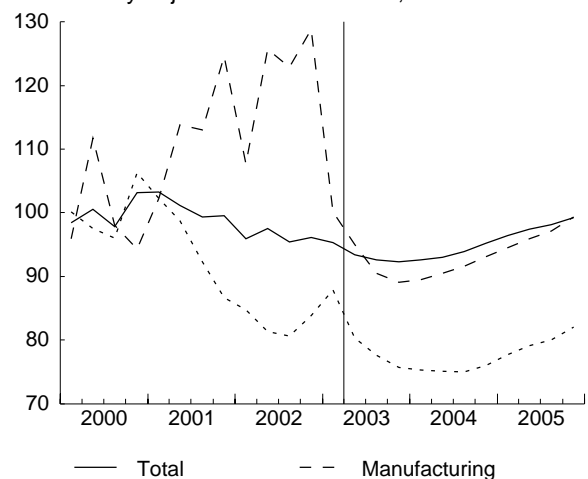
Source: Statistics Norway.

**Residential investment and housing prices**  
Seasonally adjusted indices, 2000=100



Source: Statistics Norway.

**Investment, Mainland Norway**  
Seasonally adjusted volume indices, 2000=100



Source: Statistics Norway.

**Main economic indicators 2002-2005. Accounts and forecasts**

Percentage change from previous year unless otherwise noted

	Accounts 2002	Forecasts							
		2003			2004			2005	
		SN	MoF	NB	SN	MoF	NB	SN	NB
<b>Demand and output</b>									
Consumption in households and non-profit organizations	3.6	3.4	2.9	2 3/4	4.0	2.8	3 1/4	2.9	3
General government consumption	3.2	1.3	0.3	3/4	1.7	0.8	2	1.0	2
Gross fixed investment <sup>1</sup>	-3.6	0.9	1.1	1	0.2	1.0	1/4	0.8	1 1/2
Extraction and transport via pipelines <sup>2</sup>	-4.6	16.4	13.3	20	-0.9	1.0	0	-10.0	0
Mainland Norway	-4.6	-2.5	-3.4	-4	0.5	1.0	1/2	4.8	2
Firms	-6.4	-2.9	-6.0	-6	-1.5	1.3	-1	7.1	1
Housing	-4.2	-3.7	-1.1	-3	3.7	0.7	2	4.1	5
General government	0.0	-0.1	0.1	1/4	1.5	0.2	2	0.2	2
Demand from Mainland Norway <sup>3</sup>	2.1	1.9	1.8	1 1/4	2.9	1.9	2 1/2	2.7	2 1/2
Stockbuilding <sup>4</sup>	10.2	0.0	..	..	0.0	..	..	0.0	..
Exports	-0.5	0.2	0.0	-1	3.4	2.8	1 1/2	2.6	1 1/2
Crude oil and natural gas	0.2	1.0	0.5	-2	3.3	1.6	4	1.0	0
Traditional goods	1.3	0.0	-2.2	-3	4.9	4.1	-1	4.9	2
Imports	1.7	5.4	1.3	1	3.0	2.8	1 1/4	3.1	3 1/2
Traditional goods	4.7	5.3	1.9	1 1/4	4.0	3.1	1 1/4	4.7	3 1/2
Gross domestic product	1.0	0.4	1.1	1	2.9	2.0	2 1/4	1.9	1 3/4
Mainland Norway	1.3	0.3	0.7	1 1/4	3.0	1.9	2	2.3	2 1/4
<b>Labour market</b>									
Employed persons	0.2	-0.8	-0.6	- 1/2	0.0	0.0	0	0.7	1/2
Unemployment rate (level)	3.9	4.4	4.4	4 1/2	4.7	4.6	4 3/4	4.4	4 3/4
<b>Prices and wages</b>									
Wages per standard man-year	5.4	4.5	4 1/2	5	4.0	4 1/4	4 1/2	4.0	4 1/2
Consumer price index (CPI)	1.3	2.8	2 3/4	3 1/4	1.0	1 1/2	1	2.2	2 1/4
CPI adjusted for tax changes and excluding energy products (CPI-ATE)	2.3	1.5	1 3/4	1 3/4	1.7	2 1/4	2	2.3	2 1/4
Export prices, traditional goods	-8.7	-0.4	..	-5	6.5	..	1 1/4	2.2	1 3/4
Import prices, traditional goods	-8.0	2.4	..	..	4.0	..	..	0.1	..
Housing prices	6.1	0.7	..	..	5.1	..	..	3.4	..
<b>Balance of payment</b>									
Current balance (bill. NOK)	200.6	147.6	203.7	205	145.9	190.1	155	155.3	120
Current balance (per cent of GDP)	13.2	9.6	..	14	9.3	..	10	9.5	8
<b>Memorandum items:</b>									
Household savings ratio (level)	7.2	5.4	6.8	5	6.0	6.6	5 1/4	5.4	5 1/2
Money market rate (level) <sup>5</sup>	6.9	4.6	5.1	5.6	3.8	5.0	5.5	5.1	5.5
Lending rate, banks (level) <sup>6</sup>	8.5	6.6	..	..	5.4	..	..	6.6	..
Crude oil price NOK (level) <sup>7</sup>	197.4	186.7	190.0	..	173.7	172.0	..	173.7	..
Export markets indicator	0.2	4.1	..	..	5.8	..	..	5.0	..
Importweighted krone exchange rate (44 countries) <sup>8</sup>	- 8.5	1.1	..	-3 3/4	2.4	..	0	0.0	0

<sup>1</sup> Forecasts from Norges Bank including stockbuilding.<sup>2</sup> Forecasts from Ministry of Finance and Norges Bank include service activities incidental to extraction.<sup>3</sup> Consumption in households and non-profit organizations + general government consumption + gross fixed capital formation in Mainland Norway.<sup>4</sup> Change in stockbuilding. Per cent of GDP.<sup>5</sup> NB technically assumes its rates to be constant through the forecast period.<sup>6</sup> Households' borrowing rate in private financial institutions.<sup>7</sup> Average spot price, Brent Blend.<sup>8</sup> Increasing index implies depreciation.

Sources: Statistics Norway (SN), Ministry of Finance, St.meld. nr. 2, 2002-2003 (MoF), Norges Bank, Inflasjonsrapport 1/2003 (NB).

NOK 100 billion in 2002, at current prices. In volume terms, business investment showed a decline of more than 6 per cent between 2001 and 2002, with a particularly strong decline in investment in service industries. Investment in manufacturing, mining/quarrying and primary industries increased somewhat. The announced removal of the investment tax as from the fourth quarter may have contributed to the postpone-

ment of some investments. Investment in the service industry fell through the first three quarters, but picked up by 2 per cent between the third and fourth quarter.

So far, seasonally adjusted figures show a weak fall in mainland business investment in the first quarter of this year compared with the previous quarter. While investment in manufacturing and mining fell from the



previous quarter, investment in some services sectors increased for the second consecutive quarter. The decline in manufacturing investment primarily reflects the fall in investment in the metal industry, although there is also a general decline in investment in other manufacturing sectors.

For 2003, gross investment in manufacturing is projected to continue to decline, at constant prices. The contraction in manufacturing investment after several years of expansion must be seen in connection with the completion of several large investment projects, particularly in metal production, the refinery sector and chemical industry. Investment is expected to increase in other mainland private sector industries, although this will not prevent an overall decline of 3 per cent in gross investment in mainland industries from 2002 to 2003. Among the other mainland industries, investment is rising in the banking and insurance sector, the distributive trades, domestic transport and electricity production. Investment in the electricity industry is projected to expand at a rapid pace throughout the projection period.

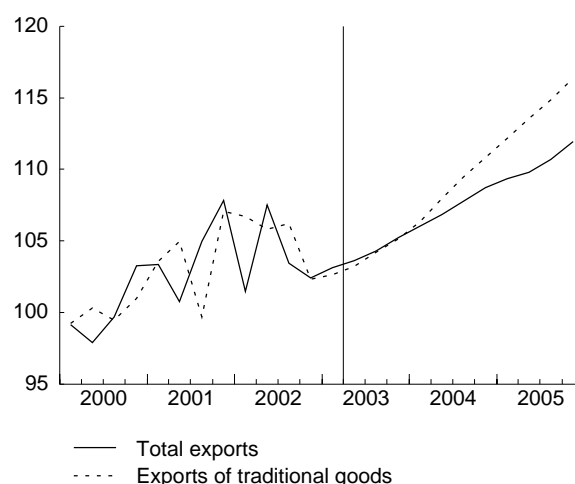
In line with Statistics Norway's investment intentions survey, manufacturing investment is assumed to continue to decline well into 2004, before higher manufacturing production again boosts investment somewhat. Investment in the commercial building industry is expected to slacken ahead. High investment over several years has increased capacity. Rental prices for commercial property have fallen and the vacancy rate is relatively high. Combined with a low level of manufacturing investment, gross investment in mainland industries in 2004 is projected to be 1.5 per cent lower than in 2003. Thereafter, an investment upswing in most sectors is expected to result in a good 7 per cent increase in mainland gross business investment between 2004 and 2005.

### Exports – volume remains steady, prices bear the brunt

As a result of weak growth in the global economy, there was virtually no increase in demand on Norwegian export markets in 2002. According to the national accounts, the volume of traditional Norwegian exports showed a small increase, primarily driven by growth in exports of petroleum products and engineering products. Seasonally adjusted, traditional merchandise exports fell somewhat through 2002, but growth picked up again in the first quarter of this year. Excluding exports of aircraft (heavily influenced by the re-export that occurs when SAS imports new aircraft to Norway that exceeds Norway's accounting share of 2/7 of investments in the company), the seasonally adjusted increase on the previous quarter was 1.1 per cent. The upswing in the first quarter primarily reflected higher exports of petrol and heating oil, but metals and engineering products also made a clear contribution to the increase. Lower exports of fish and fish products, chemical raw materials and petroleum products other

### Exports

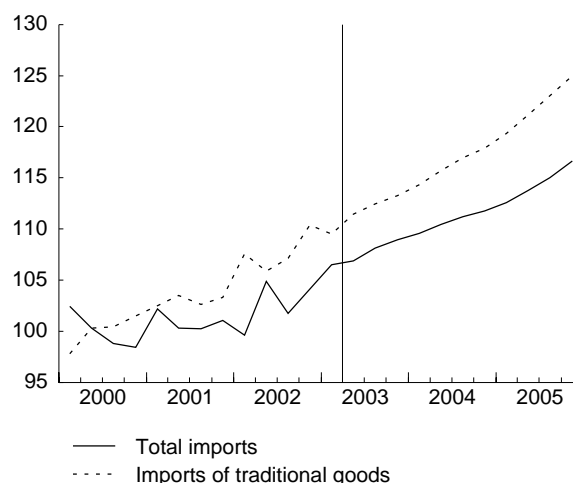
Seasonally adjusted volume indices, 2000=100



Source: Statistics Norway.

### Imports

Seasonally adjusted volume indices, 2000=100



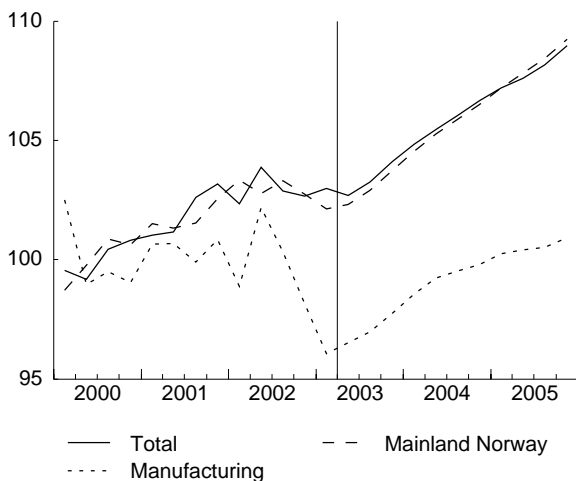
Source: Statistics Norway.

than petrol and heating oil were the main sources of downward pressure on export growth.

Prices for traditional export goods fell by as much as 8.7 per cent in 2002, measured in Norwegian krone terms. The price decline continued into the first quarter of this year. The fall in prices for traditional goods was admittedly far more moderate than in the two previous years, but this is almost solely due to the rise in prices for refined oil products and electricity. For virtually all other groups of goods, prices continued to fall at the same pace as earlier. According to the national accounts, the price decline for engineering products was particularly strong in the first quarter (-5.8 per cent on the previous quarter).

The decline in export prices in recent years primarily reflects the pronounced appreciation of the krone up to

**Gross domestic product**  
Seasonally adjusted volume indices, 2000=100



Source: Statistics Norway.

January of this year. Export companies appear to have responded to the krone appreciation by reducing prices in order to sustain export volumes. The krone started to appreciate already at the end of May 2000, but from a relatively weak level. It was not until the third quarter of 2001 that manufacturing industry's trade-weighted exchange rate index exceeded 103.8 per cent, which corresponded to the average for the period 1993-2000. Thereafter, the index fell (denotes stronger krone) to 91.5 at the beginning of January this year, and then started to rise again. The index fell by 6.5 per cent from the third quarter of 2001 to the first quarter of 2003. In the same period, prices for traditional merchandise exports fell by a seasonally adjusted 10.1 per cent and manufacturing products by 10.4 per cent, i.e. by considerably more than the fall in the exchange rate.

This indicates that factors other than the exchange rate have contributed to the price decline. The main factors are the fall in prices for a number of cyclically sensitive industrial commodities and semi-finished goods, which reflects, as is normal, the current international downturn. But prices for engineering products have also shown a strong decline of -12 per cent. In the same period, prices for imported engineering products fell by as much as export prices, i.e. also considerably more than the exchange rate index. This may indicate that a large share of the price decline is attributable to strong price competition from foreign producers, measured in international prices. Export prices for engineering products have fallen at a faster pace during the last few quarters, which partly reflects that prices for order-based production may have been agreed before the krone started to appreciate. The sharp rise in labour costs over several years, combined with a tendency for engineering companies to pass on higher costs to prices in the short term rather than the long term, may have contributed to amplifying the price decline in recent months.

The krone has depreciated again during the first half of this year. Since export companies so far seem to have allowed exchange rate changes to have more or less a full impact on prices in NOK, we assume that they will react in the same way when the krone depreciates. In addition, it is assumed that international prices for a number of cyclically sensitive export goods will show a cyclically determined increase. Even though this will, in isolation, contribute to countering the previous deterioration in profitability in the enterprise sector, many export companies will still face strong competitive pressures as a result of several years of higher cost inflation than among foreign competitors. This suggests that many Norwegian enterprises will continue to lose market shares. Whereas market growth for Norwegian exports is estimated at 4 per cent this year and around 5.5 per cent in the following two years, traditional merchandise exports are projected to show zero growth this year, and close to 5 per cent in the next two years. However, higher metal exports, as a result of new capacity in the sector, will account a considerable share of growth. Moreover, our macroeconomic model, where industries are seen as whole, may not have fully captured the scale of closures and relocations abroad that might ensue as a result of the current low level of profitability in many enterprises.

#### **A more normal increase in import shares ahead**

Norwegian enterprises' loss of market shares as result of high wage growth and a strong krone has contributed to maintaining strong import growth in recent years, in spite of weaker demand growth, particularly for the most import-sensitive demand component, investment and exports. In 2002, traditional merchandise imports increased by 4.7 per cent, and growth continued in the first quarter of this year. The national accounts show seasonally adjusted growth of 1.2 per cent on the previous quarter, excluding aircraft imports, (see discussion on exports).

While exporters – despite strong domestic cost inflation – responded to the strong krone by lowering prices measured in NOK, producers of goods for the domestic market have to a large extent passed on costs to prices in spite of the fact that the krone appreciation led to a decline in prices for competing import goods. For traditional goods as a whole, Norwegian domestic prices increased by as much as 3.4 per cent from the first quarter of 2002 to the first quarter of 2003, while import prices fell by 3.4 per cent. The result is the marked decline in market shares that we are now witnessing. The difference in price-setting between these two groups of producers has been incorporated in our macroeconomic models for a long time, using data from the past 20-30 years. This price-setting behaviour implies that when the krone weakens there will not be a corresponding increase in domestic prices, even if import prices pick up again. This means that even if the decline in market shares continues, it may

moderate somewhat in the years ahead. Traditional merchandise imports are expected to increase by 5.3 per cent this year, while mainland demand growth is projected at 1.9 per cent. In 2004 and 2005, import growth is estimated at around 4.5 per cent, with mainland demand growth at close to 3 per cent. Otherwise, a loss of market shares on the home market is considered to be normal in a country that is increasingly being integrated into international trade.

### GDP and production – growth gradually picks up

Following a small, seasonally adjusted decline in total GDP towards the end of 2002, total production increased again from the fourth quarter of last year to the first quarter of this year. However, this is wholly attributable to a marked increase in oil and gas production. Seasonally adjusted figures show that the decline in mainland GDP from the end of last year continued into 2003. While an unchanged seasonally adjusted level to the end of 2003 would result in a 1 per cent decline in mainland GDP on an annual basis, we have assumed growth of 0.3 per cent. Moreover, the abnormally low level of electricity production is expected to push down mainland production by close to a half percentage point annualised. Excluding the electricity sector, growth will be somewhat higher, but still markedly lower than trend growth.

The fall in value added in manufacturing that started in the latter half of last year continued into 2003. On an annual basis, a decline of about 2.5 per cent is expected. However, against the background of an assumed pick-up in global growth next year, combined with high consumption growth and an upswing in mainland investment in Norway, and not least a marked increase in production capacity in the metal industry, manufacturing output is expected to show clear growth next year. In 2005, however, output growth is expected to slow again owing to a sharp fall in petroleum investment.

For other mainland enterprises as a whole, growth is expected to continue to be moderate this year. In 2004, growth is expected to be considerably higher in these industries, and to continue at this higher level in 2005.

According to national accounts figures, value added in the public sector is falling and has been tending downwards since the end of 2001. This decline has recently been accompanied by a fall in employment and the number of man-hours worked in the public sector. However, public consumption is still rising, reflecting the increase in intermediate consumption (i.e. purchases of goods and services from other sectors). This increase levelled off in 2002, however, and developments so far in 2003 show a weak decline also in public consumption. Value added is expected to show a small decline in 2003 and some increase in 2004 and 2005 primarily as a result of a higher number of working days.

### Labour force, employment and number of man-weeks

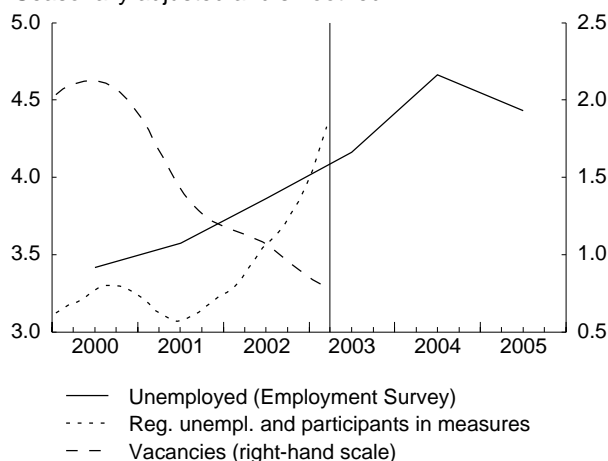
Millions. Seasonally adjusted and smoothed indices



Source: Statistics Norway.

### Unemployed and number of vacancies

Per cent of labour force  
Seasonally adjusted and smoothed



1) Backwards adjusted for breaks in the series from January 1999.  
Sources: The Directorate of Labour and Statistics Norway.

All in all, this implies that mainland production growth will increase from 0.3 per cent this year to 3 per cent in 2004 (partly because of 3 extra working days that year) and be about 2.5 per cent in 2005. As a result, growth will be a little higher than trend growth in the economy in 2004 and 2005. Total GDP growth will be somewhat weaker in both years as a result of a projected slower growth rate for the petroleum sector, and particularly in shipping and oil drilling.

### Interest rate reductions restrain rise in unemployment

The broad cyclical downturn during 2002, with severe profitability problems for internationally exposed sectors, is now having an impact on employment. According to QNA figures, after growing moderately in the first half of 2002, overall employment fell in the fourth quarter of last year and showed a further fall in the first quarter of 2003. Total employment fell by 14 700 persons from the first quarter of 2002 to the first quarter of 2003.

The fall in manufacturing employment accounts for the largest share of the total decline. Since the first quarter of 2002, manufacturing employment has dropped by 12 400 persons, or 4.2 per cent. Most other industries are also experiencing a fall in employment. In the public sector, employment fell by 3 600 from the first quarter of 2002 to the first quarter of 2003, or a decline of 0.5 per cent.

Measured as a percentage of the labour force, LFS figures show a seasonally adjusted unemployment rate of 4.1 per cent in the first quarter of this year, or an increase of 0.3 percentage point compared with the first quarter of 2002. According to Labour Directorate figures, registered unemployment rose more markedly, rising seasonally adjusted from 62 000 in May 2001 and 73 000 in May 2002 to 95 000 in May this year. The number of persons participating in labour market programmes has increased by almost 2000 in the same two-year period.

The labour market has slackened to a further extent than that implied both by the LFS and Labour Directorate figures for unemployment. Many unemployed do not consider themselves to be part of the labour force when they remain unemployed for a longer period even if they want to work, and then stop seeking employment. According to LFS figures, labour force participation is thus highly sensitive to changes in unemployment. A decline in total employment of close to 15 000 from the first quarter of 2002 is broken down on a decline in the labour force of 7 000 persons and increase in unemployment of 8 000, reducing the labour force participation rate to 72.6 per cent from almost 73.4 per cent in the first quarter of 2002.

Unemployment is expected to continue to rise up to 2004, with the average LFS unemployment rate projected at 4.7 per cent, up from 4.4 per cent this year. In 2005, unemployment is projected to fall back to 4.4 per cent. This is somewhat lower than earlier projections, primarily owing to the assumption of lower interest rates ahead.

### **Traditional incomes policy cooperation contributes to lower wage growth**

According the Technical Reporting Committee on income settlements, wage growth has been higher in Norway than among trading partners since 1997. The high level of wage growth is probably related to high profitability in internationally exposed industries and the tighter labour market following the fall in unemployment in the 1990s (see box in Economic Survey no. 4/2001). In 2002, wage settlements were also marked by the labour market situation in the previous years. The national accounts show that average wages per normal man-year rose by as much as 5.4 per cent.

However, unemployment increased in 2002 and Norwegian manufacturing's cost competitiveness deteriora-

ted sharply in the same year, primarily as a result of unfavourable exchange rate developments. Profitability problems in internationally exposed industries, weak local government finances and low demand pressure in the wider Norwegian economy have weakened virtually all segments of the labour market in the last year. Against this background wage growth is expected to be lower in the coming years. However, the carry-over from 2002 and the already agreed moderate pay increases so far in 2003 are expected to contribute about 3 percentage points to annual wage growth this year.

On the initiative of the Government last autumn, the social partners and the Government agreed to strengthen incomes policy cooperation. This year's interim settlement has resulted in very moderate pay increases in line with this initiative. Many large groups have not received any increase in this spring's wage negotiations. With wage drift of a little more than 1 percentage point, wage growth is projected at 4.5 per cent in 2003. This is in line with previous projections.

This year's moderate pay increases will result in a low carry-over, which means that wage growth will be somewhat lower next year even with relatively high pay increases in the main settlement in 2004. Growth in wages per normal man-year is projected at 4.0 per cent both in 2004 and 2005.

### **Consumer price inflation falls sharply**

In the past few years, developments in electricity prices have been one of the main explanatory factors behind variations in the year-on-year rise in consumer prices. Recently, they have played a dominant role in price developments. Towards the end of last year and into 2003, electricity prices rose sharply. The year-on-year rise in the consumer price index (CPI) moved up from 2.1 per cent in November 2002 to 2.8 per cent in December. In January, electricity prices were as much as 82.5 per cent higher than in January last year, which meant that CPI inflation was 5 per cent higher than one year earlier. Electricity prices have subsequently fallen and the rate of increase fell to 2.1 per cent in May. Electricity prices account for 2.2 percentage points of the 2.9 percentage point decline in CPI inflation from January to May.

The rate of increase in the CPI adjusted for tax changes and excluding energy products (CPI-ATE) has ten-

### **Consumer price index in 2003**

Rise from same month one year earlier and direct contribution<sup>1</sup> from electricity prices in percentage points

	CPI inflation	Contribution from elec. prices
January	5.0	3.2
February	4.8	2.8
March	3.7	2.1
April	2.9	1.3
May	2.1	1.0

<sup>1</sup> Difference between year-on-year rise in total index and the CPI excluding electricity.

ded downwards over the past 12 months, falling from 2.7 per cent in June and July 2002 to 1.8 per cent in December and down to 1.2 per cent in May. The appreciation of the krone up to January this year has been a main factor behind developments. This is reflected in an accelerating fall in prices for imported consumer goods in recent years. Prices for fish and goods that are influenced by foreign competition have shown a particularly strong decline. Services with wages as a dominant price factor have shown a similar trend. On the other hand, statistics on other services, including rents, showed upward price movements through the first four months of this year, but the rise in prices for these services also edged down between April and May.

In spite of the depreciation of the krone since the beginning of January, the krone was almost 9 per cent stronger in the first quarter of 2003 compared with the same quarter of 2002, as measured by the import-weighted exchange rate. Import prices for many groups of goods that account for a large share of household consumption have shown comparable change, which would indicate that international prices have remained virtually unchanged. One important exception is import prices for cars, which according to the QNA rose by 2.0 per cent in this period. According to the CPI, however, domestic car prices rose by only 0.4 per cent in the first quarter and fell by 0.1 per cent in April compared with the same periods one year earlier. This may indicate lower margins for car dealers.

The underlying rise in prices is largely determined by labour costs and import prices. A strong krone and low import prices have neutralized high labour costs. It will probably take some time for the high rise in labour costs in recent years to feed fully through to prices. In the same way, the krone appreciation that has taken place is still exerting downward pressure on prices.

This spring's moderate wage settlement points to low inflation, while the recent marked depreciation of the krone has the opposite effect. Excluding the effects of interest rate changes on the exchange rate, the recent decline in interest rates is contributing to reducing inflation one to two years ahead via lower house rents and reduced inventory costs. The current downturn in the Norwegian economy may also contribute to lower prices if enterprises are forced to reduce margins or implement additional efficiency measures. Lower day-care rates as a result of higher government transfers from August this year are also pushing down CPI inflation. Our projections have, however, not incorporated any explicit changes as a result of the introduction of a maximum price for day-care places. At the cut-off date for this report, the effects of this are not entirely clear, but the effects from 1 May 2004 are likely to be moderate in any case.

Underlying inflation is projected to pick up somewhat as early as in the second half of this year. As an annual average, CPI-ATE inflation is projected at 1.5 per cent this year, rising to 2.3 per cent in 2005.

Electricity prices are projected on the basis of forward prices in mid-May. Electricity prices for households are expected to edge down further into summer and thereafter remain virtually unchanged before rising moderately through the fourth quarter. Prices are also likely to increase somewhat at the beginning of 2004. In 2004 and 2005, a more normal price path is expected, i.e. somewhat higher in the winter than in the summer. As an annual average, electricity prices are projected to rise by about 32 per cent in 2003 and decline by about 20 per cent in 2004. In 2005, electricity prices for households are expected to be marginally higher than in the previous year. Oil prices, measured in NOK, are assumed to fall by 6-7 per cent as an annual average in 2003 and 2004 and remain unchanged in 2005. The calculations do not include any real indirect tax changes for 2004 or 2005. The year-on-year rise in the CPI is expected to remain at about the same level as in May until the end of the year, followed by a sharp fall in January when CPI inflation may be negative because of the extremely high electricity prices this year. CPI inflation is then projected to rise, reaching around 2.5 per cent towards the end of the projection period.

There are currently many and strong opposing forces that are influencing inflation. Lagged effects of previous changes have the opposite effect of the more immediate effects of recent changes in the same variables. In such a situation, the uncertainty in the model-based calculations for inflation is greater than usual.

### **Balance of payments – lower oil exports, higher imports**

Preliminary quarterly national accounts figures show a current account surplus of NOK 54 billion in the first quarter of 2003, virtually unchanged on the same quarter last year. The trade surplus was NOK 60 billion and was the highest since the third quarter of 2001. The deficit on the interest and transfers balance was consequently NOK 6 billion, or somewhat higher than the quarterly average for 2002. This is partly due to high share dividends paid abroad, but also to some extent to large private (net) transfers abroad.

For 2003, the current account surplus is now projected at NOK 148 billion, compared with a surplus of NOK 201 billion for 2002. The decline of NOK 53 billion partly reflects lower values for oil exports, higher imports of goods and a somewhat higher deficit on the interest and transfers balance. For 2004 and 2005, the current account surplus is expected to remain unchanged from the 2003 level.

**National accounts: Final expenditure and gross domestic product**

At fixed 2000 prices. Million kroner

	Unadjusted		Seasonally adjusted							
	2001	2002	01.2	01.3	01.4	02.1	02.2	02.3	02.4	03.1
Final consumption exp. of housh. and NPISHs	641 829	664 700	159 586	161 204	162 050	164 112	164 908	166 645	168 888	168 530
Household final consumption expenditure	615 225	638 102	152 952	154 581	155 309	157 508	158 303	160 111	162 024	161 773
Goods	342 546	356 706	84 866	85 787	86 929	88 480	88 525	88 820	90 814	89 909
Services	263 866	270 251	65 878	66 103	66 689	66 991	67 120	67 875	68 529	68 283
Direct purchases abroad by resident househ.	27 131	28 901	6 780	6 999	6 384	6 637	7 252	7 607	7 139	7 754
Direct purchases by non-residents	-18 317	-17 755	-4 572	-4 309	-4 693	-4 600	-4 594	-4 191	-4 457	-4 173
Final consumption exp. of NPISHs	26 605	26 598	6 634	6 624	6 740	6 604	6 605	6 534	6 864	6 757
Final consump. exp. of general government	288 592	297 914	72 239	72 489	73 171	75 434	73 045	74 818	74 674	75 047
Final consump. exp. of central government	115 101	161 052	28 826	28 808	29 038	40 558	39 758	40 378	40 383	41 143
Central government, civilian	88 521	133 445	22 171	22 179	22 398	33 667	32 825	33 500	33 479	34 225
Central government, defence	26 579	27 606	6 655	6 629	6 640	6 891	6 933	6 877	6 904	6 918
Final consump. exp. of local government	173 491	136 862	43 412	43 681	44 133	34 876	33 287	34 441	34 291	33 904
Gross fixed capital formation	261 191	251 728	64 542	63 779	64 907	60 870	65 710	60 705	64 617	64 343
Extraction and transport via pipelines	54 837	52 312	12 743	13 842	15 156	13 189	12 529	12 897	13 700	14 592
Service activities incidental to extraction	-797	5 427	512	102	-1 584	82	4 220	-4	1 119	560
Ocean transport	10 886	6 663	2 016	1 449	2 840	887	1 485	1 330	2 961	2 749
Mainland Norway	196 265	187 326	49 271	48 386	48 494	46 712	47 477	46 482	46 836	46 442
Mainland Norway ex. general government	156 189	147 269	39 592	38 705	38 220	36 786	37 030	36 469	37 036	36 747
Manufacturing and mining	21 163	22 614	5 314	5 276	5 820	5 031	5 872	5 739	6 014	4 678
Production of other goods	16 070	16 790	3 872	4 103	3 932	3 920	4 244	4 279	4 232	4 608
Dwellings	49 475	47 395	12 326	12 426	12 614	12 320	12 019	11 696	11 448	11 380
Other services	69 481	60 469	18 081	16 900	15 855	15 515	14 895	14 755	15 341	16 082
General government	40 077	40 058	9 678	9 681	10 274	9 926	10 446	10 012	9 800	9 695
Changes in stocks and stat. discrepancies	27 193	29 954	10 590	7 586	2 930	8 934	6 667	8 118	5 568	8 413
Gross capital formation	288 384	281 682	75 132	71 365	67 837	69 804	72 376	68 823	70 185	72 756
Final domestic use of goods and services	1 218 805	1 244 296	306 957	305 059	303 057	309 351	310 329	310 287	313 747	316 333
Final demand from Mainland Norway	1 126 687	1 149 940	281 095	282 080	283 715	286 259	285 430	287 945	290 399	290 019
Final demand from general government	328 668	337 972	81 917	82 170	83 445	85 360	83 492	84 831	84 474	84 741
Total exports	713 743	709 868	172 545	179 740	184 643	173 753	184 109	177 144	175 413	176 600
Traditional goods	222 201	225 163	56 153	53 337	57 262	57 084	56 601	56 811	54 737	54 903
Crude oil and natural gas	322 590	323 206	75 338	83 596	83 343	75 494	86 456	80 785	80 838	81 715
Ships and oil platforms	15 716	9 941	3 214	4 464	5 340	3 460	3 287	2 043	1 151	2 313
Services	153 236	151 558	37 840	38 343	38 698	37 714	37 765	37 505	38 687	37 670
Total use of goods and services	1 932 548	1 954 164	479 502	484 799	487 700	483 104	494 438	487 431	489 161	492 932
Total imports	435 146	442 534	108 043	107 978	108 847	107 301	112 951	109 635	112 169	114 734
Traditional goods	282 860	296 144	71 080	70 449	70 954	73 884	72 693	73 566	75 781	75 198
Crude oil	1 852	1 021	489	290	539	263	289	302	184	917
Ships and oil platforms	14 365	11 171	2 130	3 519	4 058	766	6 615	1 538	2 252	3 588
Services	136 068	134 198	34 344	33 720	33 296	32 389	33 354	34 228	33 953	35 031
Gross domestic product	1 497 402	1 511 630	371 459	376 821	378 853	375 803	381 487	377 796	376 991	378 198
Mainland Norway (market prices)	1 119 859	1 134 208	279 007	279 589	282 404	284 518	282 940	284 439	282 864	281 231
Petroleum activities and ocean transport	377 543	377 422	92 452	97 233	96 449	91 285	98 546	93 357	94 127	96 967
Mainland Norway (basic prices)	971 575	982 397	242 136	242 375	244 881	246 623	245 490	246 187	244 716	243 272
Mainland Norway ex. general government	754 528	765 297	187 880	188 007	190 212	191 080	192 205	191 868	190 584	189 614
Manufacturing and mining	145 143	144 126	36 338	36 060	36 400	35 690	36 883	36 211	35 431	34 669
Production of other goods	100 576	102 110	24 848	24 189	25 347	25 667	25 380	25 937	25 102	24 157
Service industries	508 808	519 061	126 694	127 758	128 464	129 723	129 942	129 721	130 051	130 788
General government	217 047	217 100	54 256	54 368	54 670	55 544	53 285	54 319	54 132	53 658
Correction items	148 284	151 811	36 871	37 214	37 523	37 894	37 450	38 252	38 149	37 959

Source: Statistics Norway.

**National accounts: Final expenditure and gross domestic product**

At fixed 2000- prices. Percentage volume change from previous period

	Unadjusted		Seasonally adjusted							
	2001	2002	01.2	01.3	01.4	02.1	02.2	02.3	02.4	03.1
Final consumption exp. of housh. and NPISHs	2.6	3.6	0.4	1.0	0.5	1.3	0.5	1.1	1.3	-0.2
Household final consumption expenditure	2.6	3.7	0.4	1.1	0.5	1.4	0.5	1.1	1.2	-0.2
Goods	2.8	4.1	-0.1	1.1	1.3	1.8	0.1	0.3	2.2	-1.0
Services	2.4	2.4	0.6	0.3	0.9	0.5	0.2	1.1	1.0	-0.4
Direct purchases abroad by resident househ.	-1.1	6.5	-0.8	3.2	-8.8	4.0	9.3	4.9	-6.2	8.6
Direct purchases by non-residents	-3.8	-3.1	-6.7	-5.8	8.9	-2.0	-0.1	-8.8	6.3	-6.4
Final consumption exp. of NPISHs	1.7	0.0	0.4	-0.2	1.8	-2.0	0.0	-1.1	5.0	-1.6
Final consump. exp. of general government	2.7	3.2	1.7	0.3	0.9	3.1	-3.2	2.4	-0.2	0.5
Final consump. exp. of central government	2.5	39.9	0.9	-0.1	0.8	39.7	-2.0	1.6	0.0	1.9
Central government, civilian	4.5	50.7	1.1	0.0	1.0	50.3	-2.5	2.1	-0.1	2.2
Central government, defence	-3.7	3.9	0.0	-0.4	0.2	3.8	0.6	-0.8	0.4	0.2
Final consump. exp. of local government	2.8	-21.1	2.2	0.6	1.0	-21.0	-4.6	3.5	-0.4	-1.1
Gross fixed capital formation	-4.2	-3.6	-5.3	-1.2	1.8	-6.2	8.0	-7.6	6.4	-0.4
Extraction and transport via pipelines	-1.0	-4.6	-2.7	8.6	9.5	-13.0	-5.0	2.9	6.2	6.5
Service activities incidental to extraction	-118.6	-780.6	209.1	-80.2	..	-105.2	..	-100.1	..	-50.0
Ocean transport	-40.0	-38.8	-56.0	-28.1	96.0	-68.8	67.3	-10.4	122.7	-7.2
Mainland Norway	0.7	-4.6	-2.1	-1.8	0.2	-3.7	1.6	-2.1	0.8	-0.8
Mainland Norway ex. general government	0.1	-5.7	-0.4	-2.2	-1.3	-3.8	0.7	-1.5	1.6	-0.8
Manufacturing and mining	13.6	6.9	11.2	-0.7	10.3	-13.6	16.7	-2.3	4.8	-22.2
Production of other goods	-2.2	4.5	-4.5	6.0	-4.2	-0.3	8.3	0.8	-1.1	8.9
Dwellings	3.7	-4.2	1.0	0.8	1.5	-2.3	-2.4	-2.7	-2.1	-0.6
Other services	-5.1	-13.0	-3.4	-6.5	-6.2	-2.1	-4.0	-0.9	4.0	4.8
General government	2.9	0.0	-8.4	0.0	6.1	-3.4	5.2	-4.2	-2.1	-1.1
Changes in stocks and stat. discrepancies	-22.4	10.2	75.7	-28.4	-61.4	204.9	-25.4	21.8	-31.4	51.1
Gross capital formation	-6.3	-2.3	1.3	-5.0	-4.9	2.9	3.7	-4.9	2.0	3.7
Final domestic use of goods and services	0.4	2.1	0.9	-0.6	-0.7	2.1	0.3	0.0	1.1	0.8
Final demand from Mainland Norway	2.3	2.1	0.3	0.4	0.6	0.9	-0.3	0.9	0.9	-0.1
Final demand from general government	2.7	2.8	0.4	0.3	1.6	2.3	-2.2	1.6	-0.4	0.3
Total exports	4.1	-0.5	-2.5	4.2	2.7	-5.9	6.0	-3.8	-1.0	0.7
Traditional goods	3.7	1.3	1.4	-5.0	7.4	-0.3	-0.8	0.4	-3.7	0.3
Crude oil and natural gas	5.2	0.2	-6.2	11.0	-0.3	-9.4	14.5	-6.6	0.1	1.1
Ships and oil platforms	51.5	-36.7	19.1	38.9	19.6	-35.2	-5.0	-37.8	-43.7	100.9
Services	-1.0	-1.1	-1.8	1.3	0.9	-2.5	0.1	-0.7	3.2	-2.6
Total use of goods and services	1.7	1.1	-0.3	1.1	0.6	-0.9	2.3	-1.4	0.4	0.8
Total imports	0.9	1.7	-1.9	-0.1	0.8	-1.4	5.3	-2.9	2.3	2.3
Traditional goods	2.9	4.7	1.0	-0.9	0.7	4.1	-1.6	1.2	3.0	-0.8
Crude oil	2.5	-44.9	-14.2	-40.7	85.9	-51.3	10.1	4.6	-39.2	399.1
Ships and oil platforms	-45.4	-22.2	-54.3	65.2	15.3	-81.1	763.6	-76.7	46.4	59.3
Services	6.0	-1.4	-0.3	-1.8	-1.3	-2.7	3.0	2.6	-0.8	3.2
Gross domestic product	1.9	1.0	0.1	1.4	0.5	-0.8	1.5	-1.0	-0.2	0.3
Mainland Norway (market prices)	1.7	1.3	-0.2	0.2	1.0	0.7	-0.6	0.5	-0.6	-0.6
Petroleum activities and ocean transport	2.7	0.0	1.0	5.2	-0.8	-5.4	8.0	-5.3	0.8	3.0
Mainland Norway (basic prices)	1.6	1.1	-0.1	0.1	1.0	0.7	-0.5	0.3	-0.6	-0.6
Mainland Norway ex. general government	1.8	1.4	-0.3	0.1	1.2	0.5	0.6	-0.2	-0.7	-0.5
Manufacturing and mining	0.5	-0.7	0.0	-0.8	0.9	-1.9	3.3	-1.8	-2.2	-2.2
Production of other goods	-3.2	1.5	-3.4	-2.7	4.8	1.3	-1.1	2.2	-3.2	-3.8
Service industries	3.2	2.0	0.2	0.8	0.6	1.0	0.2	-0.2	0.3	0.6
General government	1.0	0.0	0.8	0.2	0.6	1.6	-4.1	1.9	-0.3	-0.9
Correction items	2.1	2.4	-0.8	0.9	0.8	1.0	-1.2	2.1	-0.3	-0.5

Source: Statistics Norway.

**National accounts: Final expenditure and gross domestic product**

Price indices. 2000=100

	Unadjusted		Seasonally adjusted							
	2001	2002	01.2	01.3	01.4	02.1	02.2	02.3	02.4	03.1
Final consumption exp. of households and NPISHs	102.4	103.1	103.2	102.6	102.3	102.1	102.6	103.2	104.0	106.0
Final consumption exp. of general government	107.3	111.6	106.5	107.4	109.9	108.6	111.2	113.0	113.1	114.9
Gross fixed capital formation	103.6	103.0	105.0	104.8	102.3	102.3	104.8	105.4	100.3	100.0
Mainland Norway	103.4	103.5	103.8	104.6	103.4	102.2	104.5	105.5	102.8	100.3
Final domestic use of goods and services	103.7	104.9	103.4	102.5	105.1	101.9	106.5	104.8	106.6	106.4
Final demand from Mainland Norway	103.8	105.3	104.1	104.1	104.4	103.8	105.1	106.1	106.1	107.4
Total exports	97.7	88.8	104.1	97.4	88.4	89.5	89.6	88.0	88.1	91.2
Traditional goods	97.1	88.7	99.2	96.1	92.7	91.0	89.4	87.3	87.2	86.4
Total use of goods and services	101.5	99.1	103.7	100.6	98.8	97.5	100.2	98.7	99.9	101.0
Total imports	100.0	93.8	101.2	99.1	97.9	95.9	94.4	93.1	91.9	92.3
Traditional goods	99.8	91.9	101.5	98.5	96.8	94.2	91.9	91.2	90.3	91.1
Gross domestic product	101.9	100.6	104.4	101.1	99.1	97.9	101.9	100.3	102.3	103.6
Mainland Norway (market prices)	103.8	106.4	104.1	103.3	105.1	103.5	107.3	106.8	108.0	107.0

Source: Statistics Norway.

**National accounts: Final expenditure and gross domestic product**

Price indices. Percentage volume change from previous period

	Unadjusted		Seasonally adjusted							
	2001	2002	01.2	01.3	01.4	02.1	02.2	02.3	02.4	03.1
Final consumption exp. of households and NPISHs	2.4	0.7	1.4	-0.6	-0.3	-0.1	0.5	0.5	0.8	1.9
Final consumption exp. of general government	7.3	4.0	1.3	0.8	2.3	-1.2	2.4	1.6	0.1	1.6
Gross fixed capital formation	3.6	-0.6	2.2	-0.1	-2.4	-0.1	2.5	0.6	-4.9	-0.3
Mainland Norway	3.4	0.1	1.7	0.7	-1.2	-1.2	2.3	0.9	-2.6	-2.4
Final domestic use of goods and services	3.7	1.1	-0.7	-0.9	2.6	-3.1	4.5	-1.5	1.7	-0.2
Final demand from Mainland Norway	3.8	1.5	1.4	0.0	0.3	-0.5	1.2	0.9	0.1	1.2
Total exports	-2.3	-9.1	2.6	-6.4	-9.3	1.3	0.1	-1.8	0.1	3.6
Traditional goods	-2.9	-8.7	-1.0	-3.2	-3.5	-1.9	-1.8	-2.3	-0.1	-1.0
Total use of goods and services	1.5	-2.4	0.5	-2.9	-1.8	-1.4	2.8	-1.5	1.3	1.0
Total imports	0.0	-6.2	-1.2	-2.1	-1.2	-2.0	-1.6	-1.4	-1.2	0.4
Traditional goods	-0.2	-8.0	-1.6	-3.0	-1.7	-2.6	-2.4	-0.8	-0.9	0.8
Gross domestic product	1.9	-1.3	1.0	-3.2	-2.0	-1.2	4.1	-1.5	2.0	1.2
Mainland Norway (market prices)	3.8	2.5	1.6	-0.8	1.7	-1.6	3.7	-0.5	1.1	-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 2000 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 2000 as the base year (common year of recalculation). The recalculation of prices is carried out at the sectoral level of the quarterly national accounts.



# Regional labour market mobility by education and income

Lasse Sigbjørn Stambøl

*This article provides a study of regional mobility performance with focus on changes in education and personal income in a sample of nine Norwegian labour market regions. The analysis shows that the level of education was significantly higher amongst the employed moving between regions compared to that of the non-mobile and the employed changing job within regions. The larger regions experienced a “brain-drain” through the migration process during the recession period in the beginning of the 1990s, whilst the smaller regions benefited from a “brain-gain” over the same period. During the upswing period in 1996-97, this situation was reversed. The locally mobile employed exhibit a significantly higher income growth when compared with the non-mobile employed, and employed migrants showed an even higher increase in income than that of the locally mobile employed. In-migrants to Oslo, Stavanger and Tromsø experienced higher income growth compared with out-migrants from these regions. In the other regions however, out-migrants showed higher income increases than their in-migrant counterparts.*

## Introduction

In an economy where education and knowledge becomes more and more important, efficient and instant matching of demand and supply of competent labour is one of the most important elements in territorial competitiveness. In this article the ability to increase the input of, and the returns to human capital investments in different regions and sectors of the regional economy is analysed by using changes in average educational levels and changes in personal incomes among employed. The sections below give some illustrations to how these performances have been functioning in some Norwegian regions in the 1990s, exemplified by years of recession and economic upswing.

The analysis of labour market mobility is here limited to a sample of nine Norwegian labour market regions. The regions are aggregated into three main categories representing different types of local labour markets within the nation according to size and structure of the regional economy. The regions are chosen to consist of the three main conurbation regions of the nation (Oslo/Akershus, Bergen and Trondheim), three main regional centres including higher educational facilities as well as research institutes (Stavanger, Kristiansand and Tromsø), and finally three regional centres in smaller regions (Ålesund, Kongsvinger and Mo i Rana). The basic hypothesis is that some similarities should exist in labour market performance be-

tween regions showing a certain extent of structural conformity in size and diversification of production, whilst labour market performance in this respect is expected to diverge across more heterogeneous regions.

Labour market mobility is analysed by using recently established mechanisms for measuring regional labour market change (see e.g. Stambøl et al. (1999), Stambøl (2000)). The analysis goes beyond the traditional means of measuring net employment change by using gross-flow analysis both for the supply side, and for uncovering different possibilities on the demand side. This has enabled investigation of concise gross-flows in and out of different sectors and segments in the regional labour markets, i.e. a so-called “vacancy-account”. The analysis presented in this article represents, however, a sample of a more comprehensive investigation on local labour market performance (see e.g. Edvardsson et al. 2000, 2002, Persson ed. 2001, Stambøl 2001,2002).

## Data, definitions and methods

The analysis is mainly based on a sample of nine Norwegian regions, partly derived from a classification of economic regions used by Statistics Norway (see Hustoft et al. (1999)). Earlier investigations of geographical mobility in Norway have shown that the labour market and the level of education have a tendency to become increasingly important factors in explaining migration at a higher geographical level (see e.g. Stambøl, 1991,1994, Stambøl et al. 1998). In this analysis we use, however, somewhat more disaggregated regional levels classified on the basis of what may be identified as functional regions.

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Another important aspect in the analysis of labour market mobility is the classification of individuals according to their labour market status; e.g. employed, unemployed, under education or outside the labour force. In earlier migration analyses we used this division first on cross-sectional data (Stambøl 1995a,b), followed by investigations stressing supply-side adjustments and demand-side considerations in the regional labour markets where the propensity of change in the labour market status of each individual was analysed using gross-flow data (see e.g. Johansson et al.1997,1998, Heikkilä et al.1999, Heikkilä and Stambøl 1999, Stambøl et al.1996,1997,1999 and Stambøl 1998,1999,2000a,b). In this article the aim is, however, primarily to analyse the change of educational level and personal income among employed persons in regions and sectors connected to job-migrants, as well as investigating how these transitions operate within different and to a certain extent similar local labour markets. It was thus important to compare changes in labour market mobility among employed migrants and non-migrants, investigating the local labour market's inter- and intra-regional transitions. The necessary data for all employed persons was therefore established. The data, which covers whole populations, was collected from register-based data sources at Statistics Norway.

The end of the 1980s and the first years of the 1990s represented a clear cyclical downturn in the Norwegian economy, though the nation experienced a recovery during 1993 followed by significant economic growth in the period 1994-1998. In the analysis put forward here the comparison of the inter- and intra-regional labour market transition is based on changes over two two-year periods, where 1990-91 is chosen to represent a recession period and 1996-97 represents a period with strong growth in the national economy.

Migrants are here defined as employed persons living in different regions in the first and second year of each period. The analysis focuses predominantly on internal migration in Norway, that is to say, migration between regions within the country.

The status groups are defined as follows: *Employed persons* are individuals included in a set of different register-based labour market data sources. Besides there are also given definitions of unemployed persons, persons under education and other persons outside the labour force. For more details see e.g. Stambøl (2002). Problems of status occur, however, when employed persons are found in more than one of the registers defining these status groups. It is possible that one person may be included in several registers mentioned, e.g. partly employed, partly unemployed and partly under education in the same year. To solve this problem in the classification of employed persons

we have made following suppositions: Employed also registered as unemployed are defined as employed if the period of unemployment did not exceeds six months; otherwise they are defined as unemployed. Employed also included in the register of persons under education are defined as employed.

Definitions of changes of sectors follow similar patterns as the definitions of migrants, where the Norwegian data shows the economic sector of each employed person in the first and second year of each period. A definition of other variables includes age, the level of education and annual personal income. Individuals of working age are defined as persons within the 16-64 year age group. This age group was chosen because the analysis is part of Nordic comparisons, though it differs somewhat from the normally used definition of working age in Norway, namely people from 16-74 years of age. In this analysis a concept of "average educational level" is however introduced, calculating the average level of education in regions, sectors and among stayers and movers on the basis of the educational level in the Standard Classification of Education (one-digit-level). Following the classification of education each employed person is given a "score" for the educational level as follows:

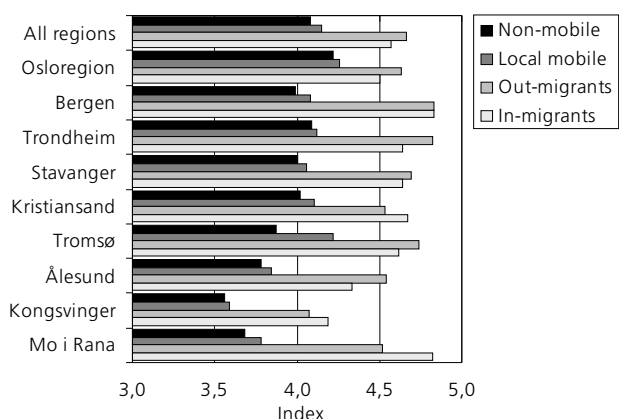
Compulsory education	= 2 points
Upper secondary school (second stage I)	= 3 points
Upper secondary school (second stage II)	= 4 points
Post secondary education (Higher education) (1-2 years)	= 5 points
Post secondary education (Higher education) (3-4 years)	= 6 points
Post secondary education (Higher education) (5 years and more)	= 7 points
Post secondary education (Doctoral degree)	= 8 points

This means that the points are given in accordance with the educational level in the standard classification at one-digit-level (NUS89). Making aggregations of the points for all kinds of groups divided by the number of employed in each group makes the average educational level for that group.

The concept of income is here defined by personal income, mainly covering the annual wages each person obtain by ordinary work.

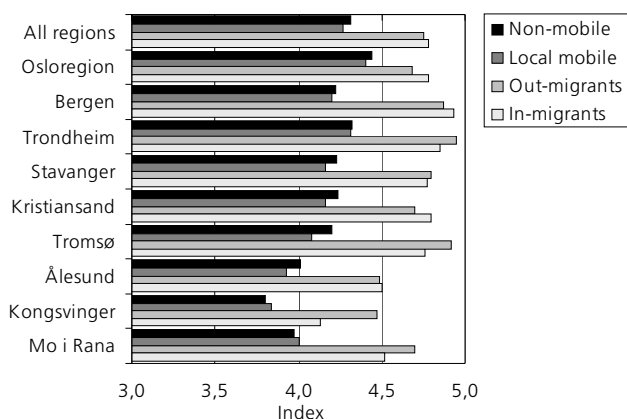
Finally labour market mobility is in this article defined as mobility among employed persons between and within twenty-one economic main sectors and one unspecified sector (see the sectors in tables below) and/or migration between regions.

**Figure 1. Average educational level 1990-91 among employed 16-64 years broken down by non-mobile, local mobile, in- and out-migrants. By region.**  
Index: Calculated classification of education



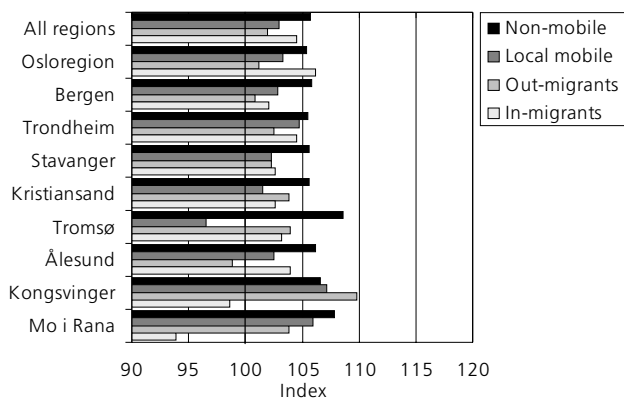
Source: Statistics Norway.

**Figure 2. Average educational level 1996-97 among employed persons 16-64 years broken down by non-mobile, local mobile, in- and out-migrants. By region. Index: Calculated classification of education**



Source: Statistics Norway.

**Figure 3. Average educational level 1996-97 in relation to average educational level 1990-91 among employed persons 16-64 years broken down by non-mobile, local mobile, in- and out-migrants. By region. Index: Average educational level 1990-91=100**



Source: Statistics Norway.

## Empirical analyses of “qualitative” labour market mobility

### The mobility of human capital

In e.g. Persson ed. (2001) and Stambøl et al. (1999, 2002) we have mainly analysed the quantitative aspects of the regional labour mobility measuring the gross and net streams of intra- and interregional mobility by number of persons. In this article we examine the “qualitative” impacts of labour mobility between and within regions and sectors. Well-functioning regions are expected to become net receivers of labour from other regions. In addition these regions are also expected to attract the most qualified labour and thus be the winners in the competition for the best human capital. On the other hand the most qualified labour expects to achieve as much returns to their human capital investments as possible, pushing their careers in direction of those regions and sectors that actually give the best return. This section is thus stressing two main aspects of these topics, first analysing the regional and sectional competitiveness for the most qualified labour, and second, analysing the return to human capital by help of the changes in personal income.

#### Changes of educational level. “Brain-drain” or “brain-gain”?

For an examination of the two concepts “brain-drain” (a relative loss of qualified persons) and “brain-gain” (a relative gain of qualified persons), we have introduced the concept of average education (for definition see the section above). As described in Stambøl (2002), it was a clear tendency to increase the educational level of the population in all regions during the 1990s, and especially then for the number of people with higher education. In this section we examine which groups contribute most to the rise of the educational level among employed in each region. In figure 1 the average educational level of employed migrants, local mobile employed and local non-mobile employed are shown during the recession years in the beginning of the 1990s. It was a clear tendency that the local mobile employed had a somewhat higher educational level compared to that of the local non-mobile employed. On the other hand employed in- and out-migrants showed a considerably higher educational level when compared with employed non-migrants. This indicates that the migration streams of employed persons include those of a high qualification level in addition to the actual numbers represented. This indicates that the regional competition for employed migrants becomes even more important. Analysing the “brain-gain”, “brain-drain” through regional migration in this way, it is noteworthy that the Oslo region experienced such a “brain-drain” of employed persons in this period, showing higher educational level among employed out-migrants compared with employed in-migrants. As earlier described, the recession period hit the capital region and other

central regions as much as other regions. This can also be seen from a “brain-drain” of employed migrants in regions as Trondheim, Stavanger and Tromsø, while the region of Kristiansand and the smaller regions of Kongsvinger and Mo i Rana experienced a “brain-gain” of employed migrants in these years.

Figure 2 shows similar results from the period of economic upswing in the second half of the 1990s. Like in the recession period, the educational level of employed migrants was considerably higher than that in the category “other employed”. The central regions of Oslo and Bergen in addition to the region of Kristiansand all then showed a “brain-gain” through the migration process, whilst the regions of Tromsø, Kongsvinger and Mo i Rana experienced a “brain-drain” correspondingly. Considering the majority of employed persons who did not migrate, the educational level now seemed to have been somewhat higher among non-mobile compared with local mobile. This may be even better illustrated from figure 3, which shows the average educational level among employed in the boom period 1996-97 in relation to the average educational level among employed in the recession period at the beginning of the 1990s. Looking at the average figures for all regions, actually all groups of employed increased their educational level between these periods. The figure indicates, however, that employed non-mobile has increased their educa-

tional level most during the 1990s. In-migrants to jobs also showed a significant rise in their educational level, whilst out-migrants from jobs showed the lowest improvement of their education. Considering the regional figures, the improvement of education of local non-mobile employed was generally high in all regions, but most remarkable in the northern regions of Tromsø and Mo i Rana. In Tromsø this was, however, counterbalanced by a decrease of the educational level among local mobile employed during the 1990s. The increased “brain-drain” through the migration processes in the smaller regions of Kongsvinger and Mo i Rana was recognised through a fall in the educational level of in-migrants to jobs during the 1990s, as well as through a considerable increase in the educational level of out-migrants from these regions.

Moreover, the “brain-gain”, “brain-drain” approach also poses important questions in terms of regional competitiveness across the different sectors. What are the net effects of the “brain-gain” and “brain-drain” processes across the regions and sectors? The table 1 illustrates the interregional competitiveness of qualified persons between sectors in 1996-97.

As shown in table 1, pharmaceutical production, finance and energy experienced the highest “brain gain” through the migration processes, whilst the most pronounced “brain-drain” sectors through

**Table 1. Differences in the average level of education among employed in- and out-migrants in 1996-1997. By sector and region.**  
Index: Average level of education of out-migrants in each sector = 100

Sector	Oslo/ Akershus	Bergen	Trond- heim	Sta- vanger	Kr. sand	Tromsø	Ålesund	Kongs- vinger	Mo i Rana	Norway
1. Primary/mining	104	97	110	92	105	90	100	89	100	99
2. Manuf. Raw material	95	94	103	95	103	-	80	111	142	100
3. Manuf. Labour int.	108	100	103	93	105	94	102	87	90	100
4. Machine/transport	105	105	101	93	113	103	102	81	108	99
5. Electro	105	108	87	96	111	100	103	96	-	100
6. Publishing/Printing	101	88	92	113	107	98	105	106	83	100
7. Energy	111	95	103	100	103	77	95	86	106	101
8. Pharmaceutical prod.	97	-	163	-	125	-	-	-	-	102
9. Construction	103	99	100	101	102	96	102	94	94	100
10. Retail	102	101	100	95	97	100	102	96	106	99
11. Hotel/restaurant	102	101	97	96	100	108	96	98	79	99
12. Wholesale	103	93	94	100	97	98	104	92	101	100
13. Transport	105	100	99	96	102	96	105	93	91	99
14. Post/telecom.	103	112	90	94	91	95	82	113	100	99
15. Finance	102	103	97	99	106	100	103	83	102	101
16. Inf. technology	97	105	95	102	109	103	122	92	79	98
17. Culture/sport	97	91	89	99	108	99	103	126	79	100
18. Basic education	98	99	100	96	100	99	101	107	102	99
19. High education/R&D	101	104	91	101	116	93	113	71	91	100
20. Health and social	101	105	96	98	100	95	101	90	97	99
21. Public adm.	102	97	100	98	103	101	93	95	93	99
22. Unspecified	104	70	87	95	89	93	80	-	-	97
All sectors	102	101	98	99	102	97	100	92	96	100

Source: Statistics Norway.

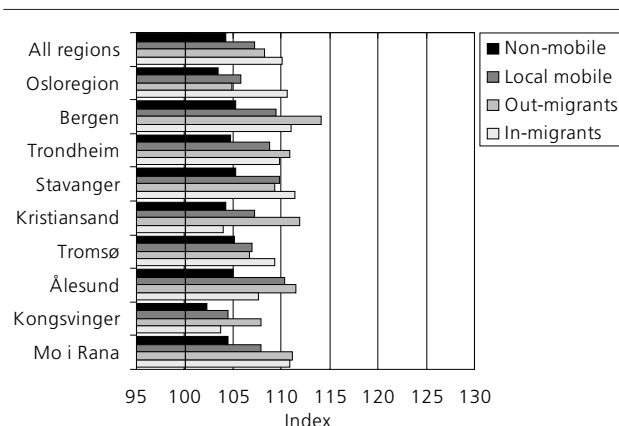
migration were machine and transport production, retail, hotel and restaurant, transport, the non-market services and somewhat more surprisingly information technology and post and telecommunication. At the regional level the most pronounced “brain-gain” effect from internal migration were to be found in the raw material manufacturing in Mo i Rana. The number of migrants behind this changes were, however, not so very high. Other strong “brain-gain” sectors from migration at the regional level were raw material manufacturing in Kongsvinger, machine and transport production in Kristiansand, energy in Oslo, post and telecommunication in Bergen and Kongsvinger, information technology in Ålesund and culture and sport in Kongsvinger. The “brain-gain” effect of migration in pharmaceutical production was even higher in Trondheim and Kristiansand, but there were very few migrants behind these figures. The most typical “de-qualification” branches from migration were energy in Tromsø, hotel and restaurant, information technology and culture and sport in Mo i Rana, and particularly higher education, research and development in Kongsvinger.

#### Income changes

In the same manner in which qualification streams were investigated in the previous section, this section illustrates the income changes in the different mobility groups and sectors. In figure 4 the income change among employed migrants, the local mobile employed and the local non-mobile employed is shown during the recession years at the beginning of the 1990s. It was a clear tendency that non-mobile employed had a weaker income growth compared with employed persons that were mobile within or between the regional labour markets. This supports the expectation that when employed persons choose to change their jobs, they mostly do this when achieving a higher income. Another important factor is the educational level. As shown in the section above, the mobile employed almost generally have higher educational level than non-mobile employed. In this context we thus expect that migrants do achieve a higher income growth compared with other employed. In addition to different income levels within the local labour markets, income changes through regional migration also reflect the differences in income across regions. This is illustrated by the differences in income change between in- and out-migrants in the capital region of Oslo, showing much higher income growth amongst in-migrants compared to that of out-migrants. The opposite phenomenon was observed in many of the other regions, showing higher income growth among out-migrants compared to that of in-migrants.

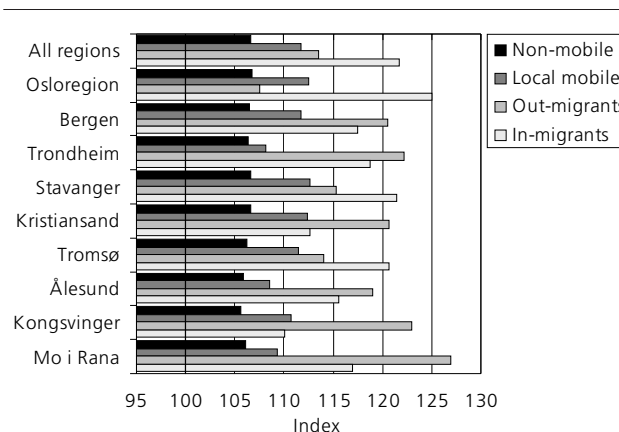
Figure 5 shows similar results from the economic upswinging period in 1996-97. The difference in income change between the groups was however now more consolidated, with lowest income change occurring amongst the non-mobile employed, and higher in-

**Figure 4. Income change 1990-1991 among employed persons 16-64 years broken down by non-mobile, local mobile, in- and out-migrants. By region. Per cent. Index: Income level 1990=100**



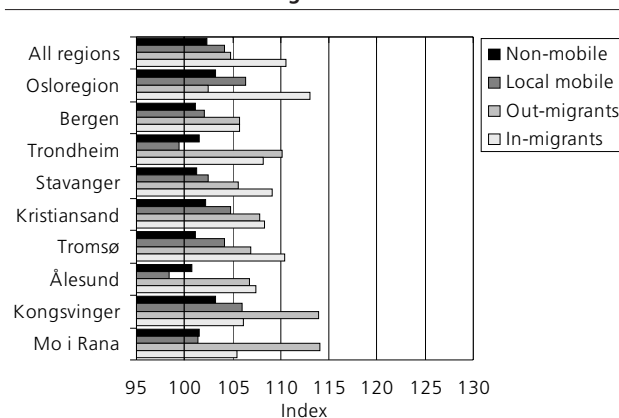
Source: Statistics Norway.

**Figure 5. Income change 1996-1997 among employed persons 16-64 years broken down by non-mobile, local mobile, in- and out-migrants. By region. Per cent. Index: Income level 1996=100**



Source: Statistics Norway.

**Figure 6. Income change 1996-97 in relation to income change 1990-91 among employed persons 16-64 years broken down by non-mobile, local mobile, in- and out-migrants. By region. Per cent. Index: Income change 1990-91=100**



Source: Statistics Norway.

**Table 2. Differences in income change among in- and out-migrants in 1996-1997. By sector and region.**  
**Index: Average income change of out-migrants in each sector =100**

Sector	Oslo/ Akershus	Bergen	Trond- heim	Sta- vanger	Kr. sand	Tromsø	Ålesund	Kongs- vinger	Mo i Rana	Norway
1. Primary/mining	96	98	75	101	85	105	98	99	77	90
2. Manuf. Raw material	107	83	91	107	110	-	99	85	107	99
3. Manuf. Labour int.	115	94	100	109	121	102	115	83	92	102
4. Machine/transport	112	92	83	115	104	102	101	86	100	101
5. Electro	130	84	108	108	86	342	96	96	-	108
6. Publishing/Printing	121	90	106	76	81	85	143	74	125	102
7. Energy	99	104	94	106	98	107	87	108	98	101
8. Pharmaceutical prod.	110	-	113	-	106	-	-	-	-	97
9. Construction	113	95	95	96	100	101	110	95	114	100
10. Retail	110	97	107	97	85	106	95	82	85	95
11. Hotel/restaurant	117	96	87	98	105	114	78	68	86	94
12. Wholesale	129	101	99	110	98	104	90	94	105	103
13. Transport	117	105	100	95	80	107	97	91	94	101
14. Post/telecom.	126	88	93	89	73	96	70	94	67	100
15. Finance	123	106	98	107	97	104	83	86	75	101
16. Inf. technology	128	77	96	111	61	79	101	57	101	103
17. Culture/sport	114	101	108	83	89	98	149	89	90	101
18. Basic education	116	93	107	118	97	109	99	82	85	102
19. High education/R&D	105	93	102	95	79	102	67	89	69	95
20. Health and social	112	90	99	110	90	112	94	89	104	100
21. Public adm.	110	99	90	105	97	102	87	106	92	101
22. Unspecified	92	162	97	87	60	121	64	-	-	95
All sectors	116	97	97	105	93	106	97	90	92	100

Source: Statistics Norway.

come growth generally taking place amongst migrants as opposed to those classed as local mobile employed. Strong income growth was particularly prevalent amongst in-migrants to the region of Oslo. As described in the section above, the "brain-gain" of the migration processes was significant in the capital region in these years, adding to the regional differences in income level, which may reflect the relative lower income growth of out-migrants from Oslo. The regions of Stavanger and Tromsø also showed higher income growth among in-migrants compared to that of out-migrants. This was somewhat surprising in the region of Tromsø, experiencing a clear "brain-drain" through the migration processes in this period. It may, however, be important to take into consideration a hypothesis, whether employed migrating to Tromsø from other parts of Northern Norway increased their income more than higher educated employed migrating from Tromsø to other parts of the country. It is in this context also important to note that there was a very sharp rise in income amongst out-migrants from the smaller regions of Kongsvinger and Mo i Rana, reflecting very high economic returns through moving to other regions (see figure 5).

In figure 6 the income change during the economic upswing in 1996-97 is compared with the income change in the recession period in the beginning of the 1990s. As expected, the increase of income follows

the economic cycles with higher income rise during the upswing period. Also in this context, the income winners in the regional labour markets were those who chose to move to Oslo, Stavanger and Tromsø or out-migrated from the smaller regions of Kongsvinger and Mo i Rana. On the other hand it may be noticed that the income losers have been the local mobile employed in the regional labour markets of Trondheim and Ålesund, showing lower income increase during the economic upswing period than in the recession period. It has to be noticed, however, that these groups actually had a relatively high income growth during the recession period in the beginning of the 1990s.

The level of income change is also an important target in the regional competitiveness calculations of different sectors. In table 2 the income change amongst the interregional cross sector mobile group is shown for regions and sectors in the 1996-97 period. In the table the average income change of out-migrants from each sector is set at 100, thus index entries above and below 100 illustrates that entries to these sectors show either higher or lower income rises when compared to their leaving counterparts.

Here the manufacturing sectors showed higher income growth amongst those who in-migrated to jobs in relation to those who out-migrated from jobs. The

sectors that recruited “cheaper” labour than they exported were to be found in the primary sectors in addition to the service sectors of retail and hotel and restaurant and somewhat more surprisingly in higher education, research and development. At the regional level, the electro sector, wholesale, post and telecommunication and information technology were the sectors that predominantly contributed to the very high income increase amongst in-migrants to Oslo. Actually all sectors in the capital region, except for the primary sectors and energy, contributed to higher income growth for in-migrants when compared to their out-migrant counterparts.

The relatively high income growth for in-migrants compared with out-migrants in Tromsø was observed in most of the sectors, but it was noteworthy to recognise that in growing sectors such as publishing and printing, telecommunication and information technology, the income increases were relatively higher amongst out-migrants. The very strong income increase of out-migrants compared to that of in-migrants in Kongsvinger and Mo i Rana, was mostly due to out-migration from sectors such as retail, hotel and restaurant, finance and basic education. In addition the relative income rises were remarkable among out-migrants from publishing and printing and information technology in Kongsvinger and post and telecommunication and higher education, research and development in Mo i Rana.

#### 4. Concluding remarks

- The level of education was significantly higher amongst the employed moving between regions compared to that of the non-mobile and the local mobile employed. This difference was, however, slightly reduced during the 1990s, due to the relatively sharper rise in educational levels amongst the non-mobile employed.
- The central regions experienced a “brain-drain” through the migration process during the recession period, whilst the smaller regions benefited from a commensurate “brain-gain” over the same period. During the upswing period in 1996-97, this situation was clearly reversed. Pharmaceutical production, finance and energy experienced the highest “brain-gain” through migration, whilst the most pronounced “brain-drain” through migration occurred in sectors such as machine and transport production, retail, hotel and restaurant, transport, the non-market services and, perhaps a little more surprisingly, in information technology and post and telecommunication.
- The local mobile employed exhibit a significantly higher income growth when compared with the non-mobile employed, and employed migrants showed an even higher increase in income than that of the local mobile employed. In-migrants to Oslo, Stavanger and Tromsø experienced higher income

growth compared with out-migrants from these regions. In all other regions however, out-migrants showed higher income increases than their in-migrant counterparts. Higher income rises amongst in-migrants compared with their out-migrant counterparts were most pronounced in the labour intensive manufacturing sectors, electro production, in printing and publishing and in service sectors like wholesale, information technology and basic education.

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### Discussion Papers

*Torstein Bye: **On the Price and Volume Effects from Green Certificates in the Energy Market.*** DP no. 351, 2003. 31 pages.

We present a model for an energy market that includes a green certificate for suppliers of energy from renewables and a purchaser commitment to buy these certificates. We show that price and volume effects in the energy market are ambiguous under a wide range of alternative levels of the purchaser commitment. We calibrate our model to data for the Norwegian economy. Simulations shows a downward movement in energy prices as the government starts increasing the level of the purchaser commitment. This implies that the producer of ordinary energy pays for the restriction in the market while energy consumption and consumer surplus increases. When the purchaser commitment increases above a certain level, the purchaser price increases and the volume effect is negative. Although the effects are sensitive to elasticities of demand and supply of both technologies, the main results are robust against a variety of combinations of elasticities. The article discusses effects both under autarky and free trade of both energy and green certificates. The results vary dependent upon whether only one or a majority of actual countries introduces a domestic market or allows for international trade both in energy and the green certificate instrument.

*Jan Larsson: **Testing the Multi-product Hypothesis on Norwegian Aluminium Industry Plants.*** DP no. 350, 2003. 26 pages.

Although most production activities involve multiple outputs, econometric models of production or cost functions normally involve only one single homogeneous output. The aim of this paper is to test the hypothesis that a multiproduct specification is superior to a model with a single homogenous product. To do this, we use a Multi-product Symmetric Generalized McFadden (MSGM) cost function. This functional form is globally concave and flexible in the sense that it provides a second order differentiable approximation of any arbitrary cost function which is twice continuously

differentiable and linear homogenous in input prices. In an empirical application on a panel data from ten Norwegian primary aluminium plants, we find support for our hypothesis. We present estimates of price elasticities, returns to scale and scope, and product specific demand elasticities. Our results indicate economies of scope, i.e. it is more profitable to produce more than one output, and show sensitivity of factor demand when the product mix changes.

*Bjart Holtsmark: **The Kyoto Protocol without USA and Australia - with the Russian Federation as a strategic permit seller.*** DP no. 349, 2003. 40 pages.

After the U.S. and Australian withdrawal from the Kyoto Protocol, and the extension of national quotas in the Bonn- and Marrakesh-agreements, meager environmental effects and a low price of emission permits is likely to be the outcome of implementation. This paper provides an analysis of these prospects for the Kyoto Protocol and the international permit market based on different assumptions related to the baseline scenario. Possible strategic behavior in the permit market is emphasized: A contribution of the paper is to take into consideration potential conflicting Russian interests in the market for natural gas in Europe and the market for emission permits under the Kyoto Protocol. The Russian Federation is a large supplier with the potential for exercising market power in both these markets. The analysis shows that the Russian interests in the gas market may lead Russia to increase export of emission allowances and consequently contribute to a low permit price. The applied analytical tool is a partial equilibrium model of the market for emission allowances and the fossil fuel markets.

*Søren Johansen and Anders Rygh Swensen: **More on Testing Exact Rational Expectations in Cointegrated Vector Autoregressive Models: Restricted Drift Terms.*** DP no. 348, 2003. 13 pages.

In this note we consider testing of a type of linear restrictions implied by rational expectations hypotheses in a cointegrated vector autoregressive

model for I(1) variables when there in addition is a restriction on the deterministic drift term.

*Bente Halvorsen, Bodil M. Larsen and Runa Nesbakken: **Possibility for hedging from price increases in residential energy demand.*** DP no. 347, 2003. 23 pages.

Liberalisation of the Norwegian electricity market has given more short-term variation in the electricity price. Since almost three quarters of Norwegian households have heating equipment using more than one energy carrier, we would expect them to be able to hedge from price increases and benefit from low prices by switching between energy carriers. In many studies estimates of the cross price derivatives in Norwegian residential energy consumption give a negative sign. The question is whether hedging is possible despite this negative sign, that is, if energy goods are alternatives and not separable in consumption. To answer this question, we estimate a conditional demand model on a sample of 2438 households to decompose the cross price derivatives. We find that the negative cross price derivatives are mainly due to budget effects. We also reject the hypothesis of weak separability, indicating that Norwegian households are able to hedge from energy price variations.

*Bodil M. Larsen and Runa Nesbakken: **How to quantify household electricity end-use consumption.*** DP no. 346, 2003. 28 pages.

Information about total electricity consumption is available for most households. However, the electricity consumption related to different end uses, e.g. space heating, water heating, lighting and services from household appliances are usually not metered. Metering data are very costly to achieve, and in this paper we study two methods for end-use estimation, which can be applied on household data for appliance holdings, demographic and economic variables. The first method is the engineering model which has been used to calculate the so far only documented Norwegian end-use results applied on data from a Norwegian energy survey. The second method is an econometric conditional demand model applied on data

from the same survey. We compare the numerical results from the two models and give some recommendations regarding choice of end-use approach and what questions to implement in household surveys designed to disaggregate electricity consumption.

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