

Economic Survey

Statistics Norway



Statistisk sentralbyrå

3/99

Economic trends

- National accounts for 1 and 2 quarter 1999
- Overview of international and Norwegian economic developments
- Forecasts for the Norwegian economy for 1999, 2000 and 2001

Articles

- Profits in the Norwegian electricity sector
- Factors determining residential electricity use

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Volume 9

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Economic Survey

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Economic trends*

New national accounts figures for the period to the end of the second quarter of 1999 provide further evidence that the cyclical upturn in the mainland economy has come to an end. After expanding by 3.5 per cent annually for five-six years, mainland GDP showed little change over the last four quarters. Employment appears to have stabilized and the decline in unemployment has come to a halt. So far this year consumer prices have risen at about the same pace as through 1998, while wage growth appears to be somewhat lower than last year. As a result of a pronounced fall in imports and a sharp rise in oil prices, the current account is again showing a surplus, and the Norwegian krone has appreciated considerably against the euro.

Just as the cyclical upturn earlier in the 1990s was fuelled by broadly based growth in demand, there are a number of factors which are now contributing to a slowdown:

- Investment is falling after expanding sharply for several years
- Lower growth among Norway's main trading partners and reduced cost competitiveness are resulting in weaker impulses for traditional exports
- Fiscal policy has been cautiously tightened this year
- Monetary policy has moved in a contractionary direction through an increase in interest rates.

However, the effects of the increase in interest rates in the second half of 1998 are now gradually being reversed, in step with a decline in interest rates. Household demand is thus likely to pick up slightly next year, and the decline in mainland fixed investment may come to a halt. On the other hand, petroleum investment will probably show a considerably stronger decline in 2000 than in 1999. All in all, developments in demand point to virtually zero growth in mainland GDP this year, and a relatively moderate increase next year. However, with an evening out of petroleum investment, a stabilization of interest rates and slightly brisker growth in exports, the growth in mainland GDP may again approach a normal level in 2001.

The many investment projects that have been carried out the last few years will probably contribute to stronger productivity gains in the Norwegian economy the next two years than the level recorded over the previous three years.

Employment will thus only show a modest increase. With a slight demographically related growth in the labour force, unemployment is therefore likely to increase moderately. Slightly reduced pressures in the labour market will contribute to somewhat lower wage growth the next two years compared with the previous three years. Reduced wage growth and relatively stable import prices indicate that consumer price inflation may be brought down towards the level prevailing in the euro area during the next three years. A sharp rise in petroleum production as a result of extensive development in the North Sea over the past few years will contribute to very substantial surpluses in the current account even if the oil price does not remain quite at the current high level.

The large current account surpluses projected for the next few years reflect the onset of a harvesting phase in the North Sea, with historically high production and relatively low investment. The estimates for the current account are therefore very sensitive to changes in oil prices. Developments over the past year demonstrate that fluctuations in this price quickly feed through to the krone exchange rate, and may therefore have unexpected consequences for developments in the mainland economy.

Other factors also contribute to some uncertainty regarding the above-mentioned projections for the Norwegian economy. According to our estimates, Norway will enter the next millennium with an unemployment rate that is lower than in 1997, historically high labour force participation rates and virtually full capacity utilization. The economy will therefore continue to be vulnerable to an unexpected sharp growth in demand, for example from the petroleum sector or households. The labour market may also tighten quickly if productivity gains do not approach historically normal levels.

Main indicators for the Norwegian economy

Growth from previous year. Per cent

	1997	1998	1999	2000	2001
GDP	4.3	2.1	0.5	3.6	2.5
- mainland Norway	4.4	3.3	0.3	1.0	1.9
Consumption in households and non-profit organizations	3.7	3.1	1.8	2.4	2.6
Unemployment rate	4.1	3.2	3.2	3.5	3.6
Consumer price index	2.6	2.3	2.3	2.0	1.9
Current balance ¹	5.2	-1.5	2.0	7.3	10.1

¹ Per cent of GDP.

* Translated from Økonomiske analyser 6/99 by Janet Aagenæs.

International economy

The estimates for GDP growth among Norway's trading partners in 1999 have been revised slightly upwards the last few months and now stand at 2.0 per cent according to Consensus Forecasts. With a stabilisation in Asia and the prospect of somewhat higher growth in the EU, it appears that growth among our trading partners will edge up in 2000 and 2001. The combination of high growth and low inflation continues in the US, although several years with a considerable decline in saving have made household demand sensitive to downward corrections in the stock market. The oil price has continued to rise. In August it was about 30 per cent above the level three months earlier, which means that it has more than doubled since the trough level in December last year. Other commodity prices are also edging up, albeit at a considerably slower pace.

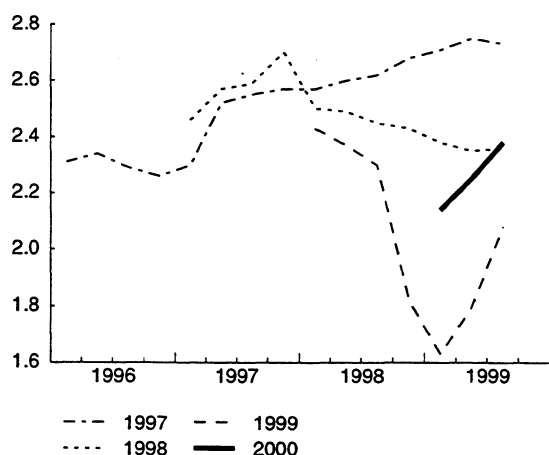
The US

As in the last few years, the US will again in 1999 be the most important driving force for growth in the international economy. The country is an important trading partner for Norway, but is also of considerable indirect importance by virtue of its size. Following a prolonged expansion with very moderate price inflation, a sharp turnaround still does not appear to be in sight. GDP grew by 1.1 per cent in the first quarter, and preliminary figures indicate that growth in at least domestic demand has remained high in the second quarter. Private consumption has helped to fuel the ongoing upturn. However, buoyed by a sharp increase in households' equity wealth, growth in consumption has been higher than income growth for some time. The saving ratio, which does not take account of changes in the valuation of wealth, has therefore fallen, and is estimated at -1.1 per cent in the second quarter. Investment has also increased considerably the last few years. The Federal Reserve has estimated that accelerated investment and a

precautionary build-up in inventories in preparation for the next millennium will amount to 0.7 per cent of GDP during 1998 and 1999. In such an event this investment will to a large extent be reduced by a comparable amount in 2000. Monetary policy has been tightened with the Federal Reserve increasing its key rates by altogether 0.5 percentage point in the course of the summer. Slightly improved prospects for Europe and Asia may entail a positive external growth impetus, but this impetus is being counteracted by the strengthening of the dollar over the last three years. The trade deficit is therefore likely to remain high the next few years. All in all, GDP growth is likely to be reduced, but without any pronounced turnaround. There is, however, considerable uncertainty associated with this picture, partly as a result of developments in share prices. They have risen sharply for a longer period, and there is a widespread perception that a correction in share prices is likely. If there is a pronounced turnaround in the stock market, this may translate into a marked decline in consumption growth and considerably lower growth in the level of activity than we assume. The effect may be amplified by developments in saving, which have made household demand particularly sensitive to changes in the value of wealth. In *Economic Survey 3/98* we used the macroeconomic model NIGEM to estimate the potential effects of a global fall in equity prices of 30 per cent. The result for the seven major industrial countries was a decline in GDP of -0.8 per cent and in consumer prices of -1.2 per cent. It seems reasonable to assume that the effects will be greater in the US than in the rest of the area inasmuch as US households have a higher proportion of their wealth in shares and a lower saving ratio than households in other major industrial countries.

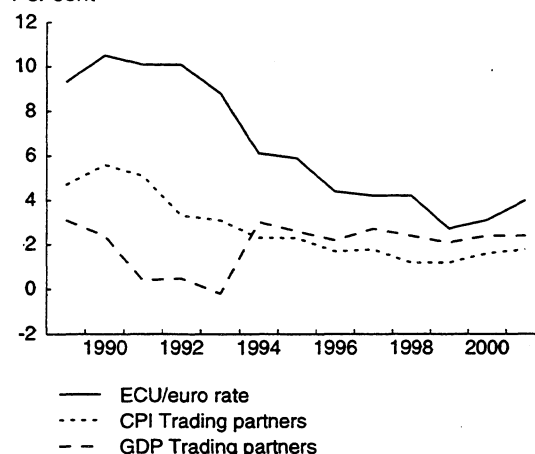
The US recorded unusually high inflation figures in April, but so far they do not appear to have been much more than

GDP-growth forecasts for Norway's main trading partners for 1997 - 2000 given on different dates



Source: Consensus Forecasts.

GDP and consumer price growth for Norway's main trading partners, and 3 month ECU/euro rate



Source: Statistics Norway.

a blip. Neither the producer nor the consumer price index rose by more than about a quarter of a per cent in July. This does not mean, however, that a moderate rise in inflation can be ruled out. Labour costs rose by 1.1 per cent through the second quarter. This was the sharpest quarterly rise since 1991, but it should be remarked that it followed an unusually low rise in the first quarter. Along with higher import prices, this may contribute to rising inflation. However, the magnitude of imported price inflation will depend on both oil prices and movements in the dollar exchange rate.

The EU

For Norway, economic developments in the EU are of particular importance. Our trade with EU countries accounts for almost 75 per cent of both our traditional exports and imports, and the volume of exports, import prices and Norwegian interest rates are very sensitive to changes in the European economy. At the beginning of 1999 developments in the EU were characterized by considerable differences between countries. Ireland, Spain, Portugal and, to some extent, France were expanding sharply, while Germany and Italy continued to lag behind. The situation in the UK was fairly bleak, with annual growth in GDP in 1999 estimated at only 0.5 per cent at the beginning of the year. Preliminary figures for industrial production in the first quarter and updated indices of business expectations may indicate that this asymmetry is being reduced. France, the UK, Germany and, to some extent, Italy all seem to be recording a higher level of activity in the second half of the year. On balance, it appears that growth will be moderate this year, but with the prospect of slightly higher growth next year. In 2001, the picture is again a little more mixed, with the prospect of a stable situation in Germany and a further increase in growth in the UK. Higher production costs in connection with the introduction of the 35-hour week may dampen growth in France. All in all, this would imply that the growth impetus from the EU will not change substantially from 2000.

An important factor behind the moderate upturn is higher private consumption in all of the major countries. The decline in inflation has contributed to boosting real wages, and the tax relief in Germany has had the same effect. Turnover is high and prices are rising in the housing market, particularly in the UK and France, developments which must be seen in connection with low interest rates in both the euro area and in the UK. The European Central Bank (ECB) reduced its key rates in April, and its British counterpart has lowered interest rates in three steps this year, most recently in mid-June. ECB President Duisenberg created expectations of a reversal of the interest rate cut when he in June acknowledged fears of accelerating price inflation, but these expectations were temporarily dampened in August when the ECB reported that so far price inflation is under control.

Higher demand from Asia may contribute positive impulses in the period ahead. Germany and Italy in particular

Economic forecasts for Norway's main trading partners

Annual per cent change

Country (Share of Norwegian exports ¹)	1997	1998	1999	2000
USA (7.1)				
GDP	3.9	3.9	3.8	2.7
Consumer price	2.3	1.6	2.2	2.5
Unemployment rate ² (level)	4.9	4.5	4.3	4.4
Japan (3.5)				
GDP	1.4	-2.8	0.2	-0.1
Consumer price	1.8	0.6	-0.3	-0.2
Unemployment rate ² (level)	3.4	4.1	4.9	5.4
Germany (12.4)				
GDP	1.8	2.3	1.6	2.5
Consumer price	1.9	1.0	0.6	1.4
Unemployment rate ² (level)	11.4	11.1	10.5	10.1
France (6.0)				
GDP	2.0	3.3	2.4	2.7
Consumer price	1.1	0.6	0.6	1.1
Unemployment rate ² (level)	12.5	11.8	11.2	10.7
United Kingdom (12.5)				
GDP	3.5	2.2	1.2	2.4
Consumer price ³	2.8	2.6	2.3	2.3
Unemployment rate ² (level)	5.5	4.7	4.6	4.7
Italy (3.4)				
GDP	1.5	1.3	1.2	2.3
Consumer price	1.8	1.7	1.6	1.7
Unemployment rate ² (level)	12.3	12.3	12.1	11.9
Sweden (12.7)				
GDP	1.8	2.6	2.8	3.1
Consumer price	0.5	-0.1	0.5	1.4
Unemployment rate ² (level)	8.0	6.5	5.6	5.3
Denmark (7.7)				
GDP	3.3	2.7	1.5	2.0
Consumer price	2.3	1.8	2.2	2.3
Unemployment rate ² (level)	7.7	6.3	5.7	5.8
The Netherlands (5.4)				
GDP	3.6	3.8	2.6	2.5
Consumer price	2.2	2.0	2.1	2.1
Unemployment rate ² (level)	5.5	4.2	3.9	4.1
Memo				
GDP trading partners	2.7	2.4	2.1	2.4
CPI trading partners	1.8	1.2	1.2	1.6
ECU interest rate	4.2	4.2	2.7	3.1

¹ Exports traditional goods. Figures for 1998 in per cent, according to Monthly Bulletin of External Trade, Statistics Norway.

² Per cent of labour force.

³ Exclusive interest rates.

Sources: Consensus Forecasts. Unemployment rates for Sweden, Denmark and the Netherlands from OECD.

were severely affected by the decline in demand in the wake of the Asian crisis, and should correspondingly benefit from a stabilisation and imminent upturn in the region. In Germany, Italy, the UK and France, manufacturing industry reports that new orders are high and that inventories have been reduced to normal levels. Inasmuch as trade within the EU is considerable, growth in the major countries may have spillover effects throughout the EU. However,

fiscal policy is tight, partly as a result of the Maastricht treaty's requirement concerning budget discipline and the prospect of an ageing population, and monetary policy is focused on low inflation. It is therefore unlikely that the EU will be able to take over the role of the US as the locomotive in the international economy in the years ahead.

The growth impetus for the EU's export sector has been strengthened by a depreciating currency in the euro area. Following the introduction of the euro on 1 January this year, the euro's value against the dollar fell fairly steadily in the period to mid-July. The currency's fall was then interrupted by the announcement of the greater likelihood of an increase in interest rates during the year, and it has since appreciated. In the long run expectations of more synchronized economic developments in the US and the EU may point to an appreciation of the euro. In isolation, however, the latest interest rate increase in the US points to the opposite, and at the moment it is unlikely that the euro will appreciate to the extent that this would seriously jeopardize conditions for the export sector.

The moderate rise in GDP growth will probably not make an important contribution to reducing unemployment. Unemployment rates have declined marginally so far in 1999, and the standardized rate stood at 10.3 per cent in June. Unemployment among young people under the age of 25 is about twice as high, in spite of a decline of about 1 percentage point during the last six months. There are still considerable national differences, with the forecasts for 1999 indicating 3.9 and 3.1 per cent unemployment respectively for the Netherlands and Luxembourg, and 17.4 per cent for Spain. One element of uncertainty is the effect of France's introduction of a 35-hour work week; the authorities' intention is that work sharing shall reduce unemployment, while critics predict higher unemployment as a result of higher costs for the state and the business sector.

Duisenberg's warning of higher inflation was partly based on high money supply growth. The ECB has a reference value for growth in the broad money supply measure M3 of 4.5 per cent, while growth has been over 5 per cent through the first half of the year. However, in spite of increases in energy prices associated with the rise in the oil price, the ECB declared that it was satisfied with price developments in its August report. In the report, the ECB pointed to strong competition as an important reason for the very moderate rise in prices. If we look at individual countries in the EU, the situation is less unequivocal. There are still substantial differences within EMU, and both Ireland and Portugal are set to record a rise in prices of more than 2.0 per cent, which is the ECB's definition of price stability.

Sweden is a small country in the EU, but an important trading partner for Norway. It is therefore worth noting that the forecasts for GDP growth have been revised upwards both for 1999 and next year. The OECD's latest country report presented a very positive picture of the Swedish economy, with balanced growth following a difficult period of

tightening. In accordance with this, the Swedish Economic Institute in its August report described an economy that will receive a positive growth impetus from household consumption, from private investment and from the export sector.

Asia

The export impetus from Asia has been an important factor behind the upturn in Europe. The ailing economies in Asia have improved more quickly than many feared, and industrial production is now increasing in most countries. In South Korea, GDP is now higher than before the Asian crisis began. Even though the pace is slower in some other countries, the situation in the entire area now seems to be improving. Many observers, however, emphasize that structural changes are still necessary for long-term stability and growth, and the region is very dependent on an improvement in the situation in Japan and continued growth in the US.

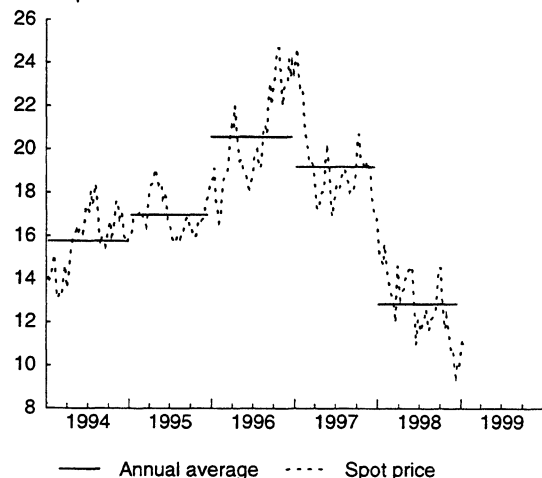
Consensus' projection for Japan's GDP growth this year has been revised upwards from -1.3 to 0.2 per cent during the past three months. Growth was surprisingly robust in the first quarter, but is unlikely to continue at the same high level. Domestic demand is largely being buoyed by a very expansionary fiscal policy, which is expected to be tightened partly due to steadily rising government debt levels. The improvement in neighbouring countries, however, is making a positive contribution, and in June Japan's trade surplus with Asia increased for the first time in five months. Figures for industrial production in June showed a weak decline from one year earlier, but compared with the dramatic fall earlier this year it may be seen as a fairly positive development. The business sector declares itself fairly optimistic about future prospects, and the yen has appreciated in recent weeks. A further appreciation of the yen, however, may create problems for the export sector and jeopardize the country's fragile growth. Japan is also facing substantial restructuring in the business sector which is feared to increase unemployment, delay investment and curb the upswing in private consumption. As a result, the growth projections for 2000 dip below zero, although higher growth is expected in subsequent years.

China is now an uncertain factor in Asia. The country avoided the most dramatic effects of the Asian crisis last year, but in 1999 it has experienced slower-than-expected growth, deflation and falling exports. In recent months the authorities have been somewhat less dismissive about the possibility of a devaluation of the currency – it is now emphasized that market forces determine the exchange rate. This spring the OECD presented calculations which indicate that any devaluation in China will have little impact on the Norwegian economy, but it may influence developments in the rest of Asia.

Oil market

The spot price of Brent Blend fell from a level of \$15 a barrel in September 1998 to about \$10 a barrel at the begin-

Spot price, Brent Blend. 1994-1999
Dollar per barrel



Source: Petroleum Intelligence Weekly.

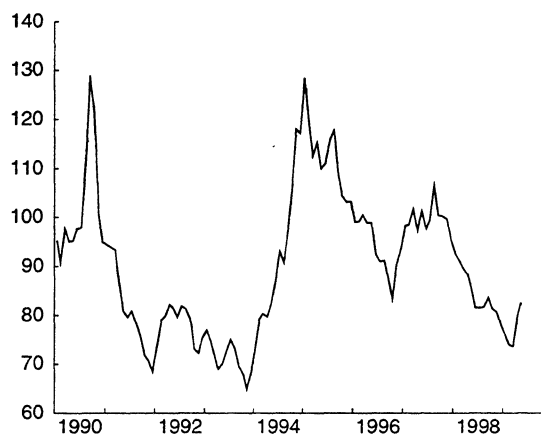
ning of 1999. Since March of this year, however, the oil price has risen at an unexpectedly sharp pace and stood at more than \$20 a barrel in August.

The current high level of oil prices must be assessed in the light of several factors. In March, OPEC decided to reduce production by 1.7 million barrels a day up to end-March 2000. In addition, some non-OPEC countries reduced production by altogether 0.4 million barrels a day. OPEC has fulfilled a little more than 90 per cent of the announced cuts, and confidence that cartel members will largely succeed in observing their production quotas has therefore increased. Increased demand for petrol in the US and, to some extent, in Europe since April may also have had a stimulatory effect on the oil price. In addition to a slight downward revision of the estimates for the cartel's production, the International Energy Agency (IEA) has increased its demand figures for both 1998 and the for the first half of 1999. This means that stocks were reduced by more than 1 million barrels a day in the first quarter, while as recently as May the IEA thought that stocks had remained fairly constant in this period. Many analysts are nevertheless of the view that the current oil price is higher than the level implied by the reduction in stocks, and that part of the increase in prices is based on expectations of future stock reductions in the third and fourth quarter.

The IEA projects that oil stocks will be reduced by about 2 million barrels a day in the second half of 1999. This is ascribable to the higher demand expected in Asia as a result of continued positive economic developments in the region, at the same time as it will take some time before the higher oil price results in higher production in non-OPEC countries. Furthermore, the IEA bases its forecasts on a normally cold winter in the western hemisphere, which will contribute to higher demand for heating oil.

In September, OPEC will hold its ordinary semi-annual ministerial meeting. At a preliminary meeting in August the energy ministers confirmed that the production cuts

Aluminium price. 1990 - 1999
Dollar based index. 1979=100



Source: World Metal Statistics.

would be maintained, at least until the end of March 2000. This is in line with expectations that OPEC will decide to wait for clear evidence of a substantial reduction in stocks before again increasing production quotas. If OPEC adheres to its reduced production quotas, oil prices can be expected to remain at approximately the current level through the winter. If, in addition, the expected reductions in oil stocks materialize, it seems likely that OPEC will decide to increase production from April next year. Along with some increase in production in non-OPEC countries, this will probably exert downward pressures on oil prices compared to the current level.

Commodity prices

In contrast to oil prices, other commodity prices have remained relatively low following the sharp fall for almost two years. *The Economist's* index fell by about 35 per cent from a peak in May 1997 until a trough was reached in March this year. The all-items index has shown small changes since then. Food prices, however, have continued to decline, while industrial raw materials, other agricultural goods and metal goods have risen slightly. In its May report, the HWWA (Institut für Wirtschaftsforschung-Hamburg) projected that commodity prices would level off during 1999 and then edge up through next year until reaching the level prevailing in early 1998. Price movements in the period after the report was presented indicate that prices for industrial raw materials, metals and metal goods may rise at a faster pace and more strongly than this. A stabilisation of the situation in Asia points to the same.

Norwegian economy

Developments so far in 1999

According to seasonally adjusted figures from the quarterly national accounts (QNA), mainland GDP declined slightly in the second quarter of 1999 after rising moderately in the previous quarter. The figures for the first quarter of 1999 have been revised downwards compared with earlier estimates, and it now appears that activity in the mainland economy has shown little change over the past year. New seasonally adjusted figures also indicate that demand from mainland Norway has exhibited a more sluggish trend than estimated earlier, with a moderate decline over the last four quarters. The situation in the labour market

has also been stable the past year, with relatively small changes in employment and unemployment. Consumer price inflation has remained at approximately the same level as through 1998, while the decline in imports and the sharp rise in oil prices help explain why Norway is again recording a substantial current account surplus.

Contractionary economic policy

According to the Ministry of Finance's budget indicator, the fiscal programme for 1999 entails a cautious tightening. In line with this, preliminary QNA figures for the

Macroeconomic indicators. 1997-1999

Growth from previous period unless otherwise noted. Per cent

	1997	1998	Seasonally adjusted			
			98.3	98.4	99.1	99.2
Demand and output						
Consumption in households and non-profit organizations	3.7	3.1	0.3	-0.8	1.2	0.2
General government consumption	2.8	3.7	1.0	0.5	-0.1	1.4
Gross fixed investment	15.1	8.1	3.6	4.6	-12.1	-6.3
- mainland Norway	12.8	2.4	1.0	0.5	-5.5	-5.8
- petroleum activities ¹	15.6	25.7	4.1	16.2	-21.4	-8.6
Final domestic demand from mainland Norway ²	5.2	3.1	0.6	-0.2	-0.4	-0.7
Exports	5.7	0.5	-3.7	2.9	-1.2	1.8
- crude oil and natural gas	2.1	-3.8	-8.2	6.5	-2.4	1.9
- traditional goods	8.0	3.4	2.2	-0.2	-0.6	0.7
Imports	12.0	9.1	-0.2	5.3	-6.3	-2.9
- traditional goods	8.1	9.6	-0.4	0.9	-0.6	-6.2
Gross domestic product	4.3	2.1	-0.7	-0.1	0.6	-0.9
- mainland Norway	4.4	3.3	0.1	-0.5	0.6	-0.7
Labour market³						
Man-hours worked	2.4	2.2	-1.1	0.9	-0.4	0.3
Employed persons	2.9	2.3	0.4	0.1	-0.1	0.6
Labour force	2.2	1.2	0.1	0.1	0.0	0.4
Unemployment rate, level ⁴	4.1	3.2	3.1	3.1	3.2	3.0
Prices						
Consumer price index ⁵	2.6	2.3	2.3	2.3	2.3	2.5
Export prices, traditional goods	0.5	1.0	-0.6	-0.6	-1.5	1.2
Import prices, traditional goods	-1.0	1.3	0.7	-2.0	-1.6	2.0
Balance of payment						
Current balance, bill. NOK	56.1	-16.3	-6.9	-16.2	0.1	6.2
Memorandum items (unadjusted, level)						
Money market rate (3 month NIBOR)	3.6	5.6	6.5	7.9	7.1	6.4
Average borrowing rate ⁶	6.0	7.2	7.6	9.7	9.3	8.5
Crude oil price NOK (level) ⁷	135.6	96.3	95.2	84.1	86.7	120.5
Importweighted krone exchange rate, 44 countries, 1996=100	99.5	101.7	102.3	102.8	101.9	99.5
NOK per ECU/eruo	8.02	8.46	8.53	8.82	8.60	8.24

¹ Figures for petroleum activities now covers the sectors oil and gas extraction proper, transport via pipelines and service activities incidental to oil and gas extraction.

² Consumption in households and non-profit organizations + general government consumption + gross fixed capital formation in mainland Norway.

³ Figures for 1997 and 1998 are from the national accounts. The quarterly figures are from Statistics Norway's Labour force survey (LFS), since the new quarterly national account series for employment are too short for seasonal adjustment.

⁴ According to Statistics Norway's labour force survey (LFS).

⁵ Percentage change from previous year.

⁶ Households' borrowing rate in private financial institutions.

⁷ Average spot price, Brent Blend.

Sources: Statistics Norway and Norges Bank.

first and second quarter of 1999 show a fairly sluggish trend in total demand from the general government sector.

The current orientation of monetary policy must also be expected to contribute to lower growth in domestic demand. The shift took place in the second and third quarter of last year when Norges Bank responded to growing depreciation pressures on the Norwegian krone by doubling its key rates for banks. Money market rates rose to a level that was nearly 4 percentage points higher than corresponding ECU rates, and financial institutions' lending and deposit rates shadowed movements in money market rates with a slight lag. At the end of 1998 the average lending rate in private financial institutions was a good 9.5 per cent, 3.5 percentage points higher than the level at end-1997.

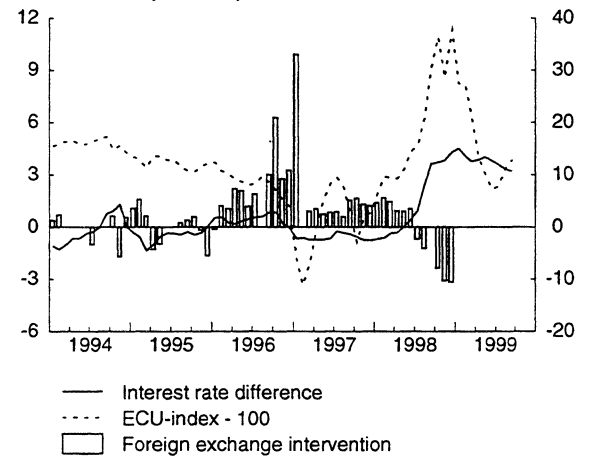
So far this year Norges Bank has lowered its key rates for banks by a total of 2 percentage points. Money market rates have fallen by about the same margin, and interest rates in private financial institutions are now about 1.5 percentage points below the level at the end of last year. However, interest rates in the ECU/euro area have also fallen during the past year so that the interest rate differential between the krone and relevant European currencies is now only moderately lower than in the second half of last year. The krone, however, has appreciated considerably against the euro this year, and in the last five months has been close to the "strong" end of the band around which the exchange rate should be stabilised, according to existing guidelines. Just as the fall in oil prices from nearly \$19 a barrel in the fourth quarter of 1997 to about \$10 a barrel at the end of 1998 probably contributed to the depreciation of the krone, it is likely that the rise to more than \$20 a barrel in August is an important reason for the appreciation this year. However, the substantial interest rate differential between the krone and the euro and slower price inflation may also have made a contribution.

Stagnation in mainland demand

Mainland demand appears to have declined slightly over the last quarters, from a peak so far in the third quarter of last year. Investment, in particular, made a negative contribution, with an estimated decline of 10 per cent through the last two quarters. A number of major government-financed development programmes in transport and communications, education and health have been completed during the past year. This has eliminated demand that has not been fully replaced by new projects. At the same time, investment in the manufacturing sector, in other goods-producing industries and in private services excluding transport and communications has declined. Manufacturing investment has shown a particularly steep fall, and Statistics Norway's investment statistics for the third quarter indicate that the negative trend will continue in the period ahead. Petroleum investment is also falling, after having generated a positive demand impetus the last two years.

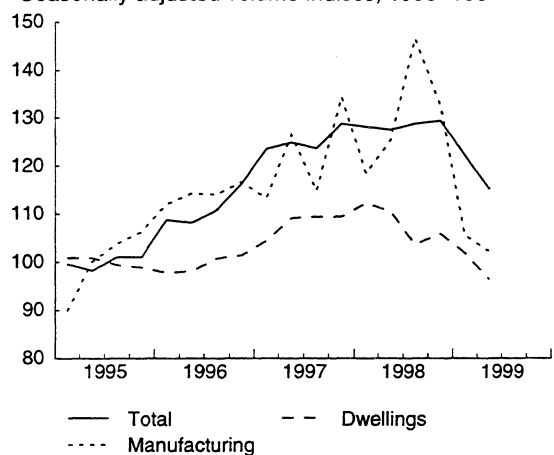
Household consumption showed little change from the first to second quarter after exhibiting fairly sharp growth

Interest rate difference and exchange rate against ECU and Norges Bank's foreign exchange intervention (bill.NKr). 1994 - 1999



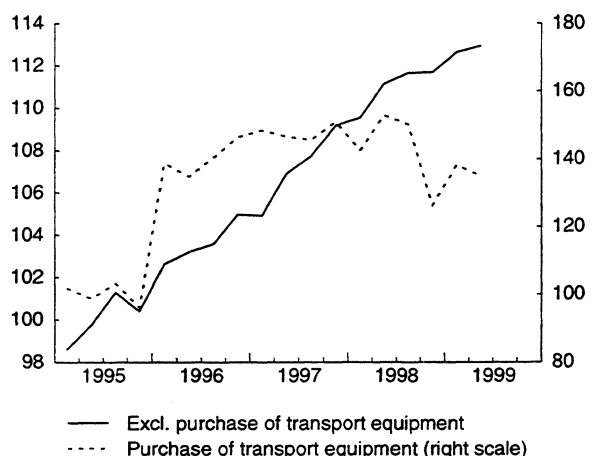
Source: Norges Bank.

Gross fixed capital formation, mainland Norway. 1995 - 1999
Seasonally adjusted volume indices, 1995=100



Source: Statistics Norway.

Consumption in households. 1995 - 1999
Seasonally adjusted volume indices, 1995=100



Source: Statistics Norway.

Exports. 1995 - 1999

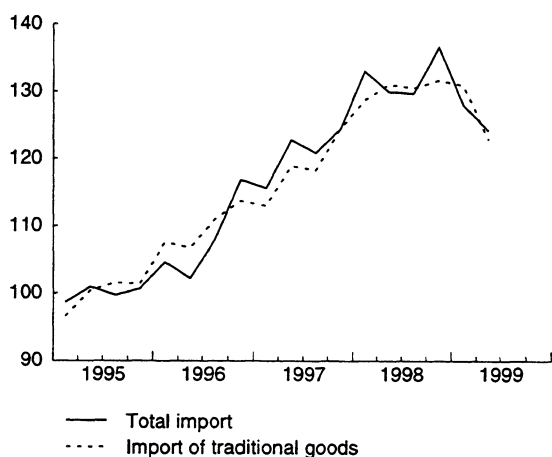
Seasonally adjusted volume indices, 1995=100



Source: Statistics Norway.

Imports. 1995 - 1999

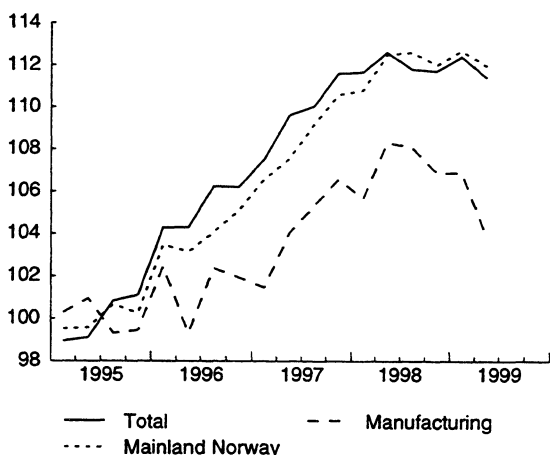
Seasonally adjusted volume indices, 1995=100



Source: Statistics Norway.

Gross domestic product. 1995 - 1999

Seasonally adjusted volume indices, 1995=100



Source: Statistics Norway.

in the previous quarter. Whereas spending on services in the first and second quarter increased at about the same pace as in the previous eight years, it appears that spending on goods reached a peak so far in the third quarter of last year. Figures for retail sales and new car registrations in July this year support this picture. Seasonally adjusted figures for household consumption in the first quarter of 1999 have been revised downwards compared with the last quarterly publication. The revision is partly due to new information about household purchases of goods, but primarily reflects the transition to the same Easter adjustment method as for the retail sales index.

It is natural to view the levelling off in spending on goods during the last few quarters in connection with the increase in interest rates at the end of last year. Even though interest rates have been reduced slightly since then, it is still considerably more expensive to debt-finance consumer spending than was the case during the previous four-five years. Because households as a group have more debt than assets at floating rates, the rise in interest rates has also contributed to curbing growth in household disposable income. The levelling off in employment and lower wage growth this year compared with 1998 point to the same.

Even though it was considerably more expensive to raise loans in the first half of 1999 than in the first half of 1998, prices for existing owner-occupied dwellings have increased by a good 8 per cent in the same period. This rise in prices may be both a delayed response to the sharp growth in income in previous years and a sign that households look upon the relatively high level of interest rates as a temporary phenomenon. It is likely, however, that supply-side factors have also played an important role. Uncertain figures indicate a pronounced decline in housing investment during the last five quarters, and that this decline has not been evenly distributed geographically. It would appear that Oslo and other areas with a very low level of residential construction have also recorded a particularly sharp rise in house prices.

Levelling off in traditional exports

Measured against a trade-weighted basket of other countries' currencies, the Norwegian krone depreciated by a good 4.5 per cent from 1997 to 1998, and by close to an additional 4 per cent up to the end of last year. This more than offset the effects on cost competitiveness of relatively strong wage growth through 1997 and 1998. The appreciation of the krone so far this year, however, points in the opposite direction, and measured in a common currency it now appears that hourly wage costs in manufacturing over the past five years have risen by an average of between and 1 per cent more quickly per year in Norway than among our main trading partners. This development may have contributed to a loss of market shares for traditional merchandise exports last year, a trend which seems to continue this year.

Measured at constant prices and adjusted for normal seasonal variations, traditional merchandise exports showed relatively little change after the first half of last year. Value data from external trade statistics indicate, however, that in this period there was a shift in exports from the UK and the euro area to the US, Sweden and Japan. With the exception of Japan, this shift can largely be explained by the geographical growth pattern.

As a whole and measured in Norwegian kroner, prices for traditional merchandise exports have shown relatively little change over the past two to three years. This may be related to the fact that the appreciation of the dollar generally compensated for the decline in commodity prices, measured in US dollars, up to the end of 1997. Between the end of 1998 and into 1999, however, we see signs of the fall in international commodity prices in Norwegian export prices, primarily in metal prices, which have edged down. With a rise in spot prices for metals and industrial raw materials through the first half of this year, it is likely that this trend will gradually be reversed. Zero growth in the mainland economy

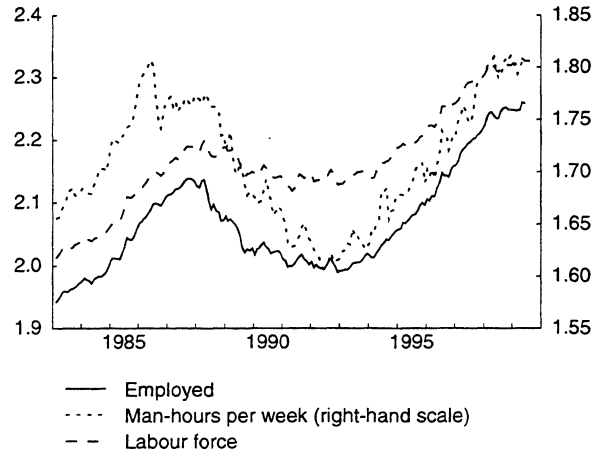
The sluggish trend in mainland investment and traditional merchandise exports through 1998 and into 1999 is reflected in both a pronounced decline in imports and weak trend in some domestic production sectors. Activity in manufacturing and in other goods-producing industries has generally moved on a downward trend during the last three to four quarters. Output in private service industries, which expanded sharply through 1998 and into 1999, also showed signs of stagnation in the second quarter of this year. For mainland Norway as a whole, seasonally adjusted GDP has shown virtually no change during the last four quarters.

Relatively stable labour market, but lay-offs are rising

The brisk growth in employment which started in 1993 slowed markedly through 1998. Between the third quarter of 1998 and up to the end of the second quarter of 1999 employment has been fairly stable, and without any renewed increase through the second half of this year, growth from 1998 to 1999 will be very modest. Figures from the quarterly national accounts indicate a seasonally adjusted decline in manufacturing employment during the last four quarters. On the other hand, it appears that employment in private service industries and the general government sector is still rising, but at a noticeably slower pace than through 1998.

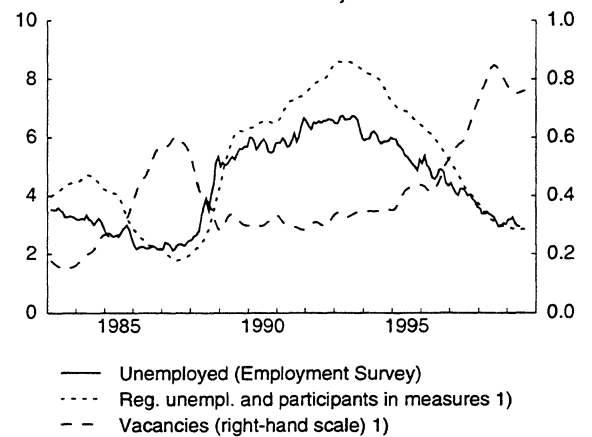
Growth in the labour force has also slowed considerably during the past year, and according to the Labour Force Survey the number of unemployed has been rather stable over the past three quarters. Both the sum of registered unemployed at employment offices and persons participating in ordinary labour market programmes and the number of vacancies at employment offices have also shown little change in this period. Following a seasonally adjusted

Labour force, employment and number of man-hours worked per week. 1983-1999
Millions. Seasonally adjusted and smoothed indices.



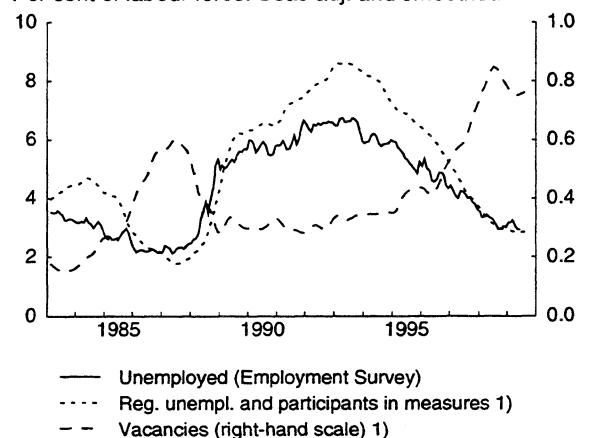
Source: Statistics Norway.

Unemployed and number of vacancies, monthly figures
Per cent of labour force. Seas adj. and smoothed



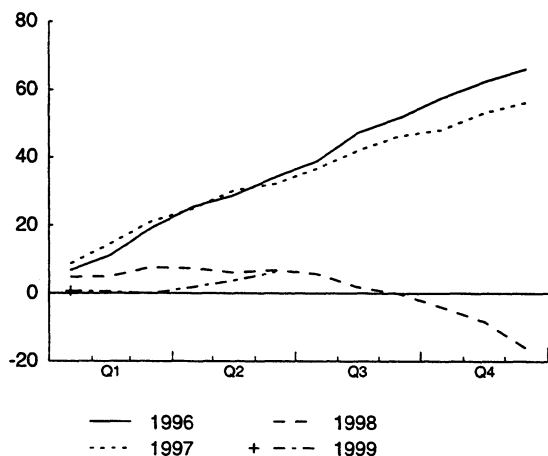
1) Backwards adjusted for break in the series from January 1999. Sources: The Directorate of Labour and Statistics Norway.

Unemployed and number of vacancies, monthly figures
Per cent of labour force. Seas adj. and smoothed



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

Current external balance 1996-1999
Cumulative figures in Nkr billion month by month



Source: Statistics Norway.

ted decline through 1996 and 1997, however, the number of lay-offs (wholly or in part) has doubled during the past year. This reinforces the impression that the unemployment trough has been passed.

Stable price inflation

As an average for the first seven months of 1999, the consumer price index was 2.3 per cent higher than in the same period last year. This is the same inflation rate as for the year 1998. The year-on-year rise in prices in July was 2.0 per cent, the lowest inflation rate observed in one and a half years. Changes in prices for petrol and food have contributed to pushing up price inflation this year, while electricity prices, telecommunication rates and prices for clothing and footwear have had the opposite effect. The harmonized index of consumer prices rose by 2.1 per cent from the first half of 1998 to the first half of this year, a good one percentage point more than in the EU. As a result of a decline in price inflation in Norway and a slight quickening of inflation in the EU, the inflation differential in July was reduced to 0.6 percentage point.

Improvement in the current account

The current account of the balance of payments showed a surplus of a good NOK 6 billion in the first half of 1999, or NOK 29 billion more than in the second half of 1998. Reduced imports, in particular, have contributed to the pronounced increase in the surplus from the second half of 1998 to the first half of 1999, but the rise in oil prices has also had an impact. A continued increase in oil prices from the second quarter and up to end-August points to a further sharp rise in the current account surplus in the third quarter.

Outlook for the remainder of 1999, 2000 and 2001

After the Norwegian economy passed a cyclical peak in 1998, both total GDP and mainland GDP have shown little change. It appears that 1999 is still characterized by a

pause in growth, primarily as a result of a general decline in investment. In 2000, sharp growth in petroleum production will boost GDP growth considerably, while the mainland economy will continue to be characterized by sluggish growth. The projected substantial fall in petroleum investment is an important reason for this. In 2001, investment is likely to show only minor changes, and growth in the mainland economy may edge up and approach an historically normal level. If the assumptions underlying our projections as well as our calculations materialize, the "overheating" of the Norwegian economy will gradually diminish during the next few years. Pressures in the labour market will gradually ease, albeit without a pronounced increase in unemployment. Wage growth will be appreciably weaker and price inflation will drift down. Norway will again record sizeable current account surpluses even if oil prices are slightly lower than the current level.

Our forecasts thus show that the Norwegian economy will not go into recession with a fall in production and sharp rise in unemployment as we experienced ten years ago. However, the driving forces behind the cyclical upturn which is now behind us, as well as the pause in growth that we are now experiencing, have a domestic origin. In this sense it is similar to the last business cycle. It is also worth noting that our projections and analyses show that even though the "cooling off" of the economy is largely ascribable to the decline in investment, we do not believe that the Norwegian economy will experience a self-reinforcing downward spiral. Rather, we assume that the level of investment will pass a trough next year and then expand moderately in 2001. Furthermore, there are now signs of somewhat stronger international growth which can counter the decline in the Norwegian economy. Our calculations also show that the relatively high rise in costs in Norway will slow, and the loss of competitiveness may come to a halt. Household saving has been high and increasing and households' financial situation is solid, factors which do not imply a strong negative impetus from household demand, rather the contrary.

Our projections show that even in 2001, after a few years with sluggish or zero growth in the mainland economy, there will be close to normal capacity utilization in the Norwegian economy. The economy is therefore vulnerable to unexpectedly large increases in demand, for example from the petroleum sector or from households.

Moderate rise in traditional merchandise exports

The estimates for GDP growth among Norway's main trading partners for 1999 and 2000 have been adjusted upwards during the past few months. It is unlikely, however, that demand in Norwegian export markets will show a substantial rise. Measured by developments in imports for our main trading partners, market growth is now projected at a little less than 5 per cent this year and at about 6 per cent next year and in 2001, against 8 per cent on average for the years 1994-1998. For Norwegian exporters, however, the outlook for the Swedish economy is a bright spot. Develop-

Main economic indicators. 1998-2001. Accounts and forecasts

Percentage change from previous year unless otherwise noted

	Accounts 1998	1999			2000			2001	
		SN	MoF	NB	SN	MoF	NB	SN	NB
Demand and output									
Consumption in households and non-profit organizations	3.1	1.8	2.2	3	2.4	2.0	2	2.6	2
General government consumption	3.7	1.3	1.2	1 3/4	1.4	1.3	2 1/4	1.4	2
Gross fixed investment	8.1	-8.2	-6.7	-7 1/2	-8.8	-10.0	-9 1/4	1.0	-1/4
-petroleum activities	25.7	-7.2	-12.7	-12	-29.0	-30.5	-25	-1.4	0
-mainland Norway	2.4	-8.1	-5.3	-7	-1.5	-2.9	-3 3/4	1.6	-1/4
-firms	2.8	-10.1	-5.6	-8 1/2	-4.8	-3.7	-7 1/2	1.2	-2 1/2
-housing	-0.6	-5.5	-5.7	-5 1/4	12.1	0.2	2 1/4	2.7	4 1/4
-general government	3.4	-4.1	-4.2	-4	-2.3	-2.9	2	2.0	2
Demand from mainland Norway ¹	3.1	-0.3	..	3/4	1.5	..	1	2.1	1 1/2
Stockbuilding ²	0.9	0.0	-0.1	..	0.0	0.2	..	0.0	..
Exports	0.5	0.8	3.6	3	9.1	9.6	9	5.0	4
- crude oil and natural gas	-3.8	1.4	6.7	4 3/4	19.0	18.2	18 1/2	5.5	2 1/4
- traditional goods	3.4	1.3	2.0	1 3/4	3.2	4.4	3 3/4	4.3	6 1/2
Imports	9.1	-3.0	-0.9	-1/4	-1.1	-0.3	0	4.0	4
- traditional goods	9.6	-2.1	-0.7	-1/4	-0.3	0.5	0	5.0	4
Gross domestic product	2.1	0.5	1.4	1 1/4	3.6	3.2	3	2.5	1 1/2
- mainland Norway	3.3	0.3	0.7	3/4	1.0	0.8	1/4	1.9	1 1/4
Labour market									
Employed persons	2.3	0.4	0.3	1/4	0.2	-0.3	-3/4	0.2	-1/2
Unemployment rate (level)	3.2	3.2	3.5	3 1/2	3.5	3.8	4	3.6	4 1/2
Prices and wages									
Wages per standard man-year	6.5	5.0	4 1/2	4 3/4	3.5	..	4	3.2	3 3/4
Consumer price index	2.3	2.3	2.4	2 1/4	2.0	2.0	2	1.9	1 3/4
Export prices, traditional goods	1.0	-0.1	-1.3	-2 1/2	4.0	1.6	2 3/4	1.3	2 1/2
Import prices, traditional goods	1.3	-1.5	-0.9	-3/4	1.1	0.1	1/4	0.7	1
Real price, dwellings	6.6	6.4	..	..	5.0	..	..	4.3	..
Balance of payment									
Current balance (bill. NOK)	-16.3	22.2	7.5	1	82.0	61.4	51	116.2	62
Current balance (per cent of GDP)	-1.5	2.0	0.6	0	7.3	5.0	4 1/4	10.1	5
Memorandum items									
Household savings ratio	6.6	7.7	6.7	5 3/4	7.3	6.6	5 3/4	6.7	5 3/4
Money market rate (level)	5.6	6.1	..	6.6	5.0	..	5.0	4.8	4.9
Average borrowing rate (level) ³	7.2	8.4	..	..	7.3	..	..	7.1	..
Crude oil price NOK (level) ⁴	96	124	110	105	125	117	113	125	113
International market growth	7.1	4.9	..	..	5.9	..	..	5.9	..
Importweighted krone exchange rate (44 countries) ⁵	2.2	-0.3	..	..	-0.5	..	..	0.0	..

¹ Consumption in households and non-profit organizations + general government + gross fixed capital formation in mainland Norway.² Change in stockbuilding. Per cent of GDP.³ Households' borrowing rate in private financial institutions.⁴ Average spot price Brent Blend.⁵ Increasing index implies depreciation.

Sources: Statistics Norway (SN), Ministry of Finance, Revidert nasjonalbudsjett 1999 (MoF), Norges Bank, Penger og kreditt 1999/2 (NB).

ments in the US and France will also push up market growth. The composition of goods in exports to these countries implies that exporters of metals, metal goods, machinery and fish will be facing slightly more favourable market trends than the average.

Developments in relative hourly wage costs, measured in a common currency, have generally been to Norwegian manufacturing industry's disadvantage the last few years, with the exception of 1998 when the depreciation of the krone more than compensated for high wage growth.

Wage growth is set to be slightly higher in Norway than among our main trading partners this year, and the krone has again appreciated. Norwegian producers will therefore record a further deterioration in their relative cost position this year. Even if the rise in labour costs next year is reduced to the level among our trading partners, a loss of market shares can be expected in the years ahead. All in all, traditional merchandise exports is projected to expand only half as quickly as demand in export markets in 1999 and the next two years.

Norges Bank's monetary policy signals

The formulation of Norwegian monetary and exchange rate policy is subject to the Exchange Rate Regulation of 6 May 1994. This states: "The monetary policy to be conducted by Norges Bank shall be aimed at maintaining a stable krone exchange rate against European currencies, based on the range of the exchange rate maintained since the krone was floated on 10 December 1992. In the event of significant changes in the exchange rate, monetary policy instruments will be oriented with a view to returning the exchange rate over time to its initial range. No fluctuation margins are established, nor is there an appurtenant obligation on Norges Bank to intervene in the foreign exchange market."

Central Bank Governor Svein Gjedrem has in a commentary in the daily newspaper *Aftenposten* on 4 May this year and in the leader in *Economic Bulletin 1999/2* explained how Norges Bank interprets the regulation. In this connection he has pointed out

1. that the initial range should be interpreted as a broadly defined central rate around which the krone can fluctuate.
2. that in its orientation of instruments, Norges Bank places emphasis on the need to bring price and cost inflation down to the level aimed at by euro countries. At the same time, monetary policy must not in itself contribute to deflationary recessions.
3. that changes in the exchange rate shall first be considered significant if they influence expectations concerning price and cost inflation to the extent that changes in the exchange rate become self-reinforcing.

The first point indicates that the bank can accept some fluctuations in the exchange rate as long as it on average over a longer period remains within the limits of the initial range. The second point implicitly establishes a target zone for price inflation in Norway around 0 to 2 per cent. A literal interpretation of the third point entails that transitory exchange rate changes are not to be interpreted as significant and therefore do not have to trigger a change in the use of instruments. Exchange rate movements which increase over time, on the other hand, may be considered significant, i.e. that Norges Bank in connection with a persistent depreciation or appreciation will normally orient its instruments with a view to gradually returning the exchange rate to its initial range. Experience shows that a persistent change in the exchange rate will be passed on to domestic prices and wages in the form of higher or lower price and wage infla-

tion than initially. The bank is thereby seeking to prevent this development.

The bank's clarification moves the operational focus in monetary policy away from the current exchange rate to all factors that influence price inflation. This also emerges in the leader in *Economic Bulletin 1999/2*, which describes how Norges Bank's macroeconomic projections should be interpreted. Here, it is pointed out that the bank's projections for future economic developments are based on a technical assumption that interest rates will generally shadow market expectations, as these are reflected in forward rates. If Norges Bank's projections show "balanced economic developments", they may support current interest rate expectations. If that is not the case, there may be reason to assume that the interest rate will not change in step with market expectations. In the current situation low and slower price and cost inflation may provide a basis for a faster-than-expected reduction in interest rates by Norges Bank, while relatively high price and cost inflation in the years ahead may result in a slower-than-expected reduction in interest rates. Any significant changes in the assumptions concerning the exchange rate, fiscal policy, international developments, etc., or in the way the economy functions, may lead to developments that differ from the bank's projections. It is emphasized that in its orientation of monetary policy Norges Bank must take into account the effects of such changes, which may thus influence the setting of interest rates. On this basis, it is natural to draw the conclusion that Norges Bank will respond to unforeseen events that have consequences for the rate of price inflation with monetary policy measures.

Against the background of Norges Bank's statements, we have in our work on the projections for future developments in the Norwegian economy found it most appropriate to apply the bank's interest rate path as presented in its publications. This path appears to be reasonable if it in combination with *our* model and *our* other assumptions results in stable price inflation within the bank's target zone, or a path which in the course of a reasonable period brings price inflation into this zone. Failing this, there may be reason to adjust the interest rate assumptions so that at least the last requirement is met. Norges Bank has not explicitly indicated how long price inflation in Norway can be permitted to deviate from the implicit target zone. Based on the path presented in *Economic Bulletin 1999/2*, it seems plausible at this stage to assume that price inflation should be within the target zone in the course of about one year.

Monetary policy and developments in interest and exchange rates

Earlier this year Norges Bank explained its interpretation of the guidelines for Norwegian monetary policy and the factors emphasized by the central bank in its conduct of monetary policy (see separate box). A key element seems to be that price inflation should over time not exceed 2 per cent, which is the objective in the euro area. Against the background of Norges Bank's statements, we have found it

appropriate to base our projections on the bank's technical assumptions concerning interest rate movements.

Norges Bank's macroeconomic projections in *Economic Bulletin 1999/2* are based on a technical assumption that the money market rate is constant from mid-June through the end of this year. It is then assumed that the money market rate will shadow market expectations, as reflected in forward rates in June. In practice, this means that the cen-

tral bank assumes an interest rate of around 6 per cent in the second half of 1999 and about 5 per cent next year and in 2001. However, an interest rate reduction of one percentage point at the turn of the year seems inconsistent inasmuch as Norges Bank has previously indicated that it does not want to change interest rates considerably in the course of a short period. In our calculations, we have therefore assumed a reduction in the overnight lending rate and deposit rate in two steps, each time by 0.5 percentage point. The first interest rate reduction is assumed to take place in the transition from the third to fourth quarter of this year, the second in the transition from the first to second quarter of next year. It is assumed that the money market rate will continue to shadow the deposit rate, as has generally been the case the past year. This means that the money market rate is assumed to be 5.5 per cent in the fourth quarter of 1999 and first quarter of next year, and then decline to 5.0 per cent.

On an annual basis this results in an average interest rate which in 1999 is slightly lower than assumed by Norges Bank for its projections, and for next year slightly higher. According to our calculations, consumer price inflation will be 2.0 per cent next year and 1.9 per cent in 2001. The assumed interest rate path is therefore fairly consistent with the objective emphasised by Norges Bank as central for its conduct of monetary policy.

Our calculations are based on the assumption that the exchange rate remains stable in the period ahead, despite an interest rate differential against the euro which is a good 3 percentage points this year, about 2 percentage points next year and about 1 per cent in 2001. With substantial current account surpluses, this interest rate differential may spur a renewed appreciation of the krone, in line with the experiences of 1996. At that time, however, price inflation in Norway was considerably lower than in the ECU/euro area, while in our projections it is now estimated to be slightly higher. According to our calculations, wage growth will also be somewhat higher in Norway than in the euro area the next few years. The nominal path therefore indicates that there may be a need for a certain interest rate differential in order to maintain a stable exchange rate. However, according to the description of interest rate formation in the money market which is embodied in our macroeconomic models, and which is based on the experiences through the fixed exchange rate period up until the end of 1992, this interest rate differential is about percentage point lower than the level following from our path. Taking into account the imprecision which is always associated with this type of projection, there nevertheless appears to be reasonable consistency between our interest rate and exchange rate assumptions. The exchange rate assumptions should, however, be looked upon as very uncertain estimates for future developments.

With an assumed constant rate of exchange between the Norwegian krone and the euro in the period ahead, the krone will appreciate by about 1.5 per cent against the ECU/euro from 1998 to 1999 following a depreciation of

about 5.5 per cent the previous year. If the rate of exchange between the euro and other currencies of importance to Norwegian imports also remains constant in the period ahead, the import-weighted krone exchange rate will appreciate moderately both from 1998 to 1999 and from 1999 to 2000. Partly as a result of the sharp depreciation of many Asian currencies against the ECU last year, this exchange rate index only depreciated by 2.2 per cent from 1997 to 1998.

For 1999, the OECD has projected an overall decline of a good percentage point in member countries' export prices, while the organization expects a comparable rise in 2000. On the basis of this projection and the exchange rate assumptions discussed above, we have assumed a moderate decline in import prices for traditional goods from 1998 to 1999 followed by a slight rise the next two years. Metals and industrial raw materials are set to record a slightly sharper rise in prices than the average, while prices for some imported consumer goods will show a slightly weaker increase.

More or less cyclically neutral fiscal policy

In contrast to monetary policy, which until last autumn had an expansionary effect, fiscal policy contributed to some extent to curbing growth in the economy through the cyclical upturn. Measured by the Ministry of Finance's fiscal policy indicator, however, the tightening effect was reduced from one year to the next until end-1998. For 1999, the Government estimates in the Revised National Budget that the fiscal programme will contribute to a tightening equivalent to about 0.5 per cent of mainland GDP.

Our projections for 1999 are based on information in the Revised National Budget, which calls for growth in general government consumption in real terms and a decline in general government investment. In our projections, the decline in investment is slightly less than in the Revised National Budget. This is related to new information, which implies that investment in major projects like the National Hospital and some local government investment in connection with the school and care of the elderly reforms will be higher than assumed earlier. Real growth in general government consumption, investment and transfers to households is estimated at a good 2 per cent.

The estimates for 2000 and 2001 are based on the assumption of a more or less cyclically neutral fiscal policy. This entails unchanged real tax rates and real general government spending growth approximately on a par with the trend rate of growth in mainland GDP (2-2.5 per cent). In the current cyclical situation, with moderate growth in mainland GDP, this nevertheless entails that general government expenditure will make a positive contribution to GDP growth. In the calculations, it is assumed that transfers to households will increase at a slightly faster rate than expenditure for general government consumption, primarily as a result of increasing obligations in the National Insurance Scheme.

Exports

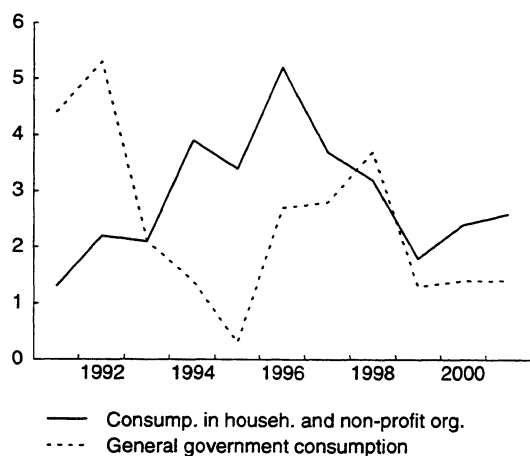
Percentage growth



Source: Statistics Norway

Consumption

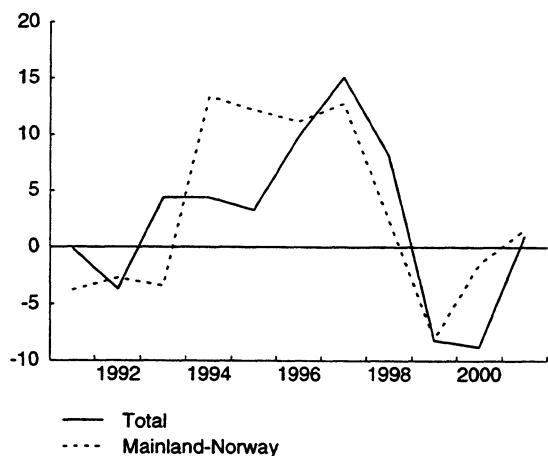
Percentage growth



Source: Statistics Norway

Gross fixed capital formation

Percentage growth



Source: Statistics Norway

Petroleum activities: lower investment, sharp rise in production

Developments in petroleum investment have for many years been an important factor behind cyclical movements in the Norwegian economy. The level of investment is high, corresponding to about 8 per cent of mainland GDP last year, and it has fluctuated considerably from one year to the next. It has proved difficult to predict, not to mention to control, these movements, thereby making it difficult to conduct a stabilisation policy.

For some time it has been clear that petroleum investment would show a sharp fall after 1998. Through this year, however, the estimate for 1999 has been revised upwards so that petroleum investment is now projected to be about 7 per cent lower than last year. Parallel to this, however, the estimates for investment in 2000 have been revised downwards, and investment is now projected to decline by 29 per cent from the previous year. However, the composition of this investment is expected to shift so that the negative demand impetus for the Norwegian economy will be slightly less than this. In the calculations for 2001, petroleum investment is assumed to show a marginal decline from 2000.

The estimates for petroleum investment are largely based on Statistics Norway's investment statistics for petroleum activities (where information on oil companies' planned investment is collected) and estimates from the Ministry of Finance and Ministry of Petroleum and Energy. Experience shows that there can be substantial deviations from the investment statistics' estimates at this point of time and the level achieved both in the current year and following year. For 1999, we assume that investment statistics underestimate investment to the same extent as the corresponding estimates last year, while the normal situation has been that this estimate has been too high. Our investment estimate for 2000 implies that investment statistics underestimate the achieved investment level by approximately the average for the last eight years. The estimates for 2000 and 2001 must be considered very uncertain.

Oil production is set to increase very modestly this year. Production problems, delays and not least the authorities' production limitations have, in conjunction with low oil prices in the first half of 1999, contributed to this. Next year, however, growth is likely to be substantial. It is assumed that production problems will be resolved, the production limitation will be lifted and several fields will be phased in. Even with a possible extension of the production limitations through the first quarter of 2000, the increase is estimated at about 18 per cent. Gas production is projected to rise by about 11 per cent this year and by about 17 per cent next year. In 2001, production in the petroleum sector is assumed to increase by about 5 per cent from the previous year.

Somewhat stronger growth in household consumption the next two years

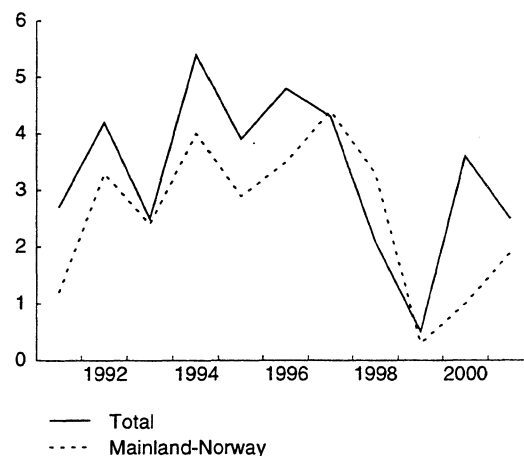
Household consumption fell appreciably in the fourth quarter of 1998 following the sharp rise in interest rates the previous quarter. Developments in the first half of this year may indicate that this was an overreaction and that households now look upon the high level of interest rates as a more temporary phenomenon. Given the path for money market rates on which we have based our projections, the average household lending rate in private financial institutions may decline from a little less than 9 per cent in the first half of 1999 to a little more than 7 per cent around the end of 2000. Since households have more debt than assets at floating rates, and the return on shares and bonds has not moved in step with lending rates, this interest rate path entails a pronounced rise in households' net interest expenses from 1998 to 1999, and a decline from 1999 to 2000. In isolation, the change in net interest expenses thereby contributes to curbing growth in household real disposable income this year, while it will push up income growth next year. The effects are relatively limited in 2001. Quantitatively, however, developments in real wages and employment are far more important for the growth in household real disposable income than interest rate changes. Weaker growth in real wages and employment entail that income growth will be lower in 1999 and particularly the next two years than in the previous four years.

From 1997 to 1998 the household saving ratio rose by about 1.5 percentage points. The saving ratio is now projected to edge up this year. Interest rate developments point to the same, both because debt-financed consumption is more expensive than earlier and because households with substantial debt often have a high marginal propensity to consume. In the next two years the saving ratio may again fall to the average for the period 1992-1998. With this path, consumption growth through the projection period will be approximately on a par with income growth, slightly weaker this year and slightly stronger the next two years. Net lending will remain at a relatively high level through the period, and households' net financial assets will continue to increase at a faster pace than their income. As a group, households thus have considerable financial leeway, which may imply a certain upside risk in the projection for consumption.

Gradual stabilisation of mainland investment

Investment is traditionally a cyclically sensitive component of aggregate demand. Through the period 1994-1997, mainland fixed investment generated a strong growth impetus to the Norwegian economy. The trend was reversed last year, and in 1999 this domestic demand component is set to show a pronounced decline. Developments in production and profitability in manufacturing, and the high level of investment the past few years, point to a sharp fall in manufacturing investment, which for 1999 is supported by Statistics Norway's investment intentions survey. Housing investment will also show a considerable decline this year even though the rise in house prices indicates higher

Gross domestic product Percentage growth



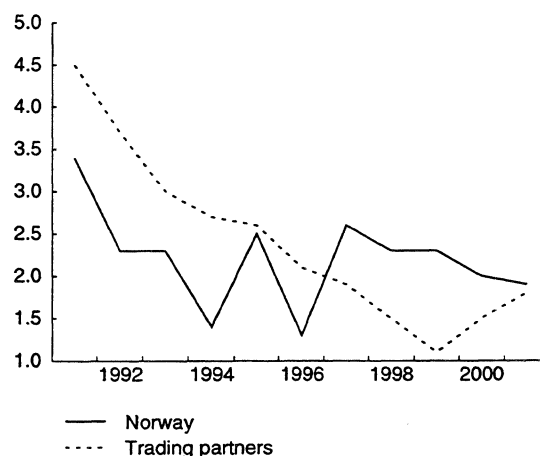
Source: Statistics Norway

Labour market Percentage change



1) Adj. for stat. rev. from 1996.
Source: Statistics Norway

Consumer price indices Percentage growth



Source: Statistics Norway

demand. Housing investment may therefore pick up again the next two years. Investment in other private service industries, on the other hand, is not likely to generate a growth impetus of significance through the projection period.

Little change in the level of activity in mainland Norway in 1999, but slightly stronger growth the next two years

With a sluggish trend in aggregate demand, mainland GDP is expected to show little change through the remainder of this year, and annual growth will probably be less than half a per cent. Next year, traditional merchandise exports and household demand will, in isolation, push up the level of activity. At the same time, it is likely that the negative demand impulses from mainland investment will recede. For 2000, however, developments in petroleum investment will have the opposite effect, and mainland GDP growth will remain low. Given this demand picture, activity in manufacturing industry and the construction sector will probably be more adversely affected than the average, while output growth in service sectors will remain at a higher level. With a virtual stabilisation of petroleum investment in 2001, growth in the mainland economy may again approach its historical average level. As a result of a sharp rise in petroleum production, GDP will increase at a considerably faster pace next year than the level of activity in the mainland economy, while a more parallel trend will be seen in 2001.

Moderate rise in unemployment in the period ahead

Following several years of strong expansion, it now appears that employment will show little change in 1999 and the next two years. Developments from 1998 to 1999 are ascribable to the sluggish growth in activity, with productivity expected to increase at about the same low pace as during the last five years. In the next two years higher demand will translate into slightly stronger growth in mainland Norway than this year. We assume, however, that productivity gains will also pick up so that the effects on employment will be fairly limited. However, the situation varies to some extent between individual sectors and reflects differences in developments in production and productivity. Manufacturing employment will fall though the entire projection period, particularly in the segment with extensive deliveries to the petroleum industry. Employment in the general government sector and some private service industries, on the other hand, will continue to expand.

With a sluggish employment trend, it is likely that the labour supply will grow approximately in line with the level implied by demographic factors. This results in a relatively modest increase in the supply of labour in the period ahead, and unemployment will then only rise moderately from the current level. As an average for the year, unemployment in 1999 is now likely to be approximately the

same as last year, while it will edge up the next two years. As a result of a fair proportion of foreign workers in such industries as construction, there is considerable uncertainty associated with developments in the labour supply in the period ahead. If a decline in employment particularly affects foreign labour, this will curb the impact on unemployment. Another element of uncertainty is related to labour force participation among older workers. Moreover, developments in productivity are of considerable importance to the employment picture and thus for changes in unemployment. If productivity gains the next few years are stronger than estimated, unemployment will rise slightly more than in our calculations.

Price and wage inflation slows

According to the Technical Committee on Income Settlements, the wage carry-over into 1999 was on average about 3 per cent. The moderate income settlements this spring nevertheless entail that the estimate for wage growth in 1999 is no higher than 5 per cent. In the report submitted by the Arntsen Committee, most of the large labour market organizations agreed that pay increases should be limited so that annual wage growth in 1999 could be reduced to approximately 4.5 per cent. This approach appears to have been virtually fully accepted in the wage settlements. The fact that our projection is 0.5 percentage point higher than this is related to several factors. Even though by international standards union density is high in Norway, there are a number of groups that are not unionized. For many, the centralized wage settlements will serve as a guideline, but not for all. The contribution from wage drift through 1999 may therefore be different than assumed.

The moderate wage settlements in 1999 and the agreement in the Arntsen Committee point to relatively moderately wage growth through 2000. The wage carry-over into 2000 will also be fairly low. Furthermore, when unemployment is as low as it is now, our models show that even minor changes in unemployment will have pronounced effects on wage growth. The moderate increase in unemployment thus points to lower wage growth in the period ahead. In 2000, however, there will be a main settlement, which historically boosts wage growth, while in 2001 there will be an interim settlement, which in isolation will push down wage growth. In our calculations, wages per normal man-year rise by 3.5 per cent in 2000 and by 3.2 per cent in 2001.

Real wage growth is set to be high this year, albeit slightly lower than last year when it was higher than in many years. Despite the outlook for a further decline in nominal wage growth in 2000 and 2001, low price inflation is expected to keep real wage growth at about 1.5 per cent. This is on a par with the average for the first half of the 1990s.

In the first half of the year the consumer price index was 2.4 per cent higher than in the same period one year earlier. In July, the year-on-year rate was reduced to 2.0 per

cent. Partly as a result of higher electricity and petrol prices, the rate of increase in the consumer price index is expected to edge up in the months ahead so that the average rise in 1999 will be 2.3 per cent. In 2000 and 2001, the rise in import prices for consumption-related goods is expected to remain low, but rising slightly. The improvement in productivity gains and lower wage growth, however, will contribute to reducing the rate of price inflation slightly in the years ahead.

Large current account surpluses the next few years

In 1998, Norway recorded a current account deficit for the first time in the 1990s. As a result of the pronounced rise in oil prices from the low level in 1998 and a decline in imports, the current account balance will again show a considerable surplus in 1999. The estimated sharp growth in petroleum exports next year points to a further improvement in the current account, and as a share of GDP the surplus on the current account may exceed the high level recorded in 1996. The surplus may increase further in 2000. The corollary to the large current account surpluses is the accumulation of net financial assets for Norway, particularly for the central government. This will contribute to an appreciable decline in the deficit on the interest and transfers balance over the next few years.

The estimates for the current account are very sensitive to changes in oil prices. In the calculations, we have assumed that the oil price, measured in NOK, edges down towards the end of this year and falls further at the beginning of 2000. On an annual basis, this results in a price just below NOK 125 a barrel for all three projection years, slightly lower than in 1996 and 1997, but markedly higher than in 1998.

National accounts: Final expenditure and gross domestic product. 1997-1999

Seasonally adjusted. At fixed 1996 prices. Million kroner

	97.2	97.3	97.4	98.1	98.2	98.3	98.4	99.1	99.2
Final consumption exp. of housh. and NPISHs.	126474	127313	129192	129234	131493	131946	130873	132480	132683
Household final consumption expenditure.	120233	121049	122923	122993	125274	125772	124735	126277	126436
Goods	67974	68842	70092	69970	71935	72359	70562	71584	71429
Services	50582	50541	51194	51259	51786	51817	52428	52805	53083
Direct purchases abroad by resident households	5474	5416	5476	5579	5367	5646	5665	5969	6194
-Direct purchases by non-residents	-3797	-3751	-3839	-3815	-3814	-4050	-3921	-4080	-4270
Final consumption exp of NPISHs.	6241	6264	6268	6242	6218	6174	6138	6202	6247
Final consump. exp. of general government	52876	53066	53860	54883	54726	55263	55565	55485	56289
Final consump. exp. of central government	20921	21007	21327	21908	21639	21845	21969	22101	21991
Central government, civilian	15234	15310	15530	16035	15846	16017	16092	16307	16207
Central government, defence	5687	5697	5797	5873	5792	5828	5876	5794	5784
Final consump. exp. of local government	31954	32059	32533	32975	33087	33418	33597	33384	34298
Gross fixed capital formation	63415	61133	63449	65134	65338	67698	70812	62269	58343
Petroleum activities	16424	14207	15459	15010	18319	19078	22161	17413	15918
Ocean transport	2390	2778	1978	4340	1485	2634	2442	1209	1304
Mainland Norway	44601	44147	46012	45784	45534	45986	46210	43647	41122
Mainland Norway ex. general government.	34734	35443	37188	36698	34924	36860	36369	34097	32290
Manufacturing and mining	4938	4479	5248	4621	4892	5724	5176	4122	3989
Production of other goods.	3911	4131	3768	4341	3927	4010	3701	3753	3694
Dwellings	7431	7452	7455	7646	7525	7063	7211	6943	6568
Other services	18453	19381	20717	20089	18579	20063	20280	19279	18040
General government	9868	8704	8824	9086	10610	9125	9841	9550	8832
Changes in stocks and stat. discrepancies	4080	5535	6476	6700	8307	6825	6436	9931	5581
Gross capital formation	67495	66668	69925	71835	73644	74523	77248	72199	63924
Final domestic use of goods and services	246846	247047	252977	255952	259863	261733	263687	260164	252896
Final demand from mainland Norway	223952	224526	229064	229902	231753	233195	232648	231611	230094
Final demand from general government	62744	61770	62684	63969	65336	64389	65406	65034	65120
Total exports	110725	110136	110511	114160	110254	106218	109318	108031	110013
Traditional goods	43010	43183	42687	44225	42632	43562	43481	43242	43554
Crude oil and natural gas	40586	39202	40565	40978	38981	35784	38114	37205	37927
Ships and platforms.	2635	2300	2133	3519	3342	1826	2032	2301	3607
Services	24494	25450	25126	25438	25300	25046	25691	25283	24925
Total use of goods and services	357571	357183	363488	370112	370117	367951	373005	368195	362909
Total imports	92870	91439	94031	100515	98220	98026	103235	96759	93920
Traditional goods	60311	60006	63123	65230	66412	66136	66745	66375	62291
Crude oil	374	437	348	634	422	490	437	429	601
Ships and oil platforms	6682	5770	4587	8501	5081	5237	9568	2750	3332
Services	25503	25226	25973	26149	26305	26163	26486	27206	27696
Gross domestic product	264701	265744	269458	269597	271897	269926	269770	271435	268989
Mainland Norway (market prices)	215435	218700	221480	221901	225256	225480	224281	225658	224153
Petroleum activities and ocean transport.	49266	47044	47978	47696	46641	44446	45488	45778	44836
Mainland Norway (basic prices).	186612	189571	191657	193175	195388	194834	195880	197292	197015
Mainland Norway ex. general government.	146758	149454	151065	152220	154638	153644	154409	155972	155042
Manufacturing and mining	29130	29496	29850	29590	30334	30271	29929	29933	29085
Production of other goods	20855	21317	21155	21080	21280	21647	21362	21170	21238
Service industries	96773	98641	100061	101549	103024	101726	103117	104870	104719
General government	39854	40116	40592	40955	40751	41190	41471	41320	41972
Correction items.	28822	29130	29823	28726	29868	30646	28401	28366	27139

National accounts: Final expenditure and gross domestic product. 1997-1999

Seasonally adjusted. At fixed 1996 prices. Percentage volume change from previous period

	97.2	97.3	97.4	98.1	98.2	98.3	98.4	99.1	99.2
Final consumption exp. of housh. and NPISHs	1.7	0.7	1.5	0.0	1.7	0.3	-0.8	1.2	0.2
Household final consumption expenditure	1.8	0.7	1.5	0.1	1.9	0.4	-0.8	1.2	0.1
Goods	1.2	1.3	1.8	-0.2	2.8	0.6	-2.5	1.4	-0.2
Services	1.7	-0.1	1.3	0.1	1.0	0.1	1.2	0.7	0.5
Direct purchases abroad by resident households	8.4	-1.1	1.1	1.9	-3.8	5.2	0.3	5.4	3.8
-Direct purchases by non-residents	-1.5	-1.2	2.3	-0.6	-0.0	6.2	-3.2	4.1	4.7
Final consumption exp. of NPISHs	0.3	0.4	0.1	-0.4	-0.4	-0.7	-0.6	1.0	0.7
Final consump. exp. of general government	0.1	0.4	1.5	1.9	-0.3	1.0	0.5	-0.1	1.4
Final consump. exp. of central government	-0.4	0.4	1.5	2.7	-1.2	1.0	0.6	0.6	-0.5
Central government, civilian	-0.2	0.5	1.4	3.2	-1.2	1.1	0.5	1.3	-0.6
Central government, defence	-1.0	0.2	1.7	1.3	-1.4	0.6	0.8	-1.4	-0.2
Final consump. exp. of local government	0.5	0.3	1.5	1.4	0.3	1.0	0.5	-0.6	2.7
Gross fixed capital formation	4.9	-3.6	3.8	2.7	0.3	3.6	4.6	-12.1	-6.3
Petroleum activities	24.2	-13.5	8.8	-2.9	22.0	4.1	16.2	-21.4	-8.6
Ocean transport	-22.6	16.2	-28.8	119.4	-65.8	77.4	-7.3	-50.5	7.8
Mainland Norway	1.1	-1.0	4.2	-0.5	-0.5	1.0	0.5	-5.5	-5.8
Mainland Norway ex. general government	1.5	2.0	4.9	-1.3	-4.8	5.5	-1.3	-6.2	-5.3
Manufacturing and mining	11.7	-9.3	17.2	-11.9	5.9	17.0	-9.6	-20.4	-3.2
Production of other goods	-4.1	5.6	-8.8	15.2	-9.5	2.1	-7.7	1.4	-1.6
Dwellings	4.5	0.3	0.0	2.6	-1.6	-6.1	2.1	-3.7	-5.4
Other services	-0.8	5.0	6.9	-3.0	-7.5	8.0	1.1	-4.9	-6.4
General government	-0.6	-11.8	1.4	3.0	16.8	-14.0	7.8	-3.0	-7.5
Changes in stocks and stat. discrepancies	41.2	35.7	17.0	3.5	24.0	-17.8	-5.7	54.3	-43.8
Gross capital formation	6.6	-1.2	4.9	2.7	2.5	1.2	3.7	-6.5	-11.5
Final domestic use of goods and services	2.7	0.1	2.4	1.2	1.5	0.7	0.7	-1.3	-2.8
Final demand from mainland Norway	1.2	0.3	2.0	0.4	0.8	0.6	-0.2	-0.4	-0.7
Final demand from general government	0.0	-1.6	1.5	2.1	2.1	-1.4	1.6	-0.6	0.1
Total exports	3.8	-0.5	0.3	3.3	-3.4	-3.7	2.9	-1.2	1.8
Traditional goods	8.6	0.4	-1.1	3.6	-3.6	2.2	-0.2	-0.6	0.7
Crude oil and natural gas	2.7	-3.4	3.5	1.0	-4.9	-8.2	6.5	-2.4	1.9
Ships and oil platforms	-16.0	-12.7	-7.3	65.0	-5.0	-45.4	11.3	13.3	56.8
Services	0.6	3.9	-1.3	1.2	-0.5	-1.0	2.6	-1.6	-1.4
Total use of goods and services	3.0	-0.1	1.8	1.8	0.0	-0.6	1.4	-1.3	-1.4
Total imports	6.2	-1.5	2.8	6.9	-2.3	-0.2	5.3	-6.3	-2.9
Traditional goods	5.2	-0.5	5.2	3.3	1.8	-0.4	0.9	-0.6	-6.2
Crude oil	-16.9	16.8	-20.4	82.3	-33.5	16.1	-10.9	-1.8	40.1
Ships and oil platforms	-7.6	-13.6	-20.5	85.3	-40.2	3.1	82.7	-71.3	21.2
Services	13.5	-1.1	3.0	0.7	0.6	-0.5	1.2	2.7	1.8
Gross domestic product	1.9	0.4	1.4	0.1	0.9	-0.7	-0.1	0.6	-0.9
Mainland Norway (market prices)	0.9	1.5	1.3	0.2	1.5	0.1	-0.5	0.6	-0.7
Petroleum activities and ocean transport	6.6	-4.5	2.0	-0.6	-2.2	-4.7	2.3	0.6	-2.1
Mainland Norway (basic prices)	0.8	1.6	1.1	0.8	1.1	-0.3	0.5	0.7	-0.1
Mainland Norway ex. general government	1.0	1.8	1.1	0.8	1.6	-0.6	0.5	1.0	-0.6
Manufacturing and mining	2.5	1.3	1.2	-0.9	2.5	-0.2	-1.1	0.0	-2.8
Production of other goods	5.8	2.2	-0.8	-0.4	0.9	1.7	-1.3	-0.9	0.3
Service industries	-0.5	1.9	1.4	1.5	1.5	-1.3	1.4	1.7	-0.1
General government	0.1	0.7	1.2	0.9	-0.5	1.1	0.7	-0.4	1.6
Correction items	1.9	1.1	2.4	-3.7	4.0	2.6	-7.3	-0.1	-4.3

National accounts: Final expenditure and gross domestic product. 1997-1999

Seasonally adjusted. Price indices. 1996 = 100

	97.2	97.3	97.4	98.1	98.2	98.3	98.4	99.1	99.2
Final consumption exp. of households and NPISHs	102.5	102.6	103.1	103.7	105.1	105.3	106.1	106.8	106.8
Final consumption exp. of general government.	102.3	103.4	103.5	104.2	106.8	109.2	110.8	110.3	110.3
Gross fixed capital formation	101.6	103.4	103.3	105.3	106.5	107.3	106.6	106.5	108.4
Mainland Norway	100.1	101.6	101.8	103.4	105.1	105.9	106.2	105.6	107.6
Final domestic use of goods and services	102.2	102.6	103.2	104.3	105.9	106.5	107.2	106.9	108.8
Final demand from Mainland Norway	102.0	102.6	103.0	103.7	105.5	106.4	107.2	107.4	107.8
Total exports	99.9	104.8	103.4	96.6	94.6	94.4	90.4	90.8	98.6
Traditional goods	97.7	102.2	102.9	101.5	102.1	101.5	100.9	99.4	100.6
Total use of goods and services	101.5	103.3	103.2	101.9	102.6	103.0	102.3	102.2	105.7
Total imports	100.5	103.8	102.1	102.9	103.6	103.3	101.7	101.0	102.2
Traditional goods	98.2	101.1	99.5	100.3	100.5	101.1	99.1	97.5	99.4
Gross domestic product	101.8	103.1	103.6	101.6	102.2	102.9	102.5	102.6	106.9
Mainland Norway (market prices)	103.0	102.9	104.2	104.4	106.7	108.0	109.1	108.3	109.8

National accounts: Final expenditure and gross domestic product. 1997-1999

Seasonally adjusted. Price indices. Percentage volume change from previous period

	97.2	97.3	97.4	98.1	98.2	98.3	98.4	99.1	99.2
Final consumption exp. of households and NPISHs	1.0	0.0	0.6	0.6	1.3	0.2	0.7	0.6	0.0
Final consumption exp. of general government.	0.9	1.1	0.1	0.6	2.5	2.3	1.4	-0.4	-0.0
Gross fixed capital formation	1.5	1.7	-0.1	2.0	1.1	0.8	-0.7	-0.1	1.7
Mainland Norway	0.1	1.5	0.2	1.5	1.6	0.8	0.3	-0.5	1.9
Final domestic use of goods and services	0.7	0.4	0.6	1.1	1.5	0.5	0.7	-0.3	1.8
Final demand from Mainland Norway	0.8	0.6	0.4	0.8	1.7	0.8	0.8	0.2	0.4
Total exports	-1.6	4.9	-1.4	-6.6	-2.1	-0.2	-4.2	0.4	8.6
Traditional goods	-1.1	4.6	0.7	-1.3	0.6	-0.6	-0.6	-1.5	1.2
Total use of goods and services	-0.0	1.8	-0.0	-1.3	0.6	0.4	-0.7	-0.1	3.4
Total imports	1.6	3.2	-1.6	0.8	0.6	-0.3	-1.6	-0.7	1.2
Traditional goods	1.0	3.0	-1.6	0.9	0.1	0.7	-2.0	-1.6	2.0
Gross domestic product	-0.6	1.3	0.5	-2.0	0.6	0.7	-0.4	0.1	4.2
Mainland Norway (market prices)	2.2	-0.1	1.3	0.1	2.3	1.2	1.0	-0.8	1.4

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 1996 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 1996 as the base year (common year of recalculation). The recalculation of prices is carried out at the sectoral level of the quarterly national accounts.

Seasonal adjustment: Beginning with ES 3/99, seasonal adjustment of QNA figures is based on X12 ARIMA. In implementing the method, the sum of a seasonally adjusted series over the four quarters of a year is not constrained to equal the corresponding unadjusted annual figure.

Profits in the Norwegian electricity sector

Ann Christin Bøeng and Torstein Bye

The electricity sector in Norway is a so-called economic rent industry. This should imply that the rate of return in this industry is higher than the return in other sectors of the economy, disregarding uncertainty. Over a long historical period, however, the return in this industry has been lower than in manufacturing industries. This was one of the reasons for deregulating the Norwegian electricity market in 1991. Following deregulation, one would expect the return to increase and that more expensive energy utilities would record a lower return than cheap energy utilities. The return, however, has risen very little. This follows partly as a result of increased competition from energy utilities in other countries with considerable production capacity in relation to demand. The underlying data from 1991 to 1997 are also unable to confirm a hypothesis concerning differences in the return due to cost differentials. This may indicate that it will still take some time before the deregulated Norwegian electricity market functions according to the intentions. Projections indicate that the outlook for a higher return in the electricity sector in the period to 2010-2020 is favourable. In the long run, the sector may recover part of the economic rent which is presumed to exist in the industry. With a cost-effective international implementation of the intentions in the Kyoto Protocol, the return in the Norwegian power supply sector may be very high.

1. Introduction

The electricity sector in Norway is a so-called economic rent industry. This industry makes use of waterfalls and river systems. It is less expensive to develop some waterfalls than others. In a market, the cheapest power station projects will be undertaken first followed by the more expensive. Power capacity will be expanded based on rising unit cost in order to derive maximum benefit from the resources. The market will ensure that no development is undertaken until the price exceeds the unit cost of the last power station to be built. Since unit costs rise, this means that the first power stations to be built, and which were therefore cheap, will have a higher return on investment over time. In particular, investments in these power stations will have a higher return than capital investments in other activities, disregarding uncertainty. This excess return is called economic rent. The same applies to some other industries, such as petroleum activities in the North Sea, the fisheries industry, parts of the agricultural sector, as well as to some extent the property market.

We know that there is a difference between theory and practice both for the fisheries and agriculture. We shall also find that the electricity industry has not achieved any economic rent, while this is obviously the case for the petroleum sector in Norway. A striking difference between these industries is that while the petroleum sector is not very labour-intensive and is primarily focused on the export market, electricity production in Norway is primarily focused on domestic demand. The fisheries industry and

agriculture have been important sectors in regional employment policy in the same way as the electricity sector.

All these industries have been subject to regulation, but the regulatory content has been very different. There have been elements of volume regulation, price regulation, and regulation of turnover and competition in the electricity sector, fisheries and agriculture, while the regulation of volume dominates in the petroleum sector. The petroleum sector has also been free to sell its products at the highest possible price in the international market and to compete with others. This has been of considerable importance in terms of the opportunity to achieve a high return in the sector.

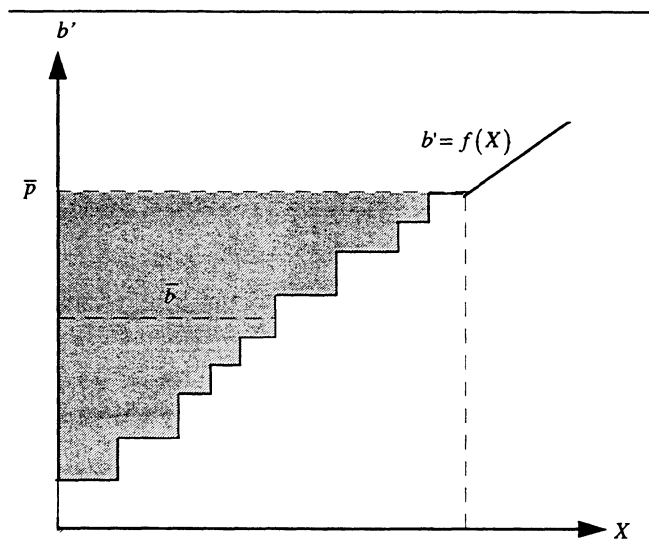
We know that many power stations that were built in Norway in the 1950s were very cheap power stations, while those that were built later were substantially more expensive. Nor has it been the case that Norway systematically built cheap power stations before the more expensive power stations. Moreover, factors such as self-sufficiency, regional power balances, industrial considerations and regional employment considerations had a considerable influence on the actual decision-making process with regard to specific power development projects.

Let us nevertheless assume that we rank power stations according to rising costs as shown in Figure 1. Here, the cost curve, $b' = f(x)$, is rising with respect to the power supply (x) to be produced. This is an indication that the least favourable projects (to the left in the figure) are more expensive than the cheapest (to the right in the figure). In an optimal situation, power capacity will not be expanded until the price (p) is equal to the marginal cost of the next project. If we assume that the normal return on investment in each power station is included in the rising cost curve, and that the price p is equal to the marginal cost b' , the

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Figure 1. A stylistic outline of economic rent in the Norwegian hydropower sector



area between the price line and the cost curve (the shaded area) is equal to the economic rent in the hydropower sector. Bye and Johnsen (1991) estimated that the theoretical economic rent in hydropower stations that were built in Norway up to 1991 came to a good NOK 9 billion per year. This was calculated as profits exceeding normal returns on capital, given that no additional power capacity was developed before the price exceeded the cost of the marginal production plant in Norway at the time. It was also assumed that it was actually possible in the long run to achieve a price which corresponds to profitable investments at the margin. The normal return on capital that was invested in the power sector was estimated at NOK 12 billion, so that the total return should be NOK 21 billion per year. The return in the power sector the same year was only NOK 10 billion, i.e. NOK 11 billion lower than it could have been. If economic rent had been achieved, the return would have been 11 per cent, compared with the actual realised return of 5.5 per cent in 1991.

In the period up to 1978 a pricing rule was followed in the Norwegian power supply sector, primarily owned by the government, which indicated that the price should reflect average costs in the power sector, i.e. that the price should be equal to \bar{b} . As the figure shows, as an average for the sector the economic rent collected by the cheapest plants will be lost because the total costs of the most expensive plants are not covered.

In the 1950s and 1960s energy-intensive manufacturing in Norway obtained 40-60 year electricity contracts at prices corresponding to the cost of some of the cheapest power projects in Norway. This entailed that a large part of the potential economic rent, the left part of the curve in figure 1, was not realised in the market. One of the main reasons for entering into these long-term contracts was that during the post-war reconstruction period in the 1950s investments in the electricity sector were considered very capital-intensive and risky projects. One way to hedge against risk was thus to tie up electricity supplies to customers on very

long-term contracts. In hindsight, this appears to be an extremely risk-averse approach. Alternatively, the information available for evaluating future possible price trends was very deficient.

In studies of the return in the electricity sector in Norway, it is for several reasons important to distinguish between actual power production, the transmission of power over large distances, and the distribution of power. It is customary to assume rising marginal costs in electricity production and falling average costs in transmission and distribution. Moreover, it is important, particularly following the deregulation of the electricity market in Norway in 1991, that transmission and distribution are monopoly services, whereas electricity production is exposed to competition. For statistical reasons, however, it is not possible to distinguish between these activities when studying the electricity sector prior to 1991. After 1991, however, the statistics were revised so that this is now possible.

In this article we shall look more closely at the return in the electricity sector in Norway. We start in section 2 by looking at the return in a historical perspective. Here, we use statistics from the national accounts, which only permit us to study developments for the electricity sector as a whole. In section 3 we proceed to study the return in somewhat greater detail for the period following the deregulation of the electricity market, with Electricity Statistics as the source. Section 4 outlines a possible scenario for the future return in this sector provided that competition is permitted to take effect. It emerges that developments may be highly influenced by how we decide to follow up the Kyoto Protocol's provisions on restrictions in the emission of greenhouse gases in the period ahead. Section 5 summarises the most important conclusions.

2. The return in the electricity sector and manufacturing 1962-1993

Let us first examine the actual return in the electricity sector in the long regulatory period from 1962-1991 in relation to other sectors of the economy. The national accounts provides figures on the net operating profit (gross operating profit less depreciation of fixed capital) as well as the capital stock distributed by sectors of the economy – including the electricity sector as a whole. Capital stock in the national accounts consists of accumulated investment less depreciation valued at replacement cost. The ratio of the net operating profit to capital stock provides the rate of return – the percentage return on fixed assets in the industry.

2.1. The return in the electricity sector

In figure 2a (annual return) and 2b (5-year moving average) we see that the return in the electricity sector in Norway throughout the entire period from 1962 to 1980 was between 2 and 3 per cent. In this period, as noted earlier, a policy was pursued whereby the price should reflect the average cost of development. Along with the long-term contracts at low prices for manufacturing, this is

Figure 2a. Return on capital in Norwegian manufacturing and power supply sector. Per cent. 1962-1993

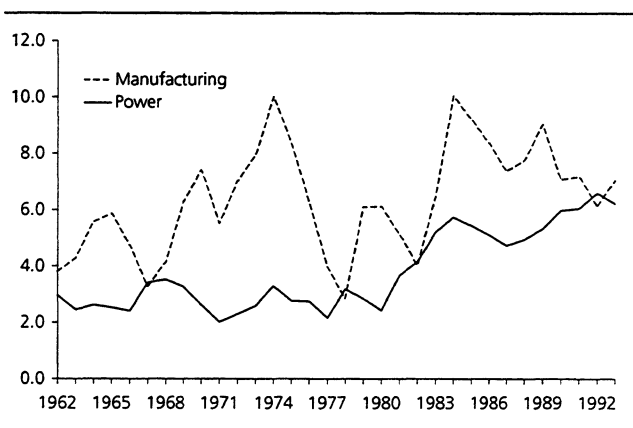


Figure 2b. Return on capital in Norwegian manufacturing and power supply sector. Per cent. 5-year moving average. 1962-1993

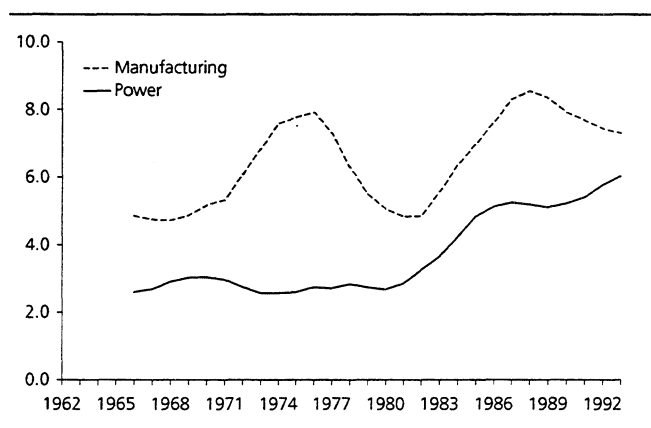


Figure 3a. Prices for electricity for households and power-intensive manufacturing. 1965-1996. Øre/kWh, including electricity tax, excluding VAT

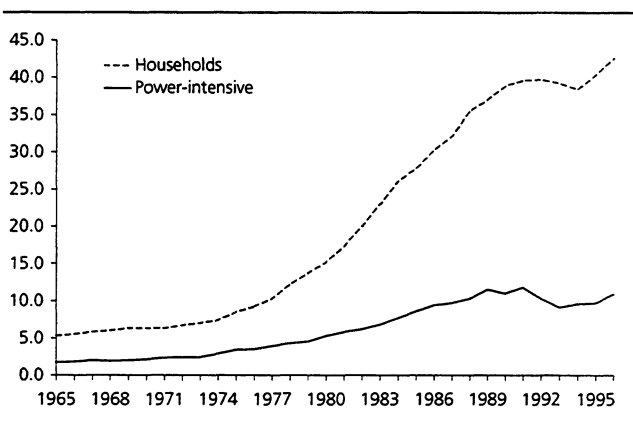
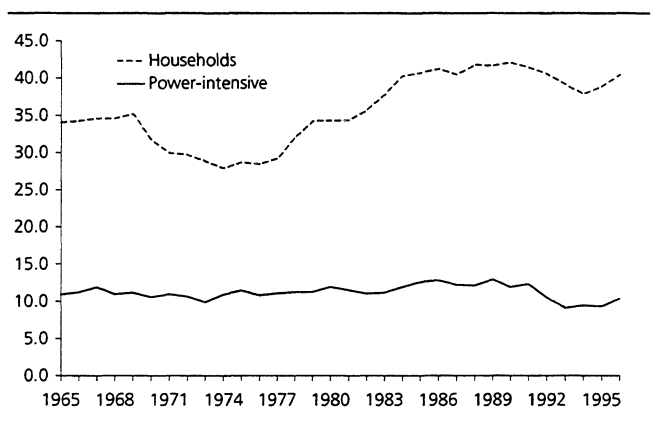


Figure 3b. Prices for electricity for households and power-intensive manufacturing. 1965-1996. Øre/kWh, including electricity tax, excluding VAT. Constant 1993-prices



the main reason for the low return in this period. We also see from Figures 3a and 3b that the price of electricity for large groups of consumers, such as households and power-intensive manufacturing, did not rise to any extent in the period until the end of the 1970s. In real terms, the actual price for the household group fell quite sharply from the end of the 1960s until the mid 1970s.

In the Energy Report which was presented in 1978, it was decided that instead of pricing electricity on the basis of average cost the price was to be equal to the long-term marginal cost with an escalation plan for prices up to 1985.¹ This also emerges clearly in the figure. The price for household customers rose sharply from 1978 up to 1992. Much of this rise in prices reflects the sharp acceleration in the rate of inflation in the Norwegian economy later in the 1980s. However, adjusted for inflation, see Figure 3b, the household price shows a rise in real terms of 30 per cent from 1978 to 1990. At the same time, we see that the price for power-intensive manufacturing only rises in nomi-

nal terms, while it falls measured at constant prices. In the period as a whole the contracts with manufacturing industry are thus not adjusted in step with the rise in consumer prices.

The return in the electricity sector, see Figure 2a, rises sharply in the same period – from 3.2 per cent in 1978 to a good 6 per cent in 1990, with a slight decline in 1986-1987. The average return in the sector may conceal considerable differences from one power station to another, which is not possible to separate in the statistics. Another reason why the average return rises so sharply is that electricity contracts with manufacturing account for a steadily smaller share of the electricity market. Those market segments that record rising real prices (general consumption) account for a steadily higher share of the market later in the period. One factor which to some extent would point to the opposite is the increasingly expensive development projects that were implemented later in the 1980s.

¹ Many have looked upon a price equal to the long-term marginal cost as a pricing criterion. When the price is equal to the long-term marginal cost, this is a signal that new investments may be profitable. It is thus an investment criterion. In the long run, however, this means that prices will move towards the long-term marginal cost for electricity in a free competitive market.

Table 1. Return on capital in some industry groups. 1962-1993. Per cent

Period	Production of consumer goods	Furniture, wood and wood products	Paper and paper products	Chemicals	Metals	Other manufacturing	Weighted manufacturing	Power production
1962-1971	8.6	7.8	1.7	0.6	7.4	0.1	5.2	2.8
1972-1981	5.5	6.6	4.0	1.9	8.3	7.4	5.9	2.8
1982-1987	7.8	7.6	3.9	5.5	10.3	6.3	7.3	5.1
1987-1993	7.5	6.8	5.2	6.6	5.6	4.7	6.3	5.8
1962-1993	7.3	7.2	3.5	3.1	7.9	4.4	6.0	3.8

Electricity production in Norway has also varied considerably along a rising trend in this period. The fluctuations are primarily due to the variation in precipitation from one year to the next. At the same time, the price has fluctuated substantially, partly due to the variation in precipitation and production, but also due to changes in cyclical conditions and temperatures. This has contributed to the highly varying levels of return in the electricity sector.

2.2. The return in manufacturing industry

We also see from Figures 2a and 2b that the return in Norwegian manufacturing has been substantially higher than the return in the electricity sector. The return in manufacturing, however, varies considerably more than the return in the electricity sector. This is because manufacturing is more exposed to competition than the electricity sector and changes in the return generally shadow cyclical developments. In Table 1 we see that the return in various manufacturing sectors also varies considerably, with the production of metals showing the highest average return over several years. This is one of the industries that has the most favourable contracts for electricity. The return is lowest on average for paper and paper products and the production of chemicals, which also have very reasonable and long-term electricity contracts. Here, however, electricity costs account for a substantially lower share than in the production of metals. On average over 10-year periods, the return in manufacturing has varied between 5 and 7 per cent. It is not until after 1990 that the return in the electricity sector has approached this level. Given that the electricity industry is an economic rent industry, we thus see that historically the return in this sector has been very low.

3. The return in the electricity sector in the period 1993-1997

3.1. Return concepts and organisation

For the period 1993-1996 detailed statistics are available for the various energy utilities, entailing that it is possible to use the accounts directly for measuring the return, whereas for 1997 preliminary accounts figures are available. Several different concepts can be used to measure the

profitability of an enterprise, such as the return on total assets, the return on equity, operating profit margin and asset turnover. The *return on total assets* is the most important indication of profitability. This ratio is defined as total capital remuneration (operating profit + interest expenses) in relation to total assets. Total assets are defined here as the sum of accumulated investments at current prices less accounting depreciation.²

Profitability in an energy utility can vary sharply from one year to the next due to fluctuations in various components of the operating profit or due to changes in total assets. Revenues primarily depend on the magnitude of energy sales and the sale of transmission services, while costs are determined by the magnitude of energy purchases, purchases of transmission services, compensation of employees, grid losses and depreciation. The reorganisation of energy utilities, or sporadic events such as a temporary production halt, may also influence the return.

Energy utilities trade in a market with greater price variations than in most other commodity markets, and the risk is therefore considerable both for purchases and sales. After the Energy Act was introduced in 1991, competition has also intensified and the spot price of electricity has shown even wider fluctuations. Many energy utilities cover a large share of their contractual obligations by buying electricity on the Power Exchange (Nord Pool ASA), and are therefore fairly vulnerable to higher spot prices. On the other hand, energy utilities that primarily sell electricity on the Power Exchange may record a less favourable result in periods with low spot prices. The uncertainty of selling and purchase prices has contributed to a sharp rise in turnover in the financial futures electricity market on the Power Exchange in recent years. The main purpose of this market is price hedging, and price guarantees in the contracts are often offered. The guarantees entail that if the market price deviates from the contract price in the period the contract is in effect, the buyer will receive, or possibly have to pay, the difference.

In recent years the electricity sector has been frequently reorganised in order to separate monopolies from activities exposed to competition. Many energy utilities have estab-

² The return on this basis therefore deviates somewhat from the return in the previous section where depreciated replacement cost (i.e. the value of the assets has been adjusted) was applied. Depreciation there is linear depreciation, while here it is depreciation permitted pursuant to tax legislation at any given time, and which the enterprise finds profitable to apply. The level of the return based on this definition is slightly higher. Profitability still indicates the return on total assets irrespective of the composition of total assets.

Definition of different types of energy utilities

Energy utilities can be split up into different types according to their main activity. There are six main types of energy utility:

- Production plants: Electricity-generating power stations which supply very little electricity directly to the end-user.
- Wholesale utilities: Energy utilities that primarily purchase power for resale to other energy utilities. They may produce some power or supply some power to end-users through regional grids.
- Integrated utilities: Energy utilities that have their own production and supply power directly to end-users. These are in turn divided up into high-integrated and low-integrated utilities:
- High-integrated utilities have more than 20 per cent own production of power sales to end-users.
- Low-integrated utilities have less than 20 per cent own production of power sales to end-users.
- Grid companies: Includes pure grid companies that do no sell, but only distribute power.
- Industrial generators: Power plants that are part of an industrial enterprise, and primarily supply power to production units in the same enterprise.

Energy utilities by type of ownership

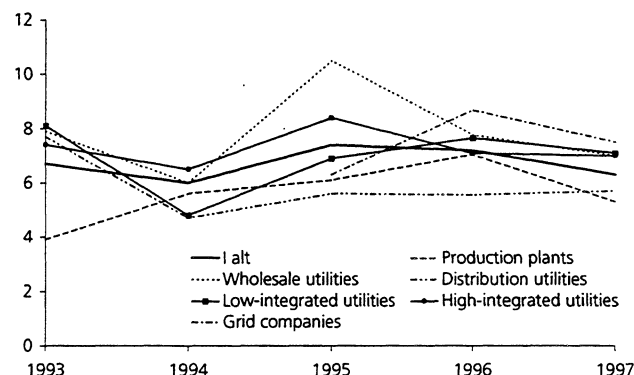
Energy utilities can also be classified according to type of ownership. A distinction is then made between municipal, state and private utilities. Municipal utilities are in turn split up into inter-municipal, county and municipal utilities.

- County utilities: Energy utilities that are solely owned by a county.
- Inter-municipal utilities: Energy utilities that are owned by at least two municipalities.
- Municipal utilities: Energy utilities that are owned by one municipality alone. In addition, this includes utilities where a municipality owns a minimum 50 per cent of the equity and the state or private interests hold the remainder.
- State utilities: Includes, in addition to state power plants, all energy utilities owned by the state or where the state owns at least 50 per cent of the share capital.
- Private utilities: Energy utilities where private interests own more than 50 per cent of the capital.

An energy utility can be owned by several categories of owner. The 50 per cent rule is then often applied in order to assign a utility to a category, i.e. the energy utility is assigned to the category that has an ownership interest of more than 50 per cent, or owns more than 50 per cent of the capital.

lished separate companies for some of their activities, with the result that the number of energy utilities rose by 14 from 1994 to 1995. This is partly because the authorities required separate accounts for the supply of electricity and grid services at the beginning of the 1990s. In the period 1984-1994, however, the number of energy utilities was

Figure 4. Return on total assets in different types of energy utilities, 1993-1997. Per cent*



* 1997 figures are preliminary.

reduced by 113. The decline in this period was related to the merger of many utilities in order to achieve economies of scale in the form of, for example, joint marketing, synergy effects in the customer handling system and broader expertise. The introduction of the Energy Act in 1991 in particular contributed to the reduction in the number of utilities as a result of the increase in competition in the electricity market and efficiency requirements.

In 1998, there were also many energy utilities that merged or were negotiating a merger. This is probably related to intensified competition, less loyal customers, lower electricity prices and the greater risk associated with sharply fluctuating purchase prices. After paving the way for changing electricity supplier, in part by removing the fee for changing supplier in 1998, there has been a sharp rise in the number of supplier changes. In January 1999, 4.5 per cent of all households in Norway had a non-local supplier, while the corresponding share in October 1997 was 1.4 per cent.

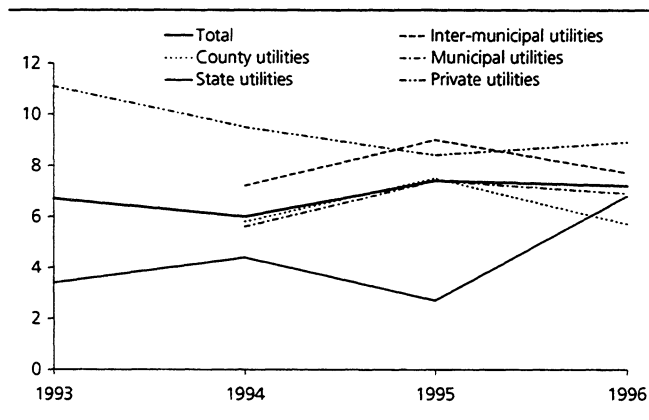
3.2. Profitability according to type of utility and ownership 1993-1997

If all power development had been undertaken in accordance with economic criteria, and the electricity market had functioned perfectly, we would expect the return in production plants to be higher than in other types of energy utilities. This is because the production plant in principle can realise economic rent in excess of a normal return. Common risk analysis should also point to the same since the risk associated with electricity production and sales is greater than for grid operations. Owners of new production plants should then demand a higher return on projects before the investment was made.

Figure 4 shows the profitability in various categories of energy utilities in the period 1993-1997 (see box for a definition of the categories).³ This shows that production

3 Grid companies were placed in a separate category from 1995.

Figure 5. Return on total assets in energy utilities by type of ownership, 1993-1996. Per cent



plants, along with distribution utilities, have the lowest return, while high-integrated utilities, low-integrated utilities and grid companies have a higher return. The regulated segments therefore appear to have a higher return than those exposed to competition. This is partly because the deregulation of the electricity market in a number of countries, substantial production capacity and increased competition have contributed to squeezing electricity prices.

It is true that in 1994 and 1996 spot prices rose considerably due to little precipitation and a tight electricity market. In isolation, this resulted in higher revenues, but the return still fell in many energy utilities compared with previous years due to limited production and higher costs for purchasing electricity.

Energy utilities' electricity purchases are often based on a mix of short-term and long-term contracts with other energy utilities. In addition, they buy electricity over the Power Exchange and import directly from abroad. The scale and composition of purchases partly depend on risk in the electricity market and how much they produce themselves. Electricity purchases over the Power Exchange can also include imports, as operators from many countries participate in this market. Prices for bilateral contracts, import prices and spot prices for electricity traded on the Power Exchange rose substantially in 1994 and 1996.

In addition to the increase in purchase prices, a higher share of energy utilities' contractual obligations had to be covered by expensive imports or other purchases when lower-than-normal reservoir levels resulted in lower production at these utilities in these years. Energy utilities that had to cover fixed low-price contracts with imports or other purchases over the Power Exchange were probably those that fared the worst in 1994 and 1996. Wholesale utilities in particular recorded considerably higher costs and less favourable results in these years since they produce very little themselves and must cover most of their contractual obligations by buying electricity.

The decline in profitability in 1996 is also due to an upward adjustment of NOK 18 billion in total assets from the

end of 1995 to the end of 1996. This results in an increase in average assets of about 6-7 per cent in these two years. Assets were increased through an upward adjustment in the values in the electricity sector in connection with the sale of power companies and reorganisation in 1995. Among other things, the value of shares, long-term claims and plant rose.

Production plants recorded a higher return both in 1994 and 1996, reflecting the fact that they produce most of the electricity themselves. Production plants with considerable water reserves in multi-year reservoirs fared particularly well in that they could sell a large share of this electricity at a high price in the spot market.

In 1995 the return in the electricity sector was higher than ever before. This may be ascribed to record-high electricity production and higher end-user prices, as well as relatively low purchase prices on the Power Exchange. Many energy utilities raised end-user prices at the beginning of 1995 because spot prices rose considerably in 1994 and remained at a high level up to the spring flood in 1995. After the spring flood, spot prices dropped substantially, and were on average 11.3 øre/kWh that year.

Wholesale utilities recorded a particularly high return since they profited from covering their long-term contracts using cheap electricity from the Power Exchange. In addition to favourable prices, financial revenues in the electricity sector rose by more than NOK 400 million from the previous year, primarily as a result of a rise in share dividends, gains on currency trading and the sale of securities.

The return in energy utilities as a whole was lower in 1997 than in the previous year. This was primarily due to purchases/sales of fixed assets and write-up of assets, entailing that total book assets increased by NOK 13.5 billion from the end of 1996 to the end of 1997. The operating profit remained virtually unchanged from 1996 to 1997. Lower end-user electricity prices contributed to lower revenues for energy utilities compared with the previous year, although the costs of electricity purchases also fell due to lower purchaser prices.

The return in production plants was reduced by a substantial margin from 1996 to 1997, partly due to higher depreciation and other operating expenses along with the previously mentioned upward adjustment of total assets. As electricity prices were very high in periods of 1996, some decided to enter into long-term contracts at relatively high prices in response to fears that prices would rise to even higher levels. Others, however, chose to wait until the fall in prices in the spring of 1997 and have benefited from that decision. Power plants sustained a corresponding loss.

In 1997 the Norwegian Water Resources and Energy Administration introduced new rules, imposing a limit on the level of income companies are permitted to have from grid activities. Moreover, individual efficiency requirements were established for grid companies. Distributors

Table 2. Return on total assets in different manufacturing industries and the power sector 1993-1996

Period	Food and beverages	Wood and wood products	Pulp, paper and paper products	Chemicals and chemicals products	Metals	Metals products excl. machinery and equipment	Manufacturing total	Power production
1993	10.9	7.5	5.1	8.7	4.9	5.0	8.1	6.7
1994	9.1	14.1	6.2	6.9	7.6	12.3	7.5	6.0
1995	11.4	6.8	17.0	7.8	18.4	9.0	10.3	7.4
1996	9.5	3.9	10.5	6.8	8.1	12.4	7.8	7.2

Source: Manufacturing Statistics in Statistics Norway. The definition of the return on total assets is the same as in Electricity Statistics.

had to increase the efficiency of operations or reduce costs beyond the efficiency requirement in order to achieve a higher return, something which appears to have occurred in some companies.

Many private utilities were built at an early stage and were cheap plants, while the state owns some of the more expensive production plants. Private utilities might thus be expected to have a higher return than government utilities. Figure 5 also shows that private utilities generally have had a substantially higher return than state utilities in large parts of the period 1993-1996. Inter-municipal utilities are approximately on a par with private utilities at the end of the period. While the return in state utilities was a good 4 per cent on average in this period, it was about 9 per cent in private utilities. Production in private utilities accounts for only 12 per cent of total production, while the corresponding share in state utilities is about 35-40 per cent. The low return in state utilities is not only related to the fact that the state owns the most expensive utilities. Another important reason is that the authorities have concluded long-term contracts for supplying cheap electricity to power-intensive manufacturing.

Historically, we saw that the return in the electricity sector was substantially lower than the return in manufacturing. In the period 1993-1996 the return in the electricity sector was still slightly lower than in manufacturing, but in recent years it has approached the level in manufacturing, see table 2. There were, however, several manufacturing sectors that recorded a high return in this period due to favourable cyclical conditions; this particularly applied to the pulp and paper industry.

3.3. The return according to the level of costs in the energy utility

If the electricity market functions, the prices charged by different types of utilities will be approximately the same irrespective of production costs at each utility. This means that the return in cheap plants shall be substantially higher than the return in more expensive plants. This particularly applies to production plants, which are primarily engaged in power production. In more integrated utilities, which are heavily involved in grid activities and where the return is regulated, a steadier return would be expected. A greater or lesser proportion of production activity points to a

varying return, even for integrated utilities. This may, however, change from one year to the next as a result of varying inflow to the reservoirs and a different degree of reservoir capacity at each utility.

We have now ranked energy utilities in cost categories by apportioning the capital costs (which is the most important cost component) for activities at each utility. For production plants (see box 1) we have used total assets/production as an indicator of the cost category classification. For low-integrated and high-integrated utilities we have used total assets/(production + power transmission volume). Since these utilities both distribute and produce electricity, the transmission of electricity is also included in the cost category classification.

Figures 6-8 show the return in power-generating energy utilities according to costs per unit produced. The return of the 10 per cent of energy utilities (number) that have the lowest costs per unit electricity produced are on the left side, the 10 per cent with the highest costs on the right.

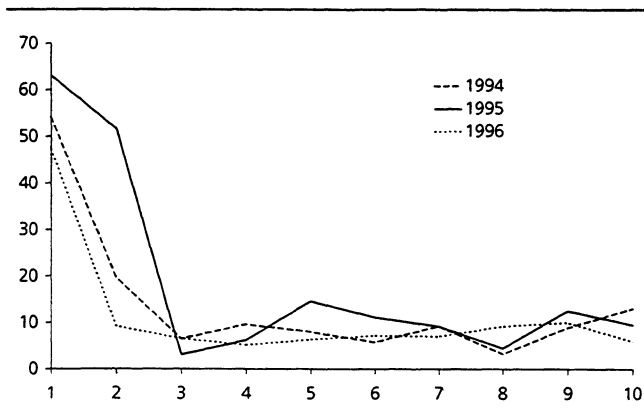
Production plants

Figure 6a shows that the return in production plants varies considerably between energy utilities. While the cheapest utilities had a return of more than 45 per cent in 1996, some of these utilities also had a return as low as 3 per cent. However, production plants with a return of more than 20 per cent are small energy utilities which altogether account for less than 2 per cent of total production.

If the 20 per cent cheapest energy utilities are disregarded, there is no clear correlation between the return and how expensive the energy utility is. (See return in cost category 3-10 in figure 6a). Here, the return varies between 3 and 15 per cent without any systematic correlation with production costs.

One important reason why we do not find any such correlation is that the price of power supplied by the various production plants covaries with production costs. This is indicated in figure 6b, which shows average prices in the same groups. Whereas the price is down to 6 øre/kWh for the cheapest energy utilities, the most expensive energy utilities have prices up to 30 øre/kWh for all years in the period 1994-1996.

Figure 6a. Return on total assets in production plants by cost category, 1994-1996. Per cent

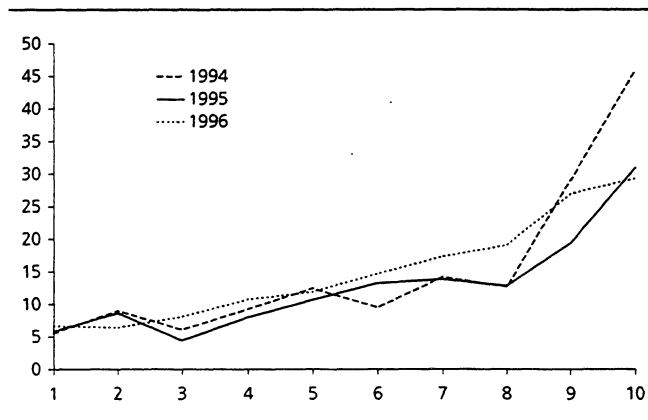


Prices are calculated here as an average of prices for electricity sold by the utilities to different customer groups. This includes power subject to licence requirements⁴, electricity on bilateral contracts domestically (sales to e.g. another energy utility), sales to end-users, exports and sales of regulating power/spot power over the Power Exchange. Sales to end-users account for about 18 per cent of total sales, and prices can vary depending on e.g. customer type and energy utility. Prices in bilateral contracts account for the highest share, however, with this turnover representing half of the sales (excluding internal sales). Prices for power subject to license requirements are regulated pursuant to the Watercourse Regulation Act, so these are fairly uniform for all energy utilities. In addition, we have Statkraft (Norwegian Energy Corporation) which sells most of the power subject to licence requirements in Norway. Prices in the spot market and for export are also the same for energy utilities. Bilateral contract prices for sales to other energy utilities, on the other hand, vary considerably.

The explanation for the considerable price variations in bilateral contracts is that the production plants primarily sell to the owners themselves and that the prices are often set in such a way that the production plant records a zero after-tax result. This means that it will be difficult to test profitability in the various areas of activity.⁵ Production plants are not exposed to the same competition as energy utilities, which primarily sell to end-users. Production plants are usually owned by one or more other energy utilities, which are engaged in the purchase, sale and distribution of electricity. Owners may, for example, be wholesale utilities, high-integrated utilities, industrial generators or other production plants.

The substantial price differences show that the cost of electricity purchases varies considerably for owners of production plants. This probably has an influence on the owners'

Figure 6b. Electricity prices in production plants by cost category, 1994-1996. Current prices. Øre/kWh



profitability. Those who own a cheap production plant can most likely benefit from this, either by achieving a high return or through the resale of electricity to end-users at low prices. Since the Norwegian Water Resources and Energy Administration has established an upper limit for the return in grid activities, low costs will probably be reflected in low end-user prices.

Production plants, however, also sell to utilities other than the owners, and also sell considerable electricity on the Power Exchange at the market price. It is uncertain whether the contract prices for energy utilities other than the owners vary as much as illustrated here, but this may be the case if customers are tied up in long-term contracts entered into before the Energy Act was adopted. Price variations can also occur if cheaper production plants do not have the capacity to sell to large, new customers, and at the same time are tied up contractually or by the owners to supplies within their own area. Moreover, information on prices in bilateral contracts may be imperfect.

Even though it is prohibited, there may also be cross-subsidisation through the production component in the energy utility. This may contribute to a high return for expensive energy utilities. Since many energy utilities are engaged in both grid and sales activities, in addition to production, the energy utility may shift the surplus from the grid or sales component to the exposed production component if control is not satisfactory. The authorities attempt to prevent this, partly by requiring that separate accounts be kept for the various activities of energy utilities. Since the regulation of grid rates is problematic, however, this may in principle continue to occur.

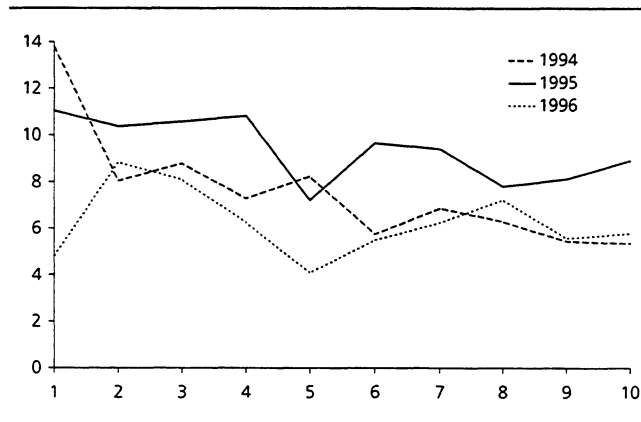
High-integrated utilities

As noted earlier, it is likely that there is less of a correlation between costs and the return in integrated utilities than

4 Power subject to licence requirements refers to the portion of electricity production which the owners of hydropower plants pursuant to the licences granted are required to supply to the municipalities affected by power development, possibly also the county and the state. Power subject to licence requirements is distributed by the licensing authorities and shall be supplied at the prices prescribed by law.

5 This may in turn be an important reason for operating with government-stipulated prices, as is actually the case in the current system, for the taxation of economic rent.

Figure 7a. Return on total assets in high-integrated utilities by cost category, 1994-1996. Per cent



in pure production plants. On the other hand, the production component will point to a lower return in expensive utilities than in cheap utilities also here. In Figure 7a, however, we see that there is a clear correlation between the return and capital costs for high-integrated utilities.⁶ In 1995 and 1996, the correlation was fairly weak, while in 1994 the difference in the return was as much as 8 percentage points for the most expensive and cheapest energy utilities. One important reason why there is a stronger correlation between the return and capital costs for high-integrated utilities than for production plants is that the exposed end-user market accounts for more than 60 per cent of total sales (excluding internal sales) from high-integrated utilities. If the electricity price is set too high, the energy utility runs the risk of losing customers. A substantial portion of the electricity is also sold on the Power Exchange. Production plants, on the other hand, sell electricity to the owners themselves, and in this sense are not exposed to the same competition.

Figures 7b and 7c show, respectively, total average prices and electricity prices for the end-user according to the same cost categories for all utility activities and for only power sales, respectively. The average price (average of electricity prices and grid charge) for expensive utilities is about 20 øre, figure 7b, while it is down to 6-7 øre/kWh for the cheapest. The price differential is partly due to the fact that expensive utilities cover their costs by charging a high grid rate in their monopoly activity, but also because energy utilities sell to different customer types with varying levels for electricity prices and grid charges.

Figure 7c shows, however, that there are also some differences in the electricity price between expensive and cheap energy utilities in exposed activities. This may be because cheap and expensive energy utilities sell to different customer groups where sales are not necessarily determined by pure market conditions, but are more institutionally contingent contracts. For example, cheap energy utilities may be tied up in long-term low-price contracts with manufacturing industry. Households are among the customer groups

Figure 7b. Average electricity prices and grid charges in high-integrated utilities by cost category, 1994-1996. Øre/kWh

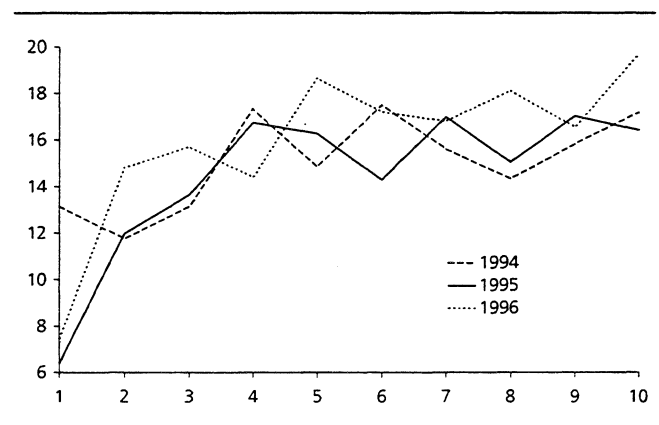
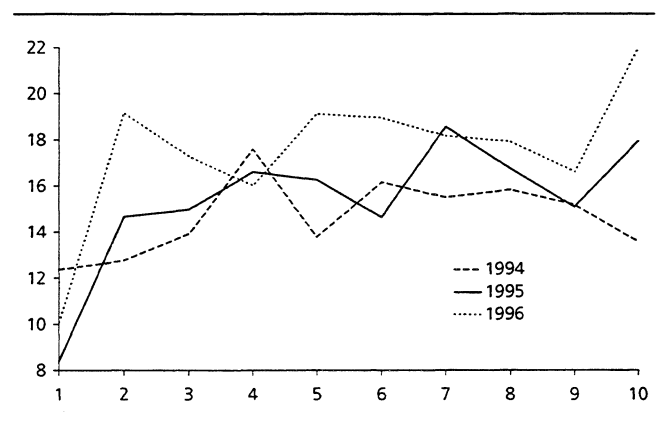


Figure 7c. Electricity prices for end-user in high-integrated utilities by cost category, 1994-1996. Øre/kWh



that pay the most, while power-intensive manufacturing pays about one-third of the price for households. Price differentials may indicate that competition in the electricity market does not function as well as it should.

Figure 7a shows that some expensive energy utilities have a high return, while some of the cheap utilities have a low return. This may be due to many factors, and may in part be related to different terms in the contract for purchases and sales of electricity. An expensive energy utility may, for example, have favourable contracts with low purchase prices because they are co-owner of a cheap production plant. Cross-subsidisation between the various activities may also occur. By studying figures 7b and 7c, we find that electricity prices vary considerably, while the average for the grid charge and electricity price is much more stable. This may indicate that energy utilities with high electricity prices charge a low rate for use of the grid, and the reverse.

⁶ Total assets/(production + power transmission volume) is used as an indicator of cost categories here.

Figure 8a. Return on total assets in low-integrated utilities by cost category, 1994-1996. Per cent

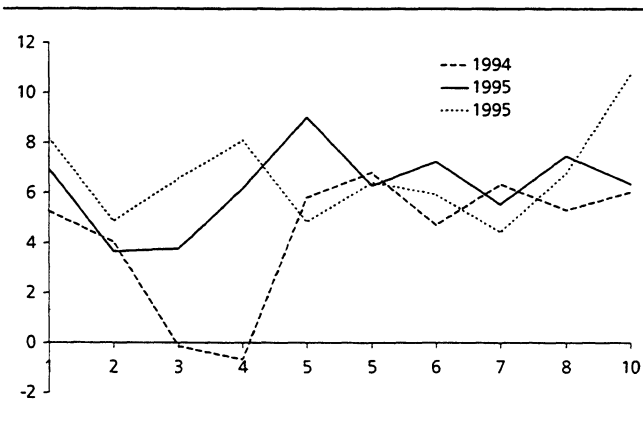


Figure 8b. Electricity prices for end-user in low-integrated utilities, 1994-1996. Øre/kWh

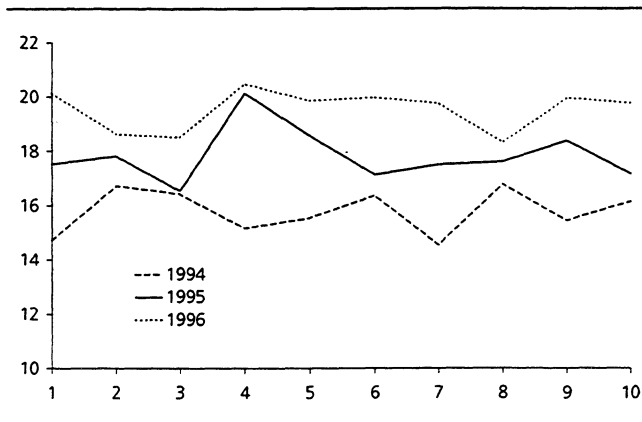
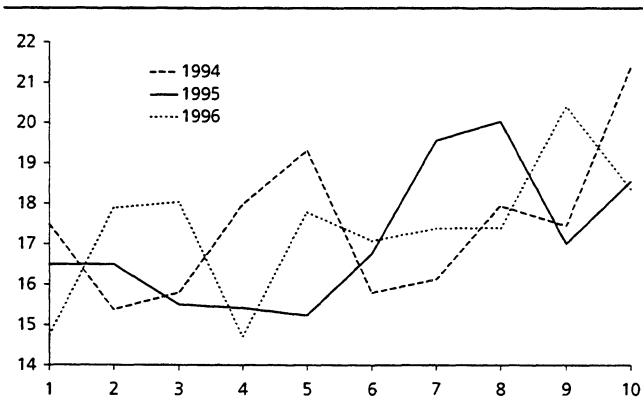


Figure 8c. Grid charges in low-integrated utilities by cost category, 1994-1996. Øre/kWh



Low-integrated energy utilities

Since there is a monopoly for grid activities, the grid charge may be set at a level where the energy utilities achieve a reasonable return on capital, as long as the return is below the upper limit stipulated by the Norwegian Water Resources and Energy Administration. This regulation points to a reasonably steady return in low-integrated utilities even though they also have some production activities. However, the difference in the grid charge between the most expensive and cheapest utilities may amount to a few øre/kWh. With high turnover, this can account for a certain differential in the return on capital.

In figure 8a we see that there is no correlation between the return and the ratio of total assets to production + power transmission volume for low-integrated utilities. Figure 8b shows that there is also no correlation between electricity prices for the end-user and capital costs. Figure 8c, however, shows that there is a weak, albeit not systematic, correlation between the grid charge and cost categories.

Since low-integrated utilities produce very little themselves, costs for electricity purchases will account for a higher share of total costs than capital costs. Low-integrated utilities with high profitability have in many cases slightly lower purchase prices than utilities with a low re-

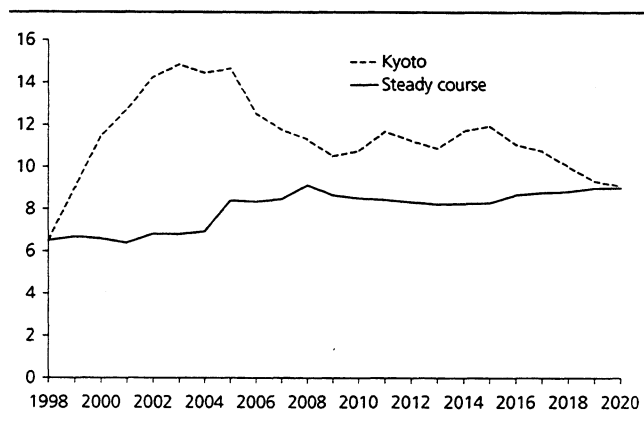
turn. Moreover, total assets in low-integrated utilities are considerably lower than in high-integrated utilities. In 1996, average total assets in low-integrated utilities came to about NOK 258 million, while the figure for high-integrated utilities was about NOK 940 million, i.e. almost four times as much.

Figure 8a shows that the return in low-integrated utilities fluctuates considerably. One would expect the return to be fairly stable since a high proportion of sales consists of grid activities, which are regulated. The fluctuations are probably due to variations in purchase prices or in the end-user price. With high purchase prices, energy utilities run the risk of having to cover fixed-price supplies to the end-user at a loss. This is one of the reasons why some energy utilities recorded a negative return in 1994. In addition, the variations in the return from one year to the next may be due to an excess return on grid activities achieved by energy utilities. A return in excess of the stipulated maximum return shall be repaid to customers in the form of reduced grid charges in the future. On the other hand, a lower return, i.e. failure to cover costs, can be recovered in the form of higher grid charges in the future. The maximum return was set at 7.5 per cent up to 1996, and was raised to 8.3 per cent in 1997.

4. The return in the period to the year 2020

What will be the return in the electricity sector in the period ahead? In the Energy Report, which was presented in the summer of 1998, see NOU 1998:11, several calculations were made of the potential for the future electricity market in Norway and the Nordic countries. Calculations were presented on price developments in the electricity market under differing framework conditions in the period to the year 2020. Two projections are of particular interest. One was called a "Steady course", which was the baseline scenario for the Commission. This represents a type of business-as-usual scenario. The second is presented in Annex 3 of the report and is called "Cost-effective Kyoto". This shows possible price developments assuming that the

Figure 9. Average return on capital in the electricity sector 1998-2020. Operating profit on assets written down to replacement cost. Per Cent. Kyoto and Steady course



Kyoto Protocol shall be implemented based on an internationally cost-effective set of instruments.

Based on the price paths in these two scenarios, it is now possible to calculate the return for the electricity sector as a whole in Norway in the same way as in section 2. Figure 9 shows that the return in the “Steady course” scenario remains approximately constant at the current level, 6.5 per cent in the period to the year 2005. The return remains virtually constant for a long period early in the calculations because of the considerable surplus capacity in the Nordic electricity market. This contributes to keeping prices low. The return then rises rapidly to a level of about 9 per cent in the period to 2010 as surplus capacity in the North European electricity market declines. Higher demand contributes to pushing up the electricity price in the market to the cost of developing new capacity. The return then remains at about 8-9 per cent. Some of the economic rent in the sector is realised. However, there are still some older, expensive projects that will provide a low return. One of the main reasons that the return does not exceed 9 per cent, even though the report indicates that the equilibrium price of electricity in the calculations is 20-21 øre/kWh, is that it is assumed in this scenario that power-intensive manufacturing will have their electricity contracts extended at favourable prices. Moreover, it is assumed that the required rate of return for new power development projects is 7 per cent.

In order to illustrate some of the uncertainty of these calculations, an alternative scenario was presented in the Energy Report. There it is assumed that international agreement will be reached concerning a system for tradable permits for emissions of greenhouse gases, and that this system will generate cost-effective reductions of emissions throughout the world. Bruvold and Bye (1998), Lindholt (1998) and Aune, Bye, Hansen and Johnsen (1998) estimate the cost-effective permit price in the period to the year 2020 at about NOK 200 per CO₂-equivalent. Such a cost for greenhouse gas emissions will contribute to increasing the price in the electricity market fairly quickly. This will occur partly through higher production costs for power plants that

use fossil energy. The electricity price in the market will be influenced because parts of the sector must be closed down due to poor profitability with this emission cost. This will create a faster balance between production capacity and demand. Prices will thus be pushed up more quickly than would have been the case without this climate cost. This is true even if it is assumed that power-intensive manufacturing will have to pay market prices for electricity, and thereby contribute to freeing up a substantial volume of electricity for other users. This is of limited importance to the price in a deregulated Nordic electricity market since this industry accounts for a relatively small part of an integrated Nordic and North European electricity market (see Bye, Hoel and Strøm (1999)).

We see from Figure 9 that the return in this case increases to 15 per cent fairly quickly. Existing capacity accounts for the dominating share of electricity production capacity, and prices increase sharply. For developments in the average return in the electricity sector, it is important that power-intensive manufacturing must also pay market prices in this calculation. Gradually, however, the return again falls to about 9 per cent. This is the result of an increase in the costs for new power plants, partly due to the cost of greenhouse gas emissions for plants based on fossil fuels, and partly due to the use of more expensive alternative technology instead of power plants based on fossil fuels. Gas-generated electricity will be unprofitable under this CO₂ regime, and the alternative technologies that are applied instead of gas-generated electricity will be more expensive than gas-generated electricity would have been without CO₂ costs. This contributes to increasing the average costs in electricity production. Since the required return on capital for electricity investments is 7 per cent, this will also keep down the average return. For large parts of the electricity sector, which are not affected by higher costs and only benefit from a rise in prices as a result of prices for greenhouse gas emissions, the return will be very high.

Other elements of uncertainty may entail that the return in the future will actually be lower. For example, technological advances in general may reduce the level of costs for new power development projects. This may contribute to lower electricity prices than those assumed here. Under a climate regime, particularly the supply of new renewable sources for electricity production and consumption, or new technologies, may contribute to lower electricity prices than suggested here. However, the underlying growth in electricity consumption should not be underestimated, which entails that the supply of new renewable or non-polluting technologies must be of a fairly large scale if this is to influence prices.

5. Summary

The electricity sector in Norway is a so-called economic rent industry. This should imply that the return in this industry is higher than the return in other sectors of the economy, disregarding uncertainty. Over a long historical period the return in this industry has been lower than in

manufacturing industries. This was one of the reasons for deregulating the Norwegian electricity market in 1991.

Following deregulation, one would expect the return to be higher and that more expensive energy utilities would record a lower return than cheap energy utilities. The return, however, has risen very little, partly as a result of increased competition from utilities in other countries with considerable production capacity in relation to demand.

Private utilities have a higher return on average than government-owned utilities. This is partly related to costs, but the way in which electricity is sold from the various types of utilities is also important.

One would expect expensive power plants to have a lower return than cheap power plants. Figures from the accounts for 1993-1997 cannot confirm this hypothesis. On the contrary, it appears that the return is virtually independent of costs.

The fact that the return is independent of costs at energy utilities is due to the apparent covariation of prices with costs. This indicates that the current electricity market does not function as well as might be desired. One of the main reasons for this is probably that a considerable portion of electricity is sold on bilateral contracts that are not directly exposed to the market.

The return in high-integrated utilities and low-integrated utilities by cost categories better corresponds to what theory would imply for production plants. This is probably because integrated utilities are more exposed to the market than power turnover in production plants.

The projections indicate that the outlook for a higher return in the electricity sector in the period to the year 2020 is favourable. In the long run the sector may recover part of the economic rent that is presumed to exist in the industry. With a cost-effective international implementation of the intentions in the Kyoto Protocol, the return may be very high in the Norwegian electricity supply sector.

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Factors determining the growth in residential electricity consumption

Bente Halvorsen and Bodil M. Larsen

In Norway, political signals have indicated that the growth in energy consumption should be reduced and that it may be necessary to increase the energy taxes. A discussion of energy taxes levels is also actualized by the Kyoto agreement. This raises the question of what effect such tax changes will have on energy consumption. Based on the data for a sample of households in the period 1976-1993, this article looks at the factors that are of importance to residential electricity demand. Household electricity consumption has increased by an average of about 3 per cent annually in the twenty-year period we have studied. Nearly half of this increase is due to an increase in the number of households, while the remainder reflects an increase in average consumption per household. The results show that several factors point to higher average electricity consumption per household in this period. Among other things, an increasing number of households have started to use electric household appliances such as dryers and dishwashers, household income measured at constant prices has increased and the floor space of dwellings has risen. The results also show that a higher electricity tax will lead to a fairly substantial change in residential electricity demand.

Introduction

Residential electricity consumption has increased over time, partly due to income growth and a composition of household consumption that requires higher energy consumption. For example, the size of dwellings and the percentage of households that have electric household appliances, such as dishwashers and dryers, have increased considerably the last twenty years. Political signals have indicated that the growth in energy consumption should be reduced, and that it may be necessary to increase taxes on energy consumption.¹ The extent to which electricity demand will be influenced by an increase in the electricity tax will in part depend on the composition of electricity consumption for various purposes. Taxes can also have unfavorable distributional effects.

Data from such sources as Statistics Norway's annual Survey of Consumer Expenditure for the period from 1976 to 1993 have been used in order to elicit how such measures will influence residential electricity demand. Based on these data, we study the factors which have influenced developments in Norwegian residential electricity consumption. The data set contains information about a household's consumption of energy goods and other goods, prices for these goods, as well as income and other household characteristics. This entails that we can make thorough empirical analyses of residential energy consumption. However, there will always be some uncertainty as-

sociated with such empirical analyses, and our results must therefore be interpreted with caution. The uncertainty may reflect, among other things, unrepresentative data, the choice of our analytical method and the specification of the econometric model. For example, our data set consists of a sample of households, although the sample is so large that the main features of the analysis are assumed to be relatively robust.

This article focuses on studying the flexibility of household demand for electricity, i.e. the possibilities for adjusting electricity consumption when prices, income or other factors that are of importance to energy demand change. The article is based on Halvorsen, Larsen and Nesbakken (1999) and Halvorsen and Larsen (1999). In studies of flexibility, it is important to take several factors into account. First, households are not a uniform group, and the demand for electricity may vary depending on the type of household. For example, it is reasonable to assume that a family with small children living in a block of flats will have a consumption pattern that differs from a minimum pensioner living in a detached dwelling. Basing these studies exclusively on analyses of aggregated data therefore entails the risk of losing important information on variations in behaviour between different types of households. By analysing the data for each household (micro data), it is possible to provide estimates for the importance of differences in energy consumption. Energy is a means to obtain such services as heat, refrigeration, freezing and lighting. Changes in the household's stock of energy-consuming equipment therefore have a considerable influence on changes in energy consumption. In addition to household characteristics, changes in the stock of equipment (increase or replacement) will depend on prices for the equip-

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¹ See, for example, section 4.4.1 in the National Budget 1999, which describes the main features of taxes on the use of energy.

ment and energy types as well as expectations concerning future prices. A third factor that should be taken into account in analyses of residential electricity demand is that households so far have been billed for all uses combined (heating, lighting, etc.) based on last year's consumption profile, adjusted for actual consumption once a year. Actual prices and the cost of electricity consumption are therefore unknown to the household. It must be assumed that such factors have an influence on electricity consumption, and it is therefore necessary to test which prices that influence household energy use.

We begin by providing an overview of developments in electricity consumption. We then present the results of an econometric analysis of those factors which influence residential electricity consumption. The article concludes with a summary and concluding remarks as well as a review of data sources used in the analysis.

Development in household electricity consumption

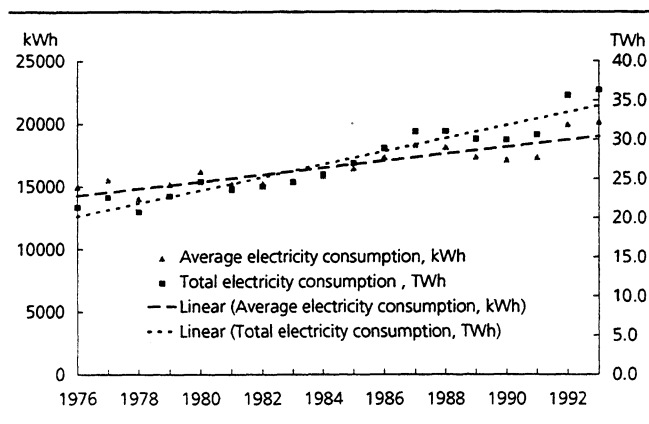
Figure 1 shows changes in total electricity consumption for all Norwegian households (measured in TWh along the right-hand axis) and average electricity consumption per household (measured in kWh along the left-hand axis) in the period 1976 to 1993, as well as a linear trend line for both series.

Total electricity consumption is calculated by multiplying average consumption per household in the sample by the number of households in Norway.² The estimated trend growth in average electricity consumption per household was 1.7 per cent a year in the period 1976-1993. Estimated total electricity consumption of Norwegian households increased by an average 3.1 per cent annually in the period, measured along the trend line.³ The reason that total electricity consumption increased by a greater margin than average consumption per household is that the number of households in Norway rose by an annual average of 1.4 per cent in this period as a result of population growth and a reduction in the number of persons in the household. This means that about 45 per cent of the growth in total residential electricity consumption is due to an increase in the number of households, while the remaining 55 per cent is ascribable to changes in factors that influence the various households' electricity consumption. In the next section we take a closer look at the factors which influence household behavior.

What determines household electricity consumption?

Econometric analyses based on the data set described at the end of the article were carried out in order to explain the factors determining residential electricity consumption.

Figure 1. Estimated average electricity consumption per household (kWh) and total electricity consumption in the household sector (TWh), 1976-1993



Source: Statistics Norway.

This section starts with a brief description of how household behaviour is modelled in the analysis, followed by a presentation of the results from the estimations. The model is estimated for each year in the period 1976-1993, but to facilitate the presentation we show the results of an analysis based on a pooling of all the data. The estimated coefficients can thus be interpreted as the average importance of each variable for electricity consumption over the entire period. Finally, we look more closely at how these explanatory variables have changed in the period 1976-1993 in order to provide an indication of their influence on developments in electricity consumption over time. For example, if a higher electricity price results in reduced electricity consumption, the electricity price will contribute to increasing consumption when the price falls over time, and reducing consumption when the price increases over time.

The model for household electricity demand

The consumption of energy does not give the household utility *per se*, but is used along with equipment to obtain goods and services, such as hot meals, clean clothing, hot water and a comfortable indoor temperature. In the model, we assume that the household's utility depends on both goods and services produced by the household and a number of other goods consumed directly by the household. The household's production of a given service is a function of the use of electricity in the production of the service and the equipment used to produce the service. The household's appliance stock depends on the stock in the previous period as well as investments in new equipment.

In the model, the household is assumed to minimize the present value of the production cost of a service with respect to electricity consumption and the desired stock of appliances. The production cost from this minimization

² The number of households in Norway is obtained from Statistics Norway's population and housing censuses.

³ The percentage annual trend growth in electricity consumption over the period is close to the figures in Statistics Norway's energy accounts.

problem will depend on the price of electricity and appliances, and leads to household demand for electricity and investments in new appliances for different levels of production. To determine the desired level of household production and consumption of goods that are not included in the production of services, we assume that the household maximizes its utility subject to budget constraints. A household's budget constraint depends on the household's income, the price of goods that are consumed directly and on the unit cost of producing the service from the cost minimization problem. The unit cost is defined as the cost per unit produced for producing the desired level of the service.

The stock of appliances is given in the short run, but in this model the electricity price may influence the stock in the long run through investments in new household appliances. A change in the electricity price will therefore have two different effects on electricity consumption: a direct (short run) effect and an indirect (long run) effect through investments in new electric household appliances.

Halvorsen and Larsen (1999) provide a further description of household behavior and the econometric specification of the problem.

Estimation results for the period 1976-1993

Estimations were carried out in two stages. In the first stage, purchases of electric appliances are determined as a function of, among other things, prices for household appliances and electricity. In the second stage, electricity consumption is then determined as a function of the estimated values from the first stage, the electricity price as well as variables that take account of household characteristics. This allows us to identify both the short run and long run effect of a change in the electricity price on household electricity consumption. Various model approaches and explanatory variables were tested before we ended up with what we consider to be the best model for explaining electricity consumption.

The results of the econometric analysis based on a pooling of the data for the entire period 1975-1994 are shown in table 1. The variables determining electricity consumption are shown in the first column, the estimated effect of the different variables on electricity consumption (coefficient values) in the second, and the t-ratios (standardized estimated values) in the third column of table 1. The table shows how different variables influence electricity consumption, measured as an average over the period 1976-1993.

We see that electricity consumption rises with household income, with the number of household members and with floor space, while it declines with the electricity price and the age of the dwelling. The latter may be due to a higher wiring capacity in newly built houses and the greater use of equipment serving as an alternative to electric heating in older dwellings. Other factors that are of importance to electricity consumption are whether the dwelling has cen-

Table 1. Estimated household electricity consumption, 1976-1993. kWh¹

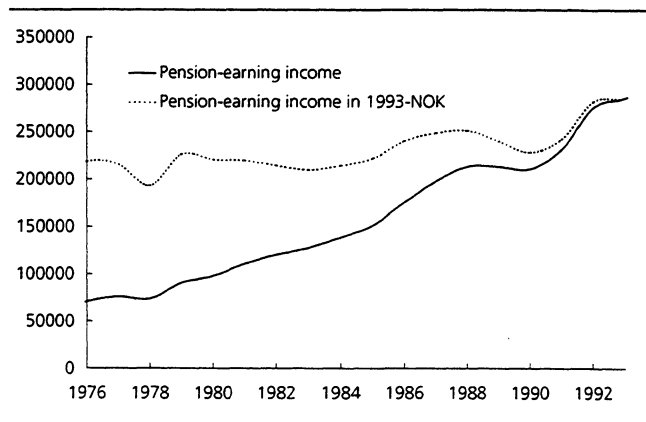
Variable	Coefficient	t-value
Intercept	-31 212	-8.56
Price of electricity, 2-year mean (1994-øre/kWh)	-200	-16.91
Price of kerosene (1994-øre/liter)	10	1.76
Price of heating oil (1994-øre/liter)	-13	-2.22
Household's annual pension-earning income (10,000 1994-NOK)	79	16.85
Newly established household pension-earning income (10,000 1994-NOK) ²	-48	-6.89
Low-income household pension-earning income (10,000 1994-NOK) ³	3 744	12.81
Predicted purchase of household appliances:		
Freezer	-519	-0.87
Refrigerator	459	0.48
Washing machine	1 174	2.09
Dishwashing machine	418	0.76
Kitchen stove	-2 103	-1.56
Current stock of household appliances:		
Freezer	102	0.79
Refrigerator	571	3.58
Washing machine	1 213	5.77
Dishwashing machine	2 706	17.69
Kitchen stove	885	2.65
Central heating	-4 500	-25.36
Block of flats	-2 839	-10.07
Dwelling's year of construction	19	10.19
Bathroom	2 574	9.39
Net floorage (m ²)	50	34.87
One-person household	-462	-2.20
Number of household members	714	12.45
Moved to present residence the current year	-1 775	-4.80
Free electricity	-3 347	-4.58
Dummy for additional sample	-1 345	-3.15
Temperature (heating degree-days*100)	9	1.00
Trend	345	9.60
R ²	0.3544	
Adjusted R ²	0.3533	

¹ An estimator is significant at the 10 per cent level if the t-value exceeds the value of 1.645, i.e. we are 90 per cent confident that the variable influences consumption. The estimator is significant at the 5 per cent level if the t-value exceeds the value of 1.96.

² Newly established households are households that have moved to the present residence during the last three years and where the main income contributor is under the age of 35.

³ Households where annual electricity expenses exceed 40 per cent of annual household gross income.

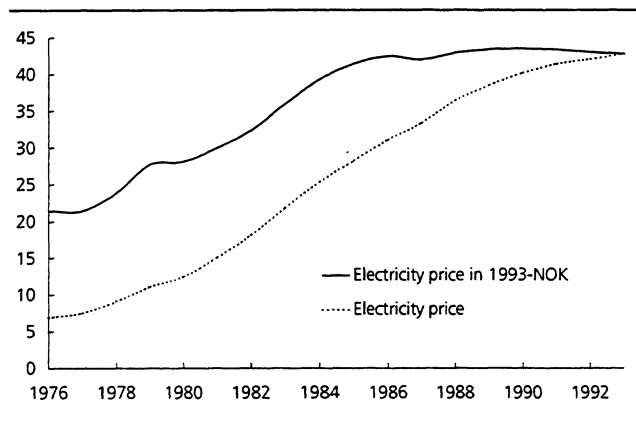
tral heating, whether it has a bathroom and whether the household lives in a block of flats. For example, estimated electricity consumption is reduced by about 2 800 kWh a year for a household living in a block of flats compared with other households, *ceteris paribus*. We also see that electricity consumption rises with the *stock* of electric appliances and that this stock of appliances has a relatively large impact on electricity consumption. The estimation results primarily show significant effects with the exception of the stock of freezers and purchases of freezers, refrigerators, dishwashers and kitchen stoves. Moreover, *purchases* of kitchen stoves and freezers result in a reduction in electricity consumption, while purchases of other

Figure 2. Changes in average pension-earning income for households, 1976-1993. NOK

Source: Association of Norwegian Power Stations and Norwegian Water Resources and Energy Directorate.

electric household appliances result in an increase. The reason for the negative coefficients is that electric appliances can be purchased either to replace old appliances or to increase the stock. For many types of appliances, technological advances have occurred over time, which make the appliance more energy efficient. The purchase of new appliances therefore influences electricity consumption both through a change in the stock of appliances and through more energy efficient appliances. In this estimation, we do not have sufficient information to separate these effects. We will, however, come back to how the estimation results for each year can be used to illustrate changes in electricity consumption for different household appliances over time.

Some aspects of developments in electricity consumption (shown in figure 1) are due to the use of a sample of households for our estimates and incomplete information concerning some key variables. In the estimations, we have attempted to correct for such effects. First, we lack information about the stock of heating equipment. In order to correct electricity consumption for the use of electricity for heating, we have included various housing characteristics, such as whether the household has a central heating system. The long run effects of a change in electricity prices therefore only contain effects through the stock of electric household appliances and not effects through changes in the stock of heating equipment. Second, we have corrected for the estimated income effect for newly established households, i.e. households that have moved to the present residence during the last three years and where the main income contributor is under the age of 35. We also correct the income effect for households with a very high budget share for electricity. The reason for these high budget shares is that in the estimations annual household gross income is defined as pension-earning income, which does not include old-age pensions, child support payments, disability pensions, etc. We have also corrected the estimations for households that have moved during the past year, as information about electricity expenses is incomplete for

Figure 3. Changes in average electricity price (2-year mean), 1976-1993. Øre/kWh

Source: Statistics Norway.

these households. Finally, we have corrected for special supplementary samples of households drawn in the Survey of Consumer Expenditure in some years.

Change in explanatory variables over time

The estimates in table 1 show the average effect of a variable on electricity consumption through the entire period. In order to gain an impression of the variables that have influenced the increase in average consumption per household over time, we must also look at changes in these variables.⁴ Figures 2 to 6 show changes in some of the most important explanatory variables.

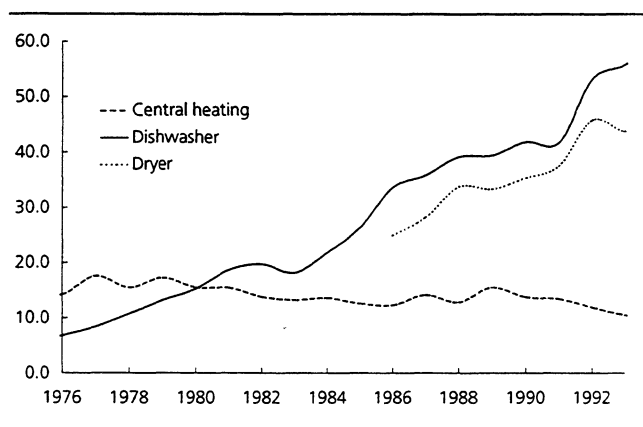
Figure 2 shows changes in average pension-earning income for households in the Survey of Consumer Expenditure from 1976 to 1993, measured both in current and real prices. The figure illustrates that household income has risen in the period. Income measured at constant prices rose by an average 1.6 per cent a year measured along a linear trend. Table 1 shows that income has a significant and positive effect on electricity consumption. All in all, this would therefore point to an increase in electricity consumption per household in the period being studied.

Figure 3 shows changes in the price of electricity in the period 1976-1993. Both the current and real price has risen in the period. Measured at constant prices, the electricity price has a strong, negatively significant effect on electricity consumption (see table 1), which means that the change in the electricity price points to reduced electricity consumption.

Figure 4 shows the percentage of households in the sample with a central heating system, dishwasher and dryer, respectively. The percentage of households that own kitchen stoves, refrigerators, freezers or washing machines has shown very little change in this period, and will therefore have less influence on changes in electricity consumption. We have therefore decided to exclude them here (see

4 In the next section we look more closely at the importance of the different variables for electricity consumption over time.

Figure 4. Share of households that own a dryer, dishwasher or central heating system, 1976-1993. Per cent



Source: Statistics Norway.

Halvorsen et al. 1999 for developments in other electric household appliances). We see in figure 4 that the percentage of households with dishwashers or dryers has increased throughout the period (on average 16.7 per cent a year since 1976 for dishwashers and 9 per cent a year since 1986 for dryers), while the share with central heating was reduced (on average -1.9 per cent a year). Since the coefficients for the stock of household appliances is positive and the coefficient for the share of households with central heating is negative, this contributes to an increase in average electricity consumption per household.

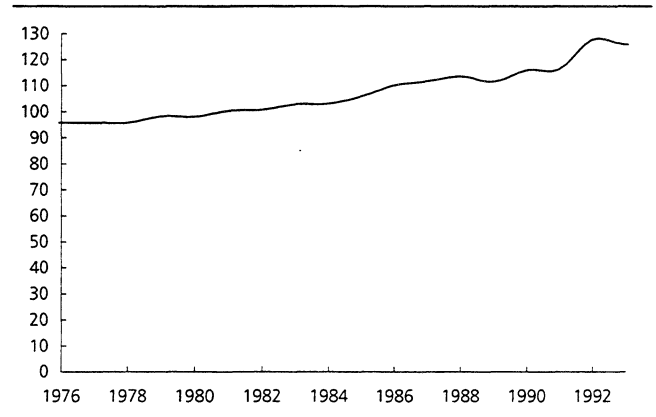
Housing characteristics also influence changes in household electricity consumption. Figure 5 shows average net floor space for households in the Survey of Consumer Expenditure for the period 1976-1993. As illustrated in the figure, floor space has increased in the period. Since electricity consumption increases with floor space, this has also led to higher electricity consumption over time.

Vintage effects

The results of the estimation shown in table 1 presuppose that the effect of a given explanatory variable on household electricity consumption is constant throughout the period, with the exception of a common time trend. It is likely, however, that this assumption will not be satisfied for all variables. If, for example, income and prices have an effect on households' investments in electric household appliances, and prices and income change over time, the stock of appliances will, *ceteris paribus*, vary. As a result, electricity consumption for various purposes will vary over time because most electric household appliances are perceived as durable consumer goods and households will not adjust the stock of this equipment continuously. We have called the change in the coefficients over time as a result of such factors *vintage effects*.

Our data set consists of annual cross sections of Norwegian households for the period 1975 to 1994. In order to provide a better description of changes in electricity consumption, and to test whether the coefficients are constant,

Figure 5. Changes in average net floor space of dwellings, 1976-1993. m²



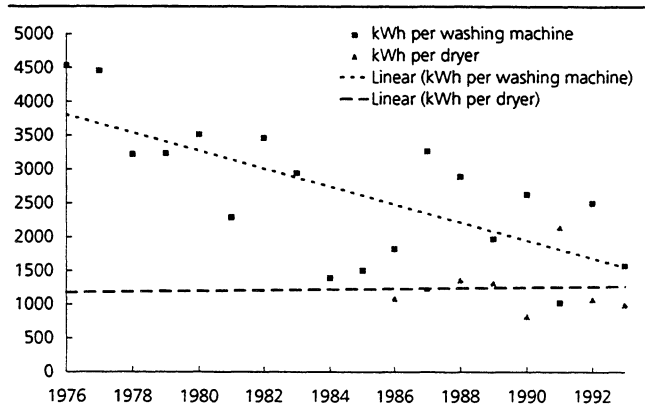
Source: Statistics Norway.

we have estimated a corresponding model as in table 1 for each year in the period. In the next two sections we shall describe these vintage effects. We focus on the effects through the stock of dishwashers and dryers as well as price and income elasticities.

Changes in electricity consumption for dishwashers and dryers

The estimated coefficients for the stock of household appliances can be interpreted as the difference in electricity consumption (measured in kWh) between households that have such appliances and those that do not. In the period being studied there have been no substantial changes with regard to the percentage of households that own kitchen stoves, refrigerators, freezers and washing machines. As early as the beginning of the 1970s such household appliances were common in Norwegian households, and 80-90 per cent of the households owned this type of equipment (see figures in Halvorsen et al. 1999 for details). It is difficult for this reason to isolate electricity consumption for such appliances in the annual estimations due to little variation between households with regard to the stock of appliances and high covariation between different types of appliances, a factor that has resulted in unstable and insignificant estimates. For the share of households that own dishwashers and dryers, on the other hand, the variation between households is sufficient for identification. In 1974, about 7 per cent of the households owned a dishwasher, while this share had risen to about 70 per cent in 1995. For dryers, we have data back to 1986, and the share that owned a dryer was then about 25 per cent, rising to 50 per cent in 1995. The estimates for these two appliances are therefore far more stable and significant. For this reason, we shall in this section *only* look at changes in electricity consumption for dishwashers and dryers.

Figure 6 shows changes in estimated electricity consumption per dishwasher and dryer for households in the Survey of Consumer Expenditure. The figures have been obtained from the annual estimations, and show changes in the estimated coefficients for each of the appliances with accom-

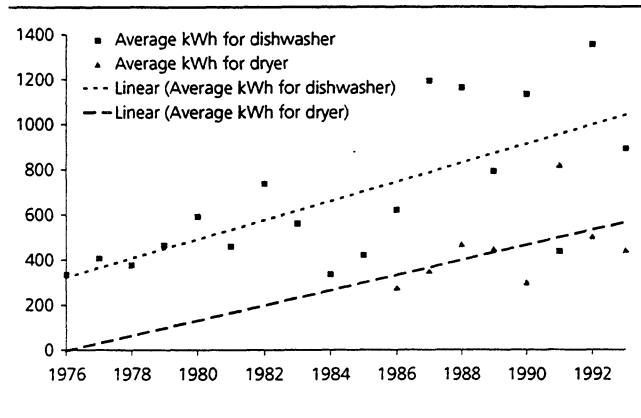
Figure 6. Estimated electricity consumption per household appliance per year, 1976-1993. kWh

Source: Statistics Norway.

panying linear trend lines. The figure illustrates that the coefficients for the stock of dishwashers are relatively high and show a clear downward trend. The coefficients indicate that a dishwasher used on average about 3 800 kWh in 1976 and 1 700 kWh in 1993. The coefficients for a dryer are lower and more constant over time.

The consumption of electricity for household appliances depends on the appliance's power consumption (kW) and utilization time (hours per year). There may be several reasons for the sharp fall in electricity consumption for dishwashers. First, it may be due to increased energy efficiency, since the power consumption of a dishwasher has fallen in the period (see Ministry of Petroleum and Energy, 1998), partly as a result of reduced water consumption. Moreover, the utilization time per dishwasher may have fallen during the period for two reasons. First, dishwashers were relatively expensive in the 1970s, and it is likely that households that bought such machines were fairly large households with substantial dishwashing needs.⁵ As the price of dishwashers gradually fell and average income increased (adjusted for inflation), the frequency of use has probably also been reduced as smaller and more marginal households have purchased dishwashers. Second, dishwashing time has been steadily reduced in new machines.

The stock of appliances in households consists of both old and new technology because the appliances may have a relatively long service life. An average dishwasher in households will therefore have a higher power requirement and longer utilization time than a new machine. This may be the reason that our estimates for electricity use for dishwashers is higher than other estimates, where the estimates are based on new technology.⁶ It should again be noted that there is considerable uncertainty associated with the estimated coefficients in figure 6, and that the estimates may be slightly high due to a possible correlation between the stock of dishwashers and excluded electric household

Figure 7. Estimated changes in electricity consumption for dishwashers and dryers, 1976-1993. kWh

Source: Statistics Norway.

appliances, such as microwave ovens. There were no major changes in electricity consumption for old dryers in households from 1986 to 1993. The reason that we do not see any declining trend in electricity consumption for dryers may be that they are used more (for more hours) than earlier, and that new and more energy-intensive dryers (e.g. condense dryers) offset the effect of a reduced price and more efficient technology.

As illustrated in figure 4, the percentage of households that own a dryer and/or dishwasher has increased sharply during this period. This means that even if electricity consumption per appliance has fallen or been stable, the average consumption for such appliances will increase. We have corrected for this in figure 7, where we have plotted average electricity consumption per household for dishwashers and dryers with accompanying trend lines. The average electricity consumption per household appliance is obtained by multiplying electricity consumption per household appliance by the average number of appliances in the household.

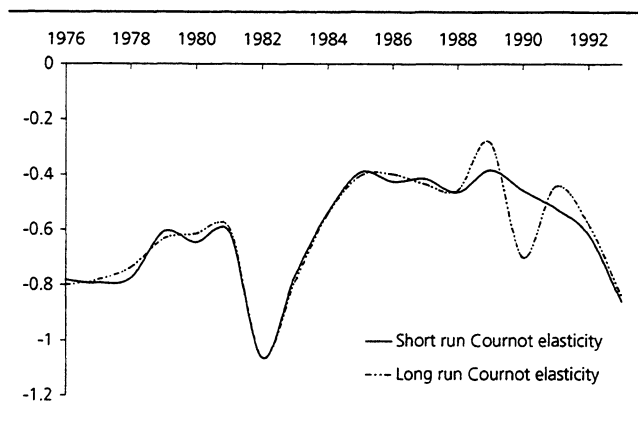
Average electricity consumption for dryers has risen by about 7.6 per cent a year measured along the trend line, while average electricity consumption for dishwashers has increased by 7.8 per cent a year. The share of electricity consumption in an average household that is due to the use of a dishwasher, i.e. the figures in figure 7 divided by average electricity consumption each year, has risen from 2.4 per cent in 1976 to 5.6 per cent in 1993, measured along a linear trend. For dryers, this share has increased from 1.9 per cent in 1986 to 3.0 per cent in 1993.

Estimated electricity consumption for dishwashers and dryers for all Norwegian households increased from about 1.7 TWh in 1986 to 2.8 TWh in 1993. Measured as a share of total household electricity consumption, electricity consumption for dishwashers and dryers rose from 7.6 per cent in 1986 to 10 per cent in 1993. Total electricity con-

⁵ See figure 5.26 and C6 in Halvorsen et al. (1999) for an overview of changes in prices for white goods in this period.

⁶ See, for example, figure 7.14 in the Ministry of Petroleum and Energy (1998).

Figure 8. Short run and long run Cournot elasticities for Norwegian households' electricity consumption, 1976 - 1993.



Source: Statistics Norway.

sumption for dishwashers and dryers increased by about 9.1 per cent annually in the period 1986 to 1993. The estimated growth in the use of electricity for dryers and dishwashers was therefore almost three times the growth in total estimated electricity consumption in figure 1.

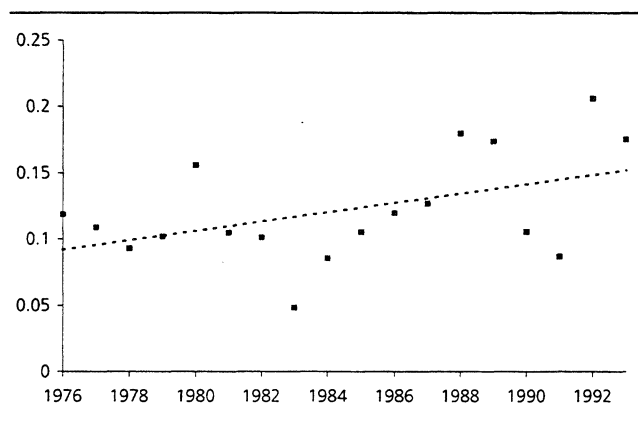
Changes in price and income elasticities over time

In the same way as for the estimated effects of the stock of household appliances, price and income coefficients will also be subject to vintage effects through the period. The reason is that changes in the appliance stock may influence the price and income sensitivity of household electricity demand, even in the short run. Moreover, price and income sensitivity may depend on factors that are not captured in these estimations, such as government energy efficiency campaigns.

To what extent electricity consumption is influenced by changes in price and income is best expressed by price and income elasticities, i.e. the percentage change in electricity consumption when there is a one per cent change in the electricity price and income, respectively. Figure 8 shows changes in long run and short run price elasticities for household electricity consumption in the period 1976-1993. The long run price elasticity contains, in addition to the short run effect, the effect of the possibility of adjusting the appliance stock to changes in the electricity price.

The price elasticity for electricity varies somewhat over the period studied, but electricity consumption is relatively price elastic. The figure shows that when the electricity price increases by one per cent, electricity consumption is reduced by between 0.4 and 0.8 per cent. On average for the entire period, our results show that electricity consump-

Figure 9. Income elasticities (Engel elasticities) for the Norwegian households electricity consumption, 1976-1993



Source: Statistics Norway.

tion is reduced by 4 per cent when the electricity price increases by 10 per cent.

There are no significant differences between the short run and long run price elasticity, and there is no clear trend in the electricity price elasticity in the period 1976-1993. The reason that short run and long run elasticities are virtually the same is that changes in electricity prices have little influence on investments in household appliances. The short run effects will therefore dominate the long run price elasticity.⁷

Changes in income elasticity are shown in figure 9. We see that income has a quite small effect on electricity consumption.⁸ When income changes by one per cent, electricity consumption changes by an average of about 0.13 per cent in the period 1976-1993. This means that the difference in electricity consumption between low-income and high-income households is fairly marginal, since increases in income are not used to any extent for increased electricity consumption. In contrast to price elasticities, the income elasticity increases over time. The reason is that the budget share for electricity declines over time, and the estimated coefficient increases when the average income level of households increases. Measured along a linear trend, the income elasticity increases from about 0.09 to about 0.15.

Conclusions

Household electricity consumption has increased by an average of about 3 per cent annually in the twenty-year period we have studied. Just under half of this increase is due to an increase in the number of households. The remainder is due to an increase in average consumption per household. There are several factors that point to an in-

7 See Halvorsen and Larsen (1999) for a theoretical explanation and further discussion of short run and long run effects of a change in electricity prices on household electricity consumption. See, for example, Rødseth (1997) for more information about interpretations of income and price elasticities.

8 This is the net effect of income on electricity consumption, i.e. after correcting for the effect of income on e.g. floor space and purchases of equipment.

crease in average electricity consumption per household. Among other things, an increasing number of households are using electric household appliances such as dryers and dishwashers, household income measured at constant prices has risen and the floor space of dwellings has increased.

Moreover, we find that electricity consumption varies relatively little between low-income and high-income households, and that changes in the electricity price have a fairly substantial influence on electricity consumption.

The data

The data set used as a basis for our analyses in this article was obtained from five different sources. The main source is Statistics Norway's annual Survey of Consumer Expenditure, which contains consumption data at the household level. These surveys are based on a sample of Norwegian households drawn according to Statistics Norway's sampling plan. The surveys have taken place continuously from 1 January 1973 to the present, with the registration of these households' purchases of all types of goods and services classified in 673 different categories. The annual net sample is between 900 and 1 400 households. All households keep accounts of their expenditures on purchases of consumer goods during a two-week period which is spread throughout the year. In addition, they complete a questionnaire concerning expenditures on such items as durable consumer goods, electricity and fuel during the last 12 months. The households are also classified according to household characteristics such as the dwelling's floor space and year of construction, type of dwelling, sex, age and status in the labor market for all household members. The Survey of Consumer Expenditure registers annual expenditures on electricity in the household and not consumption in kWh. We have therefore estimated electricity consumption (measured in kWh) by dividing the household's annual expenditures on electricity by the electricity price, where the electricity price for all households in the same municipality is assumed to be the same.

The Survey of Consumer Expenditure lacks information about some variables that are important for describing household demand for electricity, including information about prices and outdoor temperatures. This information is therefore obtained from other data sources. Information on income for all household members is linked up to the survey through Statistics Norway's tax statistics. The tax statistics are derived from the Directorate of Taxes' tax assessment registers. Moreover, we have used information on municipal electricity prices from the Norwegian Water Resources and Energy Directorate, monthly temperature data for all municipalities included in the Survey of Consumer Expenditure from the Norwegian Institute of Meteorology and files containing information on regional prices for goods and services from the data used to calculate the Consumer Price Index. Each year of the data from 1974 to 1995 is linked together and checked for any errors.

For a more detailed description of the data set used, see Halvorsen et al. (1999). For more information on Statistics Norway's Survey of Consumer Expenditure, see Statistics Norway (1996).

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Research publications in English

New titles

Discussion Papers

Roger Bjørnstad and Ragnar Nymoen:
Wage and Profitability: Norwegian Manufacturing 1967-1998
DP no. 259, 1999. 33 pages.

Economic theories of imperfectly competitive labour markets predict that wages are linked to profits. In spite of this, profit variables are not explicitly specified in empirical models of wage formation that otherwise are appealing. Does this mean that theory overplays the role of profitability in wage formation? The answer is probably not: Using Norwegian wage formation as an example, we model the determinants of profitability within a vector autoregressive model and show that existing wage equations that have been successful empirically in fact contain a close linkage between wage setting and profits.

Lars Lindholt:
Beyond Kyoto: CO₂ permit prices and the markets for fossil fuels
DP no. 258, 1999. 44 pages.

This paper analyses the markets for fossil fuels given that the limits that the Kyoto Protocol sets on CO₂ emissions from Annex B countries extend beyond 2008-2012. To our knowledge we are the first to apply a forward-looking model with endogenous prices for fossil fuels in analysis of specific CO₂ emission targets, under different assumptions concerning OPEC behaviour. We calculate both the time-path of the international permit prices needed for the Kyoto targets as well as the implications through reduced demand and lower producer prices for fossil fuels. Irrespective of the assumption concerning OPEC behaviour, the permit price has to rise for the first 30 to 40 years in order to fulfil the Kyoto targets in Annex B. The permit price can be reduced substantially, dependent on when a backstop technology starts to replace oil. The Kyoto targets will result in a loss of petroleum wealth for oil and gas producers by 15 to 20 % as long as OPEC acts as a cartel. If the developing countries are included in the Protocol, OPEC will lose much more of their wealth. The competitive fringe has far more to lose if OPEC breaks down in the absence of these emission targets, than the implementation of the targets with OPEC as a cartel.

Mari Rege:
Social Norms and Private Provision of Public Goods: Endogenous Peer Groups
DP no. 257, 1999. 26 pages.

The formation of peer groups with social norms for private contributions to a public

good is analyzed in an n-player two stage game. First people choose a peer group, then they choose whether to contribute. The first choice is made through a learning process represented by evolutionary dynamics, while the second choice is made by utility maximization. The game has two types of stable states: One in which very few people belong to peer groups with social norms for private contributions, and one in which a large portion of people belong to such peer groups. In the former state nobody contributes, while in the latter everybody contributes. Direct governmental contributions to the public good can move the society to a stable state in which nobody contributes, where as governmental subsidization can move the society to a stable state in which everybody contributes. Indeed, the crowding in caused by subsidization can prevail after policy reversal.

Pål Boug:
The Demand for Labour and the Lucas Critique. Evidence from Norwegian Manufacturing
DP no. 256, 1999. 32 pages.

This paper uses neoclassical theory as a foundation for modelling labour demand in Norwegian manufacturing. Applying the Johansen (1988,1991) methodology, we obtain a single cointegrating vector between employment, production, relative factor prices, total factor productivity and the stock of real capital. Normalised on employment, the estimated long run elasticities are 1.37 (production), 0.32 (relative factor prices), 0.57 (total factor productivity) and 1.00 (the stock of real capital). Next, we develop a conditional labour demand model that exhibits parameter constancy. In addition to equilibrium correction effects, we find contemporaneous effects of production and relative factor prices. We cannot reject super exogeneity to be present in our labour demand equation. Hence, the evidence on labour demand in Norwegian manufacturing does not lend support to the Lucas critique.

Reprints

Rolf Aaberge, Ugo Colombino, Steinar Strøm and Tom Wennemo:
Evaluating Alternative Tax Reforms in Italy with a Model of Joint Labor Supply of Married Couples
Reprints no. 140, 1999. 19 pages.

Reprint from *Structural Change and Economic Dynamics*, Vol. 9, 1998.

Documents

Yun Li:
An Analysis of the Demand for Selected Durables in China
Documents 99/13, 1999. 40 pages.

Traditional consumer theory assuming infinite divisibility of consumer goods is not appropriate for the analysis of the demand of durable goods. In addition, traditional approaches to consumer demand modeling ignores the problem associated with product heterogeneity when important product characteristics are latent. The point of departure in the present study is a particular framework developed in Dagsvik (1996a,b) and Dagsvik et al. (1998). In this approach the consumer is assumed to make his choice form a discrete set of product variants, and the resulting choice probabilities are derived from behavior arguments. The empirical application is based on household consumption data abstracted from the State Statistical Bureau's Urban Household Survey (UHS) of Sichuan and Liaoning provinces during the 1988-1990 period.

Kjersti-Gro Lindquist:
The Importance of Disaggregation in Economic Modelling
Documents 99/12, 1999. 18 pages.

This paper explores the potential costs of aggregate versus disaggregate modelling in the context of predicting the aggregate. An estimated aggregate export equation for Norwegian exports of manufacturing goods is compared with an alternative approach where manufacturing exports are divided into eight sub-groups. Important variation in estimated elasticities across commodities is found. As a consequence, the disaggregated equations clearly outperform the aggregate relationship in periods where explanatory variables develop differently across commodities and when the share of each commodity in the aggregate changes rapidly. When this is not the case, the two alternative approaches perform equally well.

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Per Richard Johansen and Knut A.
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NATIONAL ACCOUNTS FOR NORWAY

Table A1. Final expenditure and gross domestic product. At current prices. Million kroner

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Final consumption exp. of househ. and NPISHs	520 850	550 826	126 124	134 661	141 338	148 702	133 997	136 742
Household final consumption expenditure . . .	495 175	523 936	119 612	128 053	134 509	141 762	127 143	129 861
Goods	282 650	298 334	66 892	72 307	75 264	83 871	70 922	71 137
Services	206 825	218 862	51 729	54 465	57 486	55 182	54 793	57 445
Direct purchases abroad by resident househ.	21 367	23 481	4 218	5 354	8 139	5 771	4 992	6 025
- Direct purchases by non-residents	-15 667	-16 741	-3 227	-4 072	-6 380	-3 062	-3 564	-4 746
Final consumption exp. of NPISHs 4)	25 675	26 889	6 511	6 608	6 830	6 941	6 854	6 881
Final consumption exp. of general government .	218 223	237 644	57 020	58 256	60 599	61 769	60 798	61 998
Final consumption exp. of central government.	86 359	93 416	22 734	22 975	23 692	24 015	23 962	24 013
Central government, civilian	62 893	68 545	16 664	16 837	17 407	17 637	17 734	17 710
Central government, defence	23 466	24 871	6 070	6 138	6 285	6 378	6 228	6 303
Final consumption exp. of local government . .	131 864	144 228	34 286	35 281	36 907	37 754	36 837	37 985
Gross fixed capital formation	254 190	286 467	64 281	68 446	72 808	80 932	62 023	62 233
Petroleum activities	62 421	81 992	16 050	20 459	21 261	24 221	18 489	17 986
Ocean transport	10 877	11 455	4 807	1 555	2 686	2 408	1 262	1 298
Mainland-Norway	180 892	193 020	43 423	46 433	48 861	54 303	42 272	42 948
Mainland-Norway excl. general government .	142 943	152 276	34 982	36 379	39 106	41 809	32 997	34 252
Manufacturing and mining	19 094	21 176	3 714	5 033	5 940	6 489	3 323	4 101
Production of other goods	16 054	16 680	3 525	4 518	4 567	4 070	2 882	4 383
Dwelling services	30 336	31 629	7 824	7 817	7 757	8 231	7 599	7 112
Other services	77 459	82 791	19 919	19 011	20 843	23 019	19 193	18 657
General government	37 949	40 744	8 441	10 054	9 755	12 494	9 275	8 696
Changes in stocks and stat. discrepancies . . .	18 670	29 664	12 225	7 458	6 362	3 620	11 922	8 347
Gross capital formation	272 860	316 131	76 505	75 904	79 170	84 552	73 945	70 580
Final domestic use of goods and services	1 011 933	1 104 600	259 649	268 822	281 107	295 023	268 740	269 321
Final demand from Mainland-Norway 2)	919 965	981 489	226 567	239 350	250 798	264 774	237 068	241 689
Final demand from general government 3) . . .	256 172	278 388	65 461	68 310	70 354	74 263	70 073	70 694
Total exports	448 631	414 077	111 926	102 821	99 418	99 911	99 117	107 167
Traditional goods	169 238	176 763	46 407	42 443	42 348	45 564	43 867	42 941
Crude oil and natural gas	163 674	118 304	35 444	29 947	25 988	26 925	27 916	34 144
Ships and oil platforms	10 761	10 977	3 632	3 499	1 887	1 959	2 211	3 619
Services	104 958	108 033	26 443	26 932	29 195	25 463	25 123	26 463
Total use of goods and services	1 460 564	1 518 677	371 575	371 643	380 525	394 934	367 858	376 488
Total imports	371 532	411 595	100 541	100 102	102 647	108 305	94 259	94 353
Traditional goods	238 922	265 171	64 779	65 593	64 951	69 848	63 702	61 093
Crude oil	1 448	1 313	446	288	316	263	255	472
Ships and oil platforms	26 043	29 516	9 334	5 362	5 374	9 446	2 783	3 445
Services	105 119	115 595	25 982	28 859	32 006	28 748	27 519	29 343
Gross domestic product 1)	1 089 032	1 107 082	271 034	271 541	277 878	286 629	273 599	282 135
Mainland-Norway (market prices)	893 308	961 583	228 727	234 763	244 473	253 620	239 208	241 405
Petroleum activities and ocean transport	195 724	145 499	42 307	36 778	33 405	33 009	34 391	40 730
Mainland-Norway (basic prices)	773 731	836 936	200 747	202 926	213 685	219 578	211 471	211 660
Mainland-Norway excl. general government . .	607 604	656 156	157 678	158 808	167 453	172 216	164 995	164 178
Manufacturing and mining	120 214	131 538	32 855	32 566	31 666	34 452	32 678	31 669
Production of other goods	86 806	94 659	23 381	19 725	25 975	25 578	24 498	20 748
Service industries	400 583	429 959	101 443	106 517	109 812	112 187	107 818	111 760
General government	166 127	180 780	43 069	44 117	46 233	47 362	46 476	47 482
Correction items	119 577	124 647	27 980	31 837	30 787	34 042	27 737	29 745

- 1) Gross domestic product is measured at market prices, while value added by industry is measured at basic prices
- 2) Defined as total final consumption expenditure plus gross fixed capital formation in Mainland-Norway
- 3) Defined as final consumption expenditure plus gross fixed capital formation from general government
- 4) NPISH: Non-profit institutions serving households

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NATIONAL ACCOUNTS FOR NORWAY

Table A2. Final expenditure and gross domestic product. At constant 1996-prices. Million kroner

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Final consumption exp. of househ. and NPISHs	508 333	524 158	121 439	128 189	134 123	140 407	126 171	127 558
Household final consumption expenditure . . .	483 336	499 386	115 185	121 990	127 962	134 249	119 955	121 331
Goods	274 979	285 468	64 288	68 987	71 962	80 231	67 492	66 710
Services	202 106	207 313	49 757	51 682	54 350	51 524	51 085	53 140
Direct purchases abroad by resident househ.	21 438	22 286	4 190	5 123	7 666	5 307	4 637	5 749
- Direct purchases by non-residents	-15 188	-15 680	-3 049	-3 802	-6 016	-2 812	-3 260	-4 267
Final consumption exp. of NPISHs 4)	24 997	24 772	6 254	6 199	6 161	6 157	6 216	6 227
Final consumption exp. of general government .	212 600	220 437	54 909	54 795	55 170	55 563	55 499	56 388
Final consumption exp. of central government.	84 263	87 361	21 911	21 642	21 840	21 968	22 102	21 996
Central government, civilian	61 339	63 992	16 038	15 849	16 012	16 092	16 308	16 212
Central government, defence	22 924	23 369	5 873	5 792	5 828	5 876	5 794	5 784
Final consumption exp. of local government . .	128 338	133 076	32 998	33 153	33 329	33 595	33 397	34 392
Gross fixed capital formation	248 804	268 965	61 192	64 031	67 891	75 852	58 309	57 422
Petroleum activities	59 342	74 581	14 733	18 376	19 001	22 471	16 870	16 233
Ocean transport	10 234	10 901	4 340	1 485	2 634	2 442	1 209	1 304
Mainland-Norway	179 228	183 483	42 119	44 169	46 255	50 939	40 230	39 886
Mainland-Norway excl. general government .	141 890	144 865	33 931	34 540	37 131	39 263	31 523	31 869
Manufacturing and mining	19 097	20 544	3 675	4 876	5 735	6 258	3 243	3 945
Production of other goods	15 972	15 960	3 417	4 329	4 349	3 864	2 776	4 128
Dwelling services	29 483	29 299	7 460	7 276	7 093	7 470	6 944	6 350
Other services	77 338	79 062	19 379	18 059	19 954	21 670	18 560	17 445
General government	37 339	38 618	8 188	9 629	9 124	11 677	8 707	8 017
Changes in stocks and stat. discrepancies . . .	18 808	28 608	11 547	7 178	5 921	3 962	11 843	7 208
Gross capital formation	267 612	297 573	72 739	71 209	73 811	79 815	70 152	64 630
Final domestic use of goods and services . . .	988 545	1 042 168	249 087	254 193	263 104	275 784	251 822	248 577
Final demand from Mainland-Norway 2)	900 161	928 078	218 468	227 153	235 548	246 909	221 899	223 832
Final demand from general government 3) . . .	249 939	259 055	63 097	64 424	64 294	67 239	64 205	64 405
Total exports	437 915	440 221	115 485	108 704	105 560	110 471	108 969	108 580
Traditional goods	168 360	174 043	45 620	41 604	41 636	45 183	44 200	42 668
Crude oil and natural gas	159 905	153 893	41 519	38 582	35 033	38 759	37 789	37 504
Ships and oil platforms	10 205	10 718	3 519	3 341	1 825	2 032	2 302	3 607
Services	99 446	101 566	24 827	25 177	27 066	24 497	24 678	24 800
Total use of goods and services	1 426 460	1 482 389	364 572	362 897	368 664	386 256	360 791	357 157
Total imports	366 394	399 893	98 066	97 062	98 720	106 044	93 927	93 251
Traditional goods	241 256	264 327	64 854	65 659	63 865	69 949	65 551	62 333
Crude oil	1 609	1 983	634	422	490	437	429	601
Ships and oil platforms	24 267	28 387	8 501	5 081	5 237	9 568	2 750	3 332
Services	99 263	105 196	24 077	25 900	29 128	26 091	25 198	26 985
Gross domestic product 1)	1 060 066	1 082 496	266 506	265 835	269 944	280 211	266 864	263 905
Mainland-Norway (market prices)	869 717	898 249	218 162	219 584	227 173	233 329	220 384	219 412
Petroleum activities and ocean transport	190 349	184 247	48 344	46 250	42 771	46 882	46 480	44 493
Mainland-Norway (basic prices)	753 342	780 289	191 482	190 439	196 058	202 310	194 220	192 927
Mainland-Norway excl. general government . .	592 969	615 921	150 540	149 619	154 943	160 819	152 926	150 851
Manufacturing and mining	116 898	120 117	30 788	29 996	28 408	30 925	30 444	29 371
Production of other goods	82 896	85 513	21 087	17 366	23 966	23 093	21 091	17 255
Service industries	393 176	410 291	98 664	102 257	102 569	106 801	101 391	104 224
General government	160 373	164 368	40 942	40 820	41 115	41 491	41 295	42 077
Correction items	116 375	117 960	26 680	29 145	31 115	31 019	26 164	26 485

- 1) Gross domestic product is measured at market prices, while value added by industry is measured at basic prices
- 2) Defined as total final consumption expenditure plus gross fixed capital formation in Mainland-Norway
- 3) Defined as final consumption expenditure plus gross fixed capital formation from general government
- 4) NPISH: Non-profit institutions serving households

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NATIONAL ACCOUNTS FOR NORWAY

Table A3. Final expenditure and gross domestic product.
Percentage change in volume from the same period in the previous year

	1996	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Final consumption exp. of househ. and NPISHs	5,3	3,7	3,1	4,2	3,4	3,6	1,4	3,9	-0,5
Household final consumption expenditure . . .	5,5	3,8	3,3	4,5	3,6	3,9	1,6	4,1	-0,5
Goods	7,1	3,6	3,8	5,1	4,4	5,5	0,9	5,0	-3,3
Services	2,9	3,1	2,6	3,2	2,4	2,2	2,6	2,7	2,8
Direct purchases abroad by resident househ.	6,1	8,6	4,0	6,5	3,0	3,9	3,0	10,7	12,2
- Direct purchases by non-residents	1,4	-1,8	3,2	-1,1	1,2	7,6	2,1	6,9	12,2
Final consumption exp. of NPISHs 4)	2,6	1,4	-0,9	0,3	-0,4	-1,5	-2,1	-0,6	0,5
Final consumption exp. of general government .	2,8	2,8	3,7	3,9	3,6	4,1	3,2	1,1	2,9
Final consumption exp. of central government.	3,1	2,3	3,7	4,3	3,4	4,0	3,0	0,9	1,6
Central government, civilian	3,5	1,6	4,3	5,0	4,0	4,6	3,6	1,7	2,3
Central government, defence	1,9	4,3	1,9	2,3	1,8	2,3	1,4	-1,3	-0,1
Final consumption exp. of local government . .	2,6	3,2	3,7	3,7	3,6	4,2	3,3	1,2	3,7
Gross fixed capital formation	9,9	15,1	8,1	8,4	2,2	10,7	11,0	-4,7	-10,3
Petroleum activities	2,6	15,6	25,7	15,7	10,0	34,1	42,9	14,5	-11,7
Ocean transport	52,3	71,1	6,5	40,6	-37,9	-5,2	23,5	-72,1	-12,2
Mainland-Norway	11,3	12,8	2,4	3,7	1,4	4,2	0,6	-4,5	-9,7
Mainland-Norway excl. general government .	13,3	11,5	2,1	8,2	-0,2	3,9	-2,3	-7,1	-7,7
Manufacturing and mining	14,1	6,8	7,6	6,2	0,1	27,4	-0,1	-11,8	-19,1
Production of other goods	8,6	8,2	-0,1	7,2	-1,3	-2,7	-1,6	-18,8	-4,6
Dwelling services	-0,1	8,2	-0,6	7,9	1,5	-5,5	-5,3	-6,9	-12,7
Other services	20,7	14,7	2,2	8,9	-0,7	3,7	-1,9	-4,2	-3,4
General government	3,8	18,1	3,4	-11,5	7,5	5,4	11,5	6,3	-16,7
Changes in stocks and stat. discrepancies . .	-43,9	18,9	52,1	122,8	38,3	43,1	-7,8	2,6	0,4
Gross capital formation	3,0	15,3	11,2	18,0	4,9	12,7	9,9	-3,6	-9,2
Final domestic use of goods and services	4,2	6,4	5,4	7,8	3,8	6,1	4,1	1,1	-2,2
Final demand from Mainland-Norway 2)	5,8	5,2	3,1	4,1	3,0	3,9	1,6	1,6	-1,5
Final demand from general government 3) . . .	2,9	4,9	3,6	1,6	4,1	4,3	4,5	1,8	-0,0
Total exports	9,3	5,7	0,5	8,0	-1,3	-3,6	-0,8	-5,6	-0,1
Traditional goods	10,0	8,0	3,4	14,2	-3,3	0,7	2,6	-3,1	2,6
Crude oil and natural gas	13,7	2,1	-3,8	2,9	-3,4	-8,8	-6,0	-9,0	-2,8
Ships and oil platforms	-16,8	11,5	5,0	12,2	26,8	-20,6	-4,7	-34,6	8,0
Services	5,8	7,2	2,1	5,4	2,7	-1,4	2,4	-0,6	-1,5
Total use of goods and services	5,7	6,2	3,9	7,9	2,3	3,2	2,7	-1,0	-1,6
Total imports	8,0	12,0	9,1	17,6	3,8	6,8	9,3	-4,2	-3,9
Traditional goods	9,8	8,1	9,6	18,2	6,3	9,9	5,2	1,1	-5,1
Crude oil	-10,4	17,0	23,3	41,0	12,9	12,1	25,5	-32,4	42,4
Ships and oil platforms	27,2	37,2	17,0	17,6	-24,0	-9,2	108,6	-67,7	-34,4
Services	0,6	17,0	6,0	15,5	4,7	3,8	1,9	4,7	4,2
Gross domestic product 1)	4,9	4,3	2,1	4,7	1,7	1,9	0,4	0,1	-0,7
Mainland-Norway (market prices)	3,8	4,4	3,3	5,7	2,6	3,4	1,6	1,0	-0,1
Petroleum activities and ocean transport	11,0	3,7	-3,2	0,4	-2,3	-5,6	-5,3	-3,9	-3,8
Mainland-Norway (basic prices)	2,6	4,1	3,6	6,3	2,7	2,9	2,5	1,4	1,3
Mainland-Norway excl. general government . .	2,6	4,6	3,9	7,3	2,8	3,0	2,6	1,6	0,8
Manufacturing and mining	1,1	2,8	2,8	8,3	-0,2	2,9	0,3	-1,1	-2,1
Production of other goods	-3,3	5,6	3,2	9,1	0,6	2,0	1,3	0,0	-0,6
Service industries	4,4	4,9	4,4	6,6	4,0	3,3	3,6	2,8	1,9
General government	2,5	2,2	2,5	2,8	2,3	2,6	2,2	0,9	3,1
Correction items	12,6	6,8	1,4	1,6	2,3	6,4	-4,2	-1,9	-9,1

1) Gross domestic product is measured at market prices, while value added by industry is measured at basic prices
2) Defined as total final consumption expenditure plus gross fixed capital formation in Mainland-Norway
3) Defined as final consumption expenditure plus gross fixed capital formation from general government
4) NPISH: Non-profit institutions serving households

NATIONAL ACCOUNTS FOR NORWAY

Table A4. Final expenditure and gross domestic product.
Percentage change in prices from the same period in the previous year

	1996	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Final consumption exp. of househ. and NPISHs	1,5	2,5	2,6	1,9	2,6	2,8	2,9	2,3	2,0
Household final consumption expenditure . . .	1,4	2,4	2,4	1,9	2,5	2,6	2,6	2,1	2,0
Goods	0,5	2,8	1,7	1,0	1,9	2,0	1,7	1,0	1,7
Services	2,5	2,3	3,2	2,8	3,0	3,3	3,4	3,2	2,6
Direct purchases abroad by resident househ.	3,4	-0,3	5,7	5,4	5,0	4,6	8,3	6,9	0,3
- Direct purchases by non-residents	1,9	3,2	3,5	3,8	3,1	3,6	3,6	3,3	3,9
Final consumption exp. of NPISHs 4)	3,4	2,7	5,7	3,1	4,3	6,9	8,4	5,9	3,7
Final consumption exp. of general government .	3,4	2,6	5,0	3,0	4,0	5,7	7,3	5,5	3,4
Final consumption exp. of central government.	3,0	2,5	4,3	3,0	3,9	4,7	5,7	4,5	2,8
Central government, civilian	2,6	2,5	4,5	2,9	4,0	5,0	5,9	4,7	2,8
Central government, defence	4,1	2,4	4,0	3,1	3,7	3,6	5,4	4,0	2,8
Final consumption exp. of local government . .	3,7	2,7	5,5	3,0	4,1	6,4	8,2	6,2	3,8
Gross fixed capital formation	2,2	2,2	4,3	5,3	4,8	3,8	3,3	1,3	1,4
Petroleum activities	4,4	5,2	4,5	6,8	6,3	4,3	1,3	0,6	-0,5
Ocean transport	5,2	6,3	-1,1	10,6	-0,4	-10,0	-8,2	-5,7	-4,9
Mainland-Norway	1,4	0,9	4,2	4,1	4,3	4,2	4,4	1,9	2,4
Mainland-Norway excl. general government .	1,2	0,7	4,3	4,4	4,6	4,1	4,4	1,5	2,0
Manufacturing and mining	-0,2	-0,0	3,1	2,5	3,9	3,7	2,3	1,4	0,7
Production of other goods	2,4	0,5	4,0	4,3	4,1	3,4	4,4	0,7	1,7
Dwelling services	3,1	2,9	4,9	3,8	4,7	5,7	5,7	4,3	4,2
Other services	0,6	0,2	4,6	5,1	4,9	3,9	4,6	0,6	1,6
General government	1,9	1,6	3,8	2,8	3,0	4,6	4,3	3,3	3,9
Changes in stocks and stat. discrepancies . . .	2,7	-0,7	4,5	8,6	0,2	11,4	-7,6	-4,9	11,5
Gross capital formation	2,5	2,0	4,2	5,6	4,4	4,3	2,9	0,2	2,5
Final domestic use of goods and services	2,2	2,4	3,5	3,2	3,4	3,8	3,7	2,4	2,4
Final demand from Mainland-Norway 2)	1,9	2,2	3,5	2,6	3,3	3,8	4,2	3,0	2,5
Final demand from general government 3)	3,2	2,5	4,8	3,0	3,9	5,5	6,7	5,2	3,5
Total exports	7,3	2,4	-8,2	-4,9	-5,6	-9,8	-12,4	-6,1	4,3
Traditional goods	-1,2	0,5	1,0	3,3	3,5	-0,6	-1,7	-2,4	-1,3
Crude oil and natural gas	21,7	2,4	-24,9	-19,2	-20,4	-29,1	-31,7	-13,5	17,3
Ships and oil platforms	3,9	5,4	-2,9	1,0	0,9	-4,2	-12,0	-6,9	-4,2
Services	1,8	5,5	0,8	5,1	0,1	0,7	-2,5	-4,4	-0,3
Total use of goods and services	3,7	2,4	0,1	0,6	0,8	-0,2	-0,9	0,0	2,9
Total imports	1,7	1,4	1,5	4,0	2,9	-0,1	-0,2	-2,1	-1,9
Traditional goods	0,1	-1,0	1,3	3,0	2,2	0,2	0,1	-2,7	-1,9
Crude oil	37,0	-10,0	-26,4	-22,7	-17,2	-29,2	-37,1	-15,4	15,1
Ships and oil platforms	7,6	7,3	-3,1	7,1	-1,4	-8,4	-9,6	-7,8	-2,0
Services	4,4	5,9	3,8	6,1	6,2	1,6	2,2	1,2	-2,4
Gross domestic product 1)	4,3	2,7	-0,4	-0,5	0,0	-0,2	-1,1	0,8	4,7
Mainland-Norway (market prices)	1,5	2,7	4,2	3,3	4,1	4,8	4,7	3,5	2,9
Petroleum activities and ocean transport	19,3	2,8	-23,2	-16,9	-19,9	-25,6	-30,8	-15,5	15,1
Mainland-Norway (basic prices)	1,9	2,7	4,4	2,5	3,8	6,9	4,5	3,9	3,0
Mainland-Norway excl. general government . .	1,3	2,5	4,0	2,3	3,5	6,7	3,4	3,0	2,5
Manufacturing and mining	-0,5	2,8	6,5	7,2	5,3	8,6	5,3	0,6	-0,7
Production of other goods	4,4	4,7	5,7	2,0	7,8	10,0	3,3	4,8	5,9
Service industries	1,1	1,9	2,9	0,8	2,2	5,5	2,9	3,4	2,9
General government	4,4	3,6	6,2	3,2	5,0	7,6	8,7	7,0	4,4
Correction items	-0,9	2,8	2,8	9,7	5,7	-8,3	6,2	1,1	2,8

1) Gross domestic product is measured at market prices, while value added by industry is measured at basic prices

2) Defined as total final consumption expenditure plus gross fixed capital formation in Mainland-Norway

3) Defined as final consumption expenditure plus gross fixed capital formation from general government

4) NPISH: Non-profit institutions serving households

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Table A5. Gross domestic product and value added by industry.
At current prices. Million kroner

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Gross domestic product 1).	1 089 032	1 107 082	271 034	271 541	277 878	286 629	273 599	282 135
Agriculture and hunting	11 859	12 265	2 339	-179	6 969	3 136	2 262	-107
Forestry and logging	2 750	2 582	499	941	408	733	511	699
Fishing and fish farming	7 321	9 020	2 020	2 380	2 092	2 527	2 449	2 835
Oil and gas extraction incl. services	166 785	116 742	34 725	29 983	26 153	25 880	27 683	33 683
Oil and gas extraction	159 561	108 869	32 743	27 749	24 031	24 347	25 682	31 944
Service act. incidental to oil and gas ext.	7 224	7 873	1 982	2 234	2 123	1 534	2 001	1 738
Mining and quarrying	2 160	2 226	549	606	538	532	507	509
Manufacturing	118 054	129 311	32 305	31 959	31 128	33 919	32 171	31 160
Food products, beverages and tobacco	17 754	17 950	4 235	4 385	4 687	4 643	3 755	3 628
Textiles, wearing apparel, leather	2 170	1 993	536	515	432	510	526	497
Wood and wood products	4 841	4 791	1 324	1 242	1 159	1 066	1 077	1 105
Pulp, paper and paper products	4 750	5 797	1 396	1 395	1 517	1 489	1 466	1 393
Publishing, printing, reproduction	13 214	13 922	3 510	3 431	3 329	3 651	3 252	3 378
Refined petroleum products	2 354	3 967	923	867	1 056	1 120	745	375
Basic chemicals	6 586	6 758	1 811	1 778	1 606	1 563	1 624	1 444
Chemical and mineral products	11 202	10 771	2 727	2 697	2 568	2 778	2 660	2 818
Basic metals	8 288	9 999	2 596	2 663	2 432	2 308	2 510	2 458
Machinery and other equipment n.e.c.	31 165	35 295	8 791	8 625	8 117	9 762	9 775	9 402
Building of ships, oil platforms and moduls.	11 586	13 604	3 260	3 277	3 230	3 837	3 626	3 588
Furniture and other manufacturing n.e.c.	4 144	4 466	1 197	1 084	995	1 190	1 155	1 072
Electricity and gas supply	25 275	25 365	7 920	5 395	4 999	7 051	7 790	5 292
Construction	39 602	45 427	10 602	11 187	11 507	12 130	11 486	12 031
Service industries excluded general government	429 523	458 717	109 024	113 313	117 064	119 316	114 526	118 808
Wholesale and retail trade	98 626	102 860	24 084	24 978	26 115	27 682	24 728	24 435
Hotels and restaurants	13 767	15 276	3 302	3 800	4 136	4 038	3 531	4 118
Transport via pipelines	13 018	13 386	3 429	3 164	3 036	3 756	3 639	3 405
Water transport	18 291	17 929	4 741	4 286	4 931	3 971	3 637	4 320
Ocean transport	15 922	15 372	4 152	3 631	4 215	3 373	3 068	3 642
Inland water and costal transport	2 369	2 557	589	655	716	597	569	677
Other transport industries	44 928	47 165	10 808	12 140	12 905	11 312	11 087	13 360
Post and telecommunications	19 832	19 982	4 877	4 945	4 713	5 446	4 874	4 919
Financial intermediation	36 939	39 873	9 427	9 928	9 329	11 187	10 709	10 809
Dwelling services	65 989	68 346	16 883	17 037	17 181	17 245	17 498	17 827
Business services etc.	63 465	73 570	16 911	18 178	19 375	19 107	18 832	19 575
Personal services	54 668	60 332	14 563	14 856	15 341	15 571	15 990	16 041
General government	166 127	180 780	43 069	44 117	46 233	47 362	46 476	47 482
Central government	48 481	52 046	12 599	12 735	13 247	13 466	13 414	13 357
Civilian central government	36 386	38 922	9 405	9 500	9 930	10 087	10 046	9 937
Defence	12 096	13 125	3 194	3 235	3 317	3 379	3 368	3 420
Local government	117 645	128 734	30 470	31 382	32 986	33 896	33 063	34 125
FISIM 2)	-28 466	-31 876	-7 346	-7 754	-7 779	-8 997	-9 338	-10 096
Value added tax and investment levy	104 371	110 492	25 354	27 173	27 844	30 121	26 595	26 976
Other taxes on products, net	44 089	44 897	9 781	12 207	10 243	12 666	11 222	12 599
Statistical discrepancy	-416	1 133	191	210	480	253	-743	265
Mainland-Norway (basic prices)	773 731	836 936	200 747	202 926	213 685	219 578	211 471	211 660
Market producers	722 496	717 201	179 423	174 721	179 307	183 750	177 919	183 054
Non-market producers	246 959	265 234	63 631	64 983	67 783	68 837	67 943	69 336
Education	44 169	48 113	11 540	11 826	12 124	12 622	12 146	12 979
Health and social work	82 417	91 525	21 587	22 313	23 613	24 012	23 858	24 113

1) Gross domestic product is measured at market prices, while value added by industry is measured at basic prices
2) Financial intermediation services indirectly measured

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Table A6. Gross domestic product and value added by industry.
Percentage change in volume from the same period in the previous year

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Gross domestic product 1).	4,3	2,1	4,7	1,7	1,9	0,4	0,1	-0,7
Agriculture and hunting	-4,3	3,8	1,6	56,0	6,1	3,6	1,9	-50,8
Forestry and logging	0,9	-3,9	-20,3	-15,9	-16,4	61,1	4,7	-24,4
Fishing and fish farming	3,1	-1,9	-3,8	-3,2	-9,7	9,6	-0,3	0,4
Oil and gas extraction incl. services	4,2	-4,0	0,0	-2,7	-6,5	-7,0	-4,9	-4,5
Oil and gas extraction	3,5	-3,5	0,7	-2,3	-6,6	-5,9	-5,1	-4,4
Service act. incidental to oil and gas ext.	30,1	-18,2	-17,2	-13,7	-3,8	-34,8	2,3	-9,5
Mining and quarrying	2,9	-0,8	6,1	-2,7	-0,6	-5,0	-3,1	-7,4
Manufacturing	2,8	2,8	8,4	-0,2	3,0	0,4	-1,1	-2,0
Food products, beverages and tobacco	0,6	-1,4	2,4	-2,6	-2,7	-2,5	-2,5	-7,2
Textiles, wearing apparel, leather	-1,4	-4,1	2,3	-12,6	-4,2	-0,9	-5,6	-11,4
Wood and wood products	7,3	-0,0	17,7	7,3	-2,0	-18,9	-12,5	-4,8
Pulp, paper and paper products	4,4	-0,0	6,4	-1,9	2,5	-6,6	-1,9	-3,0
Publishing, printing, reproduction	-1,7	0,8	5,4	1,5	-1,8	-1,8	-2,5	0,8
Refined petroleum products	2,8	-3,9	-0,9	-8,7	0,2	-6,4	2,1	-15,0
Basic chemicals	2,3	4,6	7,6	6,7	5,6	-1,3	-1,6	-9,7
Chemical and mineral products	3,1	-0,2	1,6	-10,0	6,8	2,3	-0,2	0,3
Basic metals	3,2	5,2	4,1	2,1	9,8	5,2	3,4	3,4
Machinery and other equipment n.e.c.	5,5	5,5	12,9	2,4	4,7	2,5	1,7	0,3
Building of ships, oil platforms and moduls.	1,2	8,5	14,9	3,0	5,6	10,7	-1,5	0,5
Furniture and other manufacturing n.e.c.	8,2	6,7	24,4	-2,1	5,0	1,6	-6,2	-3,2
Electricity and gas supply	6,6	4,8	17,8	-0,6	3,7	-1,3	2,0	6,3
Construction	9,2	3,4	9,6	5,1	1,7	-1,8	-2,1	-3,9
Service industries excluded general government	4,6	4,1	6,3	3,7	3,0	3,6	2,7	1,8
Wholesale and retail trade	5,1	5,2	9,0	3,8	6,3	2,5	2,6	-3,9
Hotels and restaurants	7,6	4,3	7,6	4,3	2,8	3,0	3,6	4,3
Transport via pipelines	-1,2	-1,4	1,1	0,8	-5,0	-2,5	1,2	1,3
Water transport	2,9	3,4	4,0	-1,1	2,6	8,3	1,9	-0,3
Ocean transport	2,4	3,3	3,3	-1,4	2,5	9,0	2,1	-0,6
Inland water and costal transport	7,0	4,2	10,0	0,9	3,9	2,8	0,8	1,7
Other transport industries	6,9	1,4	3,5	-2,5	2,1	2,9	-2,0	5,0
Post and telecommunications	5,4	7,7	5,8	8,0	8,1	8,7	6,2	8,3
Financial intermediation	3,4	4,3	11,8	7,0	-9,1	7,1	8,4	8,2
Dwelling services	1,0	1,2	1,1	1,1	1,2	1,2	1,2	1,3
Business services etc.	9,2	8,9	9,2	9,2	9,8	7,3	4,4	3,3
Personal services	3,0	2,8	5,1	4,3	1,4	0,4	0,5	1,0
General government	2,2	2,5	2,8	2,3	2,6	2,2	0,9	3,1
Central government	1,8	1,9	2,5	1,1	2,2	1,7	0,6	1,2
Civilian central government	2,3	1,6	2,3	0,6	2,1	1,3	0,7	0,9
Defence	0,3	2,9	3,4	2,6	2,5	3,1	0,2	2,2
Local government	2,4	2,7	2,9	2,8	2,8	2,4	1,0	3,8
FISIM 2)	-2,8	7,0	11,8	5,8	-9,2	20,1	15,8	19,0
Value added tax and investment levy	5,7	3,4	4,5	3,6	4,1	1,5	2,7	-2,1
Other taxes on products, net	2,5	0,3	1,9	1,8	1,0	-2,9	0,9	-5,4
Statistical discrepancy . . . . .	.	110,5	127,5	129,9	86,7	101,8	-29,9	-21,7
Mainland-Norway (basic prices)	4,1	3,6	6,3	2,7	2,9	2,5	1,4	1,3
Market producers	4,6	2,3	6,0	1,6	1,1	0,7	0,2	-0,4
Non-market producers	2,0	2,0	2,4	1,9	2,0	1,7	0,8	2,3
Education	2,1	3,5	3,6	3,2	3,4	3,7	-1,0	5,6
Health and social work	3,9	3,6	4,6	4,6	3,1	2,1	1,9	2,6

1) Gross domestic product is measured at market prices, while value added by industry is measured at basic prices
2) Financial intermediation services indirectly measured

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Table A7. Household final consumption expenditure. At current prices. Million kroner

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Household final consumption expenditure	495 175	523 936	119 612	128 053	134 509	141 762	127 143	129 861
Food, beverages and tobacco	100 864	106 547	22 792	26 943	27 482	29 330	24 659	26 400
Clothing and footwear	29 839	31 633	6 241	7 604	7 808	9 980	6 751	8 125
Housing, water, electr., gas and other fuels . . .	109 663	112 570	29 789	26 968	26 346	29 467	30 738	27 804
Furnishings, household equipment etc.	31 400	34 056	7 672	7 422	8 696	10 266	7 860	7 163
Health	13 631	15 168	3 577	3 772	3 798	4 021	3 873	3 999
Transport	82 573	84 838	19 390	22 395	23 427	19 626	20 212	22 132
Leisure, entertainment and culture	47 906	53 184	11 631	12 065	13 891	15 597	12 803	12 591
Education	2 271	2 435	560	518	678	679	593	541
Hotels, cafes and restaurants	29 826	32 478	6 732	8 146	9 584	8 016	7 375	8 815
Miscellaneous goods and services	41 502	44 288	10 237	10 939	11 039	12 072	10 853	11 012
Direct purchases abroad by resident househ. . .	21 367	23 481	4 218	5 354	8 139	5 771	4 992	6 025
- Direct purchases by non-residents	-15 667	-16 741	-3 227	-4 072	-6 380	-3 062	-3 564	-4 746
Goods	282 650	298 334	66 892	72 307	75 264	83 871	70 922	71 137
Services	206 825	218 862	51 729	54 465	57 486	55 182	54 793	57 445
Services, dwellings	87 692	91 130	22 435	22 695	22 957	23 043	23 305	23 699
Other services	119 132	127 732	29 293	31 770	34 529	32 140	31 489	33 746

Table A8. Household final consumption expenditure.

Percentage change in volume from the same period in the previous year

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Household final consumption expenditure	3,8	3,3	4,5	3,6	3,9	1,6	4,1	-0,5
Food, beverages and tobacco	1,2	-0,4	-1,3	3,6	-2,0	-1,7	4,3	-5,2
Clothing and footwear	4,7	8,3	9,7	3,9	14,6	6,0	11,7	6,2
Housing, water, electr., gas and other fuels . . .	0,8	2,1	2,7	1,4	2,6	1,6	2,4	1,2
Furnishings, household equipment etc.	7,3	7,7	13,4	7,8	12,1	0,4	1,0	-5,1
Health	6,2	6,0	11,3	7,6	3,2	2,4	2,7	1,9
Transport	3,0	0,7	2,0	-0,0	2,9	-2,1	2,1	-3,9
Leisure, entertainment and culture	6,8	9,0	10,8	7,0	11,2	7,3	7,6	2,5
Education	3,0	3,3	2,9	1,2	7,3	1,6	1,1	-0,3
Hotels, cafes and restaurants	7,4	4,0	4,9	6,4	2,7	2,6	4,4	3,4
Miscellaneous goods and services	5,3	5,1	5,8	5,9	4,3	4,5	4,7	2,4
Direct purchases abroad by resident househ. . .	8,6	4,0	6,5	3,0	3,9	3,0	10,7	12,2
- Direct purchases by non-residents	-1,8	3,2	-1,1	1,2	7,6	2,1	6,9	12,2
Goods	3,6	3,8	5,1	4,4	5,5	0,9	5,0	-3,3
Services	3,1	2,6	3,2	2,4	2,2	2,6	2,7	2,8
Services, dwellings	0,8	1,3	1,1	1,1	1,6	1,5	1,5	1,4
Other services	4,9	3,5	4,8	3,3	2,7	3,4	3,6	3,8

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Table A9. Gross fixed capital formation by type of capital goods and by industry.
At current prices. Million kroner

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Gross fixed capital formation	254 190	286 467	64 281	68 446	72 808	80 932	62 023	62 233
Buildings and structures	98 470	104 994	24 500	24 923	26 325	29 247	24 602	23 951
Oil exploration, drilling, pipelines	28 046	32 821	7 537	8 699	8 686	7 899	7 775	7 792
Oil platforms etc.	32 790	43 478	7 723	10 426	10 811	14 518	9 203	9 121
Ships and boats.	13 704	13 876	5 798	2 049	3 197	2 831	1 530	1 501
Other transport equipment.	23 527	23 224	5 047	6 083	5 786	6 309	4 207	4 366
Machinery and equipment	57 653	68 073	13 675	16 267	18 003	20 129	14 706	15 501
Agriculture and hunting	6 485	6 501	1 068	1 998	1 915	1 521	1 059	1 982
Forestry and logging	563	585	142	147	147	148	146	150
Fishing and fish farming	2 125	2 067	864	433	465	304	231	188
Oil and gas extraction, incl. services	54 253	73 605	14 042	18 346	18 713	22 503	16 467	16 550
Oil and gas extraction	53 778	70 277	14 348	18 136	18 684	19 109	16 425	16 538
Service act. incidental to oil and gas ext.	475	3 328	-306	210	29	3 394	42	12
Mining and quarrying	273	361	44	107	78	133	46	80
Manufacturing	18 821	20 815	3 671	4 926	5 862	6 356	3 277	4 021
Food products, beverages and tobacco	3 762	3 885	718	875	1 134	1 157	706	787
Textiles, wearing apparel, leather	298	234	39	85	48	62	32	36
Wood and wood products	562	431	90	130	114	97	88	104
Pulp, paper and paper products	1 603	2 425	351	805	826	443	209	466
Publishing, printing, reproduction	1 725	2 173	452	424	710	587	519	451
Refined petroleum products	531	340	106	91	49	95	35	73
Basic chemicals	1 800	2 163	262	372	661	867	347	543
Chemical and mineral products	2 258	2 141	508	505	474	654	329	352
Basic metals	2 434	1 597	346	411	367	474	305	410
Machinery and other equipment n.e.c.	2 493	3 678	499	819	1 008	1 352	466	549
Building of ships, oil platforms and moduls.	860	1 100	195	238	307	360	146	123
Furniture and other manufacturing n.e.c.	493	647	106	171	162	208	93	127
Electricity and gas supply	4 386	4 862	800	1 251	1 387	1 425	887	1 519
Construction	2 495	2 666	651	689	654	672	559	544
Service industries excl. general government	126 840	134 262	34 558	30 495	33 833	35 376	30 076	28 503
Wholesale and retail trade	26 287	28 830	6 939	7 214	7 126	7 552	6 722	6 247
Hotels and restaurants	2 554	2 742	692	681	665	703	595	567
Transport via pipelines	8 168	8 387	2 008	2 113	2 548	1 718	2 022	1 436
Water transport	11 917	12 449	5 175	1 768	2 895	2 611	1 393	1 428
Ocean transport	10 877	11 455	4 807	1 555	2 686	2 408	1 262	1 298
Inland water and costal transport	1 040	994	368	214	209	203	131	130
Other transport industries	17 991	17 007	4 129	3 055	4 605	5 219	3 887	4 009
Post and telecommunications	6 733	7 630	1 243	1 371	1 961	3 056	1 420	1 564
Financial intermediation	6 331	6 943	1 804	1 728	1 651	1 760	1 657	1 564
Dwelling services	30 336	31 629	7 824	7 817	7 757	8 231	7 599	7 112
Business services etc.	9 451	11 028	2 718	2 835	2 787	2 688	2 671	2 640
Personal services	7 072	7 617	2 026	1 914	1 839	1 837	2 110	1 938
General government	37 949	40 744	8 441	10 054	9 755	12 494	9 275	8 696
Central government	15 238	17 278	3 312	4 652	3 777	5 537	3 941	3 072
Civilian central government.	11 117	13 342	2 517	3 908	2 886	4 031	3 302	2 639
Defence.	4 121	3 936	795	744	891	1 506	639	433
Local government	22 711	23 466	5 129	5 402	5 978	6 957	5 334	5 624
Mainland-Norway	180 892	193 020	43 423	46 433	48 861	54 303	42 272	42 948
Education	10 473	8 156	2 084	2 178	1 864	2 029	2 150	2 099
Health and social work.	8 295	10 645	2 410	2 397	2 627	3 211	3 039	2 901

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Table A10. Gross fixed capital formation by type of capital goods and by industry.
Percentage change in volume from the same period in the previous year

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Gross fixed capital formation	15,1	8,1	8,4	2,2	10,7	11,0	-4,7	-10,3
Buildings and structures	12,3	1,6	5,3	1,0	1,9	-1,2	-3,8	-7,9
Oil exploration, drilling, pipelines	29,3	8,8	28,4	11,2	6,8	-5,3	3,1	-7,4
Oil platforms etc.	11,5	28,4	-0,8	-0,7	43,1	80,3	17,1	-13,5
Ships and boats.	70,5	2,3	29,4	-34,1	-9,2	18,2	-71,9	-22,7
Other transport equipment.	3,9	-8,7	-12,3	-3,9	-2,9	-15,0	-11,5	-31,6
Machinery and equipment	13,0	15,5	13,4	11,7	21,5	15,1	6,3	-4,3
Agriculture and hunting	0,2	-3,3	-1,4	-3,8	-4,4	-2,6	-2,9	-2,5
Forestry and logging	0,0	-0,1	-0,4	-0,5	-0,2	0,8	0,1	-0,7
Fishing and fish farming	96,6	-5,8	2,5	-9,4	-18,8	2,5	-73,4	-57,4
Oil and gas extraction, incl. services	13,5	29,7	10,0	12,2	42,3	54,9	16,6	-9,0
Oil and gas extraction	23,9	24,7	16,4	12,4	39,1	32,1	13,5	-8,0
Service act. incidental to oil and gas ext.	-89,5	618,5	.	-3,4	.	.	.	-94,1
Mining and quarrying	-24,8	26,7	26,4	46,9	0,2	32,5	4,5	-26,9
Manufacturing	7,5	7,3	6,0	-0,6	27,9	-0,6	-12,0	-18,9
Food products, beverages and tobacco	5,8	-0,2	-5,4	-6,2	16,4	-5,5	-3,0	-10,3
Textiles, wearing apparel, leather	37,1	-23,4	-40,0	8,2	-24,4	-36,8	-20,0	-58,5
Wood and wood products	-23,0	-26,5	-37,6	-6,8	-23,4	-36,8	-4,4	-22,5
Pulp, paper and paper products	21,2	48,0	14,9	109,8	97,3	-16,2	-40,8	-42,1
Publishing, printing, reproduction	21,7	22,4	57,8	-19,6	100,7	-4,1	14,0	6,6
Refined petroleum products	5,4	-35,7	177,4	-15,6	-62,6	-62,4	-66,0	-19,9
Basic chemicals	-33,0	16,6	-39,9	-26,6	76,4	63,2	32,2	47,4
Chemical and mineral products	23,7	-7,7	40,4	-14,3	-19,0	-16,8	-35,9	-30,9
Basic metals	16,6	-37,0	-27,5	-47,2	-32,9	-35,5	-14,3	-3,7
Machinery and other equipment n.e.c.	28,2	42,0	29,5	46,2	56,5	35,3	-8,8	-33,5
Building of ships, oil platforms and moduls.	21,5	23,9	44,2	5,6	50,1	11,3	-26,8	-48,9
Furniture and other manufacturing n.e.c.	-2,5	27,1	54,6	26,1	9,2	32,4	-13,2	-26,4
Electricity and gas supply	-3,0	6,6	28,2	4,3	6,2	-0,6	8,3	18,9
Construction	14,4	1,3	9,1	2,3	-1,7	-3,6	-13,3	-21,5
Service industries excl. general government	17,2	1,7	14,5	-3,5	0,1	-3,0	-13,5	-8,3
Wholesale and retail trade	17,7	4,5	12,5	7,3	5,8	-5,4	-3,6	-14,1
Hotels and restaurants	26,3	2,8	33,4	26,2	-15,7	-14,9	-15,8	-18,3
Transport via pipelines	31,5	-0,7	75,9	-5,3	-4,7	-29,4	0,7	-33,7
Water transtort.	68,3	5,9	36,9	-35,3	-5,8	22,7	-71,2	-14,7
Ocean transport	71,1	6,5	40,6	-37,9	-5,2	23,5	-72,1	-12,2
Inland water and costal transport	43,3	-1,2	2,4	-7,4	-12,6	14,4	-59,2	-32,5
Other transport industries	15,2	-10,0	-6,3	-32,9	1,1	-3,6	-4,7	28,6
Post and telecommunications	12,7	9,7	9,7	7,8	7,9	11,9	12,2	13,0
Financial intermediation	9,5	5,0	16,9	8,0	-1,2	-2,3	-10,0	-11,3
Dwelling services	8,2	-0,6	7,9	1,5	-5,5	-5,3	-6,9	-12,7
Business services etc.	10,6	11,0	16,6	13,9	11,8	2,1	-3,3	-8,7
Personal services	8,5	3,5	10,0	6,9	1,6	-4,4	1,3	-1,0
General government	18,1	3,4	-11,5	7,5	5,4	11,5	6,3	-16,7
Central government.	1,6	9,9	-3,8	39,5	-2,3	8,9	15,2	-37,0
Civilian central government.	3,1	15,8	-1,0	58,6	-1,6	11,8	27,0	-36,0
Defence.	-2,1	-5,6	-11,4	-14,1	-4,5	2,4	-20,3	-41,6
Local government	32,7	-1,0	-15,9	-10,6	11,0	13,7	0,5	1,1
Mainland-Norway	12,8	2,4	3,7	1,4	4,2	0,6	-4,5	-9,7
Education	73,4	-25,0	-41,9	-34,3	-4,5	2,7	-0,1	-6,0
Health and social work	8,6	23,4	24,9	23,2	22,0	23,4	22,0	17,9

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NATIONAL ACCOUNTS FOR NORWAY

Table A11. Exports of goods and services. At current prices. Million kroner

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Total exports	448 631	414 077	111 926	102 821	99 418	99 911	99 117	107 167
Goods	343 673	306 044	85 483	75 889	70 223	74 448	73 994	80 704
Crude oil and natural gas.	163 674	118 304	35 444	29 947	25 988	26 925	27 916	34 144
Ships, new	5 267	7 364	2 727	1 889	1 480	1 268	1 425	2 909
Ships, second-hand.	4 126	2 897	459	1 497	311	630	676	575
Oil platforms and modules, new	231	66	18	37	9	2	5	17
Oil platforms, second-hand	1 005	523	399	40	53	31	48	61
Direct exports related to petroleum act.	132	127	29	36	34	28	57	57
Other goods	169 238	176 763	46 407	42 443	42 348	45 564	43 867	42 941
Agriculture, forestry and fishing	7 711	8 830	2 201	2 093	2 183	2 353	2 087	2 068
Mining and quarrying	2 284	2 409	561	603	618	627	513	614
Manufacturing products	158 631	165 097	43 571	39 685	39 394	42 446	41 168	40 133
Food products, beverages and tobacco	21 430	23 769	6 245	5 468	5 296	6 760	6 271	5 242
Textiles, wearing apparel, leather	2 351	2 460	596	592	611	661	633	574
Wood products	2 923	2 827	657	690	671	809	776	827
Pulp, paper and paper products	10 811	12 074	3 041	2 973	3 020	3 040	3 148	2 877
Printing and publishing	473	625	143	124	146	212	195	192
Refined petroleum products.	20 619	13 838	4 827	3 048	3 134	2 829	2 645	3 225
Basic chemicals	12 963	13 727	3 762	3 432	3 400	3 133	3 177	3 119
Chemical and mineral products.	10 627	11 241	2 691	2 861	2 879	2 810	2 962	3 180
Basic metals	33 792	35 451	9 656	8 736	8 559	8 500	8 464	8 496
Machinery and other equipment n.e.c.	39 124	45 346	11 050	10 882	10 785	12 628	11 897	11 455
Furniture and other manufacturing products	3 518	3 739	903	879	893	1 064	1 000	946
Electricity	612	427	74	62	153	138	99	126
Services	104 958	108 033	26 443	26 932	29 195	25 463	25 123	26 463
Gross receipts, shipping	52 125	52 066	13 301	12 931	13 204	12 630	11 898	12 393
Petroleum activities, various services.	752	736	192	184	170	190	187	182
Oil drilling etc.	1 925	1 722	518	578	304	322	594	825
Pipeline transport	3 987	4 909	1 187	1 015	1 070	1 637	1 572	1 410
Travel.	15 667	16 741	3 227	4 072	6 380	3 062	3 564	4 746
Other services	30 502	31 859	8 018	8 152	8 067	7 622	7 308	6 907
Transport, post and telecommunication.	8 633	9 223	2 149	2 426	2 607	2 041	1 852	1 976
Financial and business services	17 461	18 302	4 803	4 599	4 403	4 497	4 440	3 958
Services n.e.c.	4 408	4 334	1 066	1 127	1 057	1 084	1 016	973

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Table A12. Exports of goods and services.
Percentage change in volume from the same period in the previous year

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Total exports	5,7	0,5	8,0	-1,3	-3,6	-0,8	-5,6	-0,1
Goods	5,2	0,1	8,7	-2,4	-4,4	-1,6	-7,0	0,3
Crude oil and natural gas.	2,1	-3,8	2,9	-3,4	-8,8	-6,0	-9,0	-2,8
Ships, new	22,4	36,8	76,3	39,4	29,6	-5,9	-48,0	53,7
Ships, second-hand.	-3,2	-20,6	-74,1	92,8	-44,6	-2,4	100,9	-51,8
Oil platforms and modules, new	276,2	-71,9	-20,6	609,2	-95,5	-78,6	-73,1	-55,1
Oil platforms, second-hand	6,9	-48,0	.	-92,8	-87,1	19,2	-88,0	52,5
Direct exports related to petroleum act.. . . .	-4,7	-11,9	-27,6	-5,2	1,3	-13,0	96,3	68,2
Other goods	8,0	3,4	14,2	-3,3	0,7	2,6	-3,1	2,6
Agriculture, forestry and fishing	7,1	7,0	18,0	-4,4	14,8	1,8	-4,8	5,0
Mining and quarrying	-2,1	-0,4	1,8	-11,0	3,5	5,5	-11,7	3,4
Manufacturing products	8,5	3,3	14,2	-3,1	-0,2	3,0	-3,0	2,1
Food products, beverages and tobacco	6,5	2,5	13,8	0,3	-5,2	0,8	-3,9	-1,3
Textiles, wearing apparel, leather	10,6	6,8	11,6	8,0	4,0	4,3	1,3	-10,7
Wood products	-3,2	-2,4	-10,4	-11,3	-1,8	15,5	15,4	20,8
Pulp, paper and paper products	6,4	2,1	11,5	0,2	-0,8	-2,0	-0,9	-4,1
Printing and publishing	-22,0	26,4	2,6	-4,4	20,5	86,9	21,8	40,5
Refined petroleum products.	12,5	-14,4	8,1	-24,8	-21,6	-19,0	-27,8	2,5
Basic chemicals	4,8	7,6	22,8	0,9	9,4	-1,2	-10,2	-1,7
Chemical and mineral products.	14,7	4,3	5,5	4,6	7,3	0,1	12,2	7,5
Basic metals	9,8	3,4	12,9	-2,4	0,3	3,1	-1,7	7,7
Machinery and other equipment n.e.c.	8,0	11,1	22,8	0,8	6,8	15,5	3,6	-0,7
Furniture and other manufacturing products	8,1	3,6	2,2	-3,3	7,8	7,5	8,9	7,6
Electricity	-24,8	-9,5	12,3	-12,9	46,1	-51,9	56,9	175,2
Services	7,2	2,1	5,4	2,7	-1,4	2,4	-0,6	-1,5
Gross receipts, shipping	2,4	3,3	3,3	-1,4	2,5	9,0	2,1	-0,6
Petroleum activities, various services.	55,9	-5,6	0,1	-6,2	-11,1	-5,3	-5,6	-3,4
Oil drilling etc.	7,4	-24,7	-1,9	2,9	-51,9	-43,2	14,2	55,5
Pipeline transport	19,1	7,7	6,9	13,0	1,8	9,0	17,1	17,5
Travel.	-1,8	3,2	-1,1	1,2	7,6	2,1	6,9	12,2
Other services	19,0	0,7	12,3	9,7	-10,3	-6,0	-10,7	-14,8
Transport, post and telecommunication.	11,3	3,6	12,9	16,7	-13,4	6,5	-17,8	-20,8
Financial and business services	23,1	0,5	14,8	10,0	-10,4	-9,6	-8,4	-11,5
Services n.e.c.	19,8	-4,2	0,8	-3,8	-0,7	-12,0	-7,0	-15,3

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NATIONAL ACCOUNTS FOR NORWAY

Table A13. Imports of goods and services. At current prices. Million kroner

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Total imports	371 532	411 595	100 541	100 102	102 647	108 305	94 259	94 353
Goods	266 413	296 000	74 559	71 243	70 641	79 557	66 740	65 010
Ships	14 041	13 316	5 759	2 513	2 740	2 304	703	784
Oil platforms and modules	2 241	5 023	1 013	116	92	3 802	200	734
Direct imports related to petroleum activities	9 761	11 177	2 562	2 733	2 542	3 340	1 880	1 927
Other goods	240 370	266 484	65 225	65 881	65 267	70 111	63 957	61 565
Agriculture, forestry and fishing	8 323	9 049	2 879	2 171	2 005	1 994	2 334	2 183
Crude oil	1 448	1 313	446	288	316	263	255	472
Mining and quarrying	3 397	3 566	984	906	780	896	929	739
Manufacturing products	225 882	251 535	60 585	62 248	62 084	66 618	60 098	57 999
Food products, beverages and tobacco	10 669	12 428	2 739	2 950	3 406	3 333	3 078	3 123
Textiles, wearing apparel, leather	16 738	18 170	4 830	3 582	5 485	4 273	5 019	3 341
Wood products	4 869	5 260	1 307	1 372	1 278	1 303	1 198	1 261
Pulp, paper and paper products	6 487	6 653	1 697	1 616	1 614	1 726	1 696	1 638
Printing and publishing	3 560	3 891	942	836	980	1 133	997	900
Refined petroleum products	10 918	9 782	2 409	2 430	2 521	2 422	2 180	2 425
Basic chemicals	9 621	9 933	2 480	2 453	2 421	2 579	2 211	2 503
Chemical and mineral products	23 529	26 113	6 260	6 505	6 454	6 894	6 379	6 648
Basic metals	23 925	24 821	6 633	6 379	5 913	5 896	5 189	4 953
Machinery and other equipment n.e.c.	91 568	106 419	25 244	26 761	25 362	29 052	26 334	24 579
Furniture and other manufacturing products	8 169	9 356	2 258	2 109	2 203	2 786	2 301	2 098
Non-competitive imports	15 829	18 709	3 786	5 255	4 447	5 221	3 516	4 530
Electricity	1 320	1 021	331	268	82	340	341	172
Services	105 119	115 595	25 982	28 859	32 006	28 748	27 519	29 343
Operating costs shipping, excl. bunkers	26 078	26 696	6 714	6 848	6 529	6 605	6 393	6 262
Operating costs oil drilling, excl. bunkers	1 585	2 974	565	674	746	989	731	1 132
Petroleum activities, various services	5 013	3 384	900	820	741	923	1 207	2 088
Travel	31 614	34 742	6 241	7 921	12 042	8 538	7 386	8 915
Other services	40 829	47 799	11 562	12 596	11 948	11 693	11 802	10 946
Transport, post and telecommunication	3 393	4 359	1 041	1 180	1 171	967	954	1 015
Financial and business services	20 773	23 147	5 736	5 658	5 607	6 146	5 960	5 450
Services n.e.c.	16 663	20 293	4 785	5 758	5 170	4 580	4 888	4 481

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Table A14. Imports of goods and services.
Percentage change in volume from the same period in the previous year

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Total imports	12,0	9,1	17,6	3,8	6,8	9,3	-4,2	-3,9
Goods	10,3	10,3	18,3	3,4	8,2	11,9	-7,1	-6,9
Ships	101,5	0,9	-1,9	-5,2	-13,6	44,0	-84,5	-66,1
Oil platforms and modules	-43,5	146,5	.	-93,5	-65,7	.	-77,5	568,4
Direct imports related to petroleum activities.	22,6	10,5	25,0	5,2	3,5	10,6	-28,9	-31,1
Other goods	8,2	9,7	18,4	6,4	9,9	5,3	0,7	-4,8
Agriculture, forestry and fishing	-3,0	4,4	33,2	-9,0	10,5	-11,9	-16,9	7,8
Crude oil	17,0	23,3	41,0	12,9	12,1	25,5	-32,4	42,4
Mining and quarrying	8,6	8,4	45,5	-2,1	-2,2	-2,1	-10,6	-5,0
Manufacturing products	9,4	9,9	19,0	6,7	9,9	5,6	1,9	-5,3
Food products, beverages and tobacco	9,1	6,3	8,5	1,9	5,9	9,3	8,9	10,2
Textiles, wearing apparel, leather	5,7	4,8	9,9	-0,1	4,0	5,0	3,8	-6,0
Wood products	18,3	7,9	25,2	2,8	11,7	-3,7	-4,4	-5,0
Pulp, paper and paper products	9,5	0,4	9,9	-2,9	-0,9	-3,7	-0,1	4,1
Printing and publishing	10,2	7,6	16,5	6,5	1,8	6,7	8,7	3,4
Refined petroleum products.	9,4	7,5	9,6	-3,7	18,6	7,0	10,1	-1,6
Basic chemicals	6,6	2,2	16,9	-0,5	-5,5	0,1	-11,0	4,7
Chemical and mineral products.	7,2	7,7	16,4	3,3	8,7	3,6	0,0	2,2
Basic metals	3,3	7,1	14,0	13,0	16,0	-9,9	0,3	-11,0
Machinery and other equipment n.e.c.	14,7	13,8	28,8	9,2	10,1	9,9	2,9	-7,1
Furniture and other manufacturing products	15,5	10,8	19,9	5,1	9,6	9,5	4,3	-0,3
Non-competitive imports.	-6,2	13,1	2,1	13,7	24,4	12,3	-4,0	-20,5
Electricity	-45,1	-12,8	-59,7	84,0	117,7	48,5	16,4	-21,2
Services	17,0	6,0	15,5	4,7	3,8	1,9	4,7	4,2
Operating costs shipping, excl. bunkers	2,4	3,3	3,3	-1,4	2,5	9,0	2,1	-0,6
Operating costs oil drilling, excl bunkers	36,6	80,7	159,6	66,8	41,3	98,2	25,4	65,5
Petroleum activities, various services.	39,0	-34,9	38,4	-62,0	-50,4	2,4	30,0	148,8
Travel.	8,6	4,0	6,5	3,0	3,9	3,0	10,7	12,2
Other services	32,1	11,1	23,6	21,4	10,0	-6,1	-0,5	-12,0
Transport, post and telecommunication.	-4,8	24,5	18,5	41,9	37,0	4,7	-10,0	-12,9
Financial and business services	43,9	6,8	18,0	9,3	4,8	-2,8	1,5	-2,3
Services n.e.c.	28,8	13,9	33,2	33,1	10,9	-12,4	-1,0	-22,1

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NATIONAL ACCOUNTS FOR NORWAY

Table A15. Balance of payments. Summary. At current prices. Million kroner

	1997	1998	98:1	98:2	98:3	98:4	99:1	99:2
Total exports	448 631	414 077	111 926	102 821	99 418	99 911	99 117	107 167
Goods	343 673	306 044	85 483	75 889	70 223	74 448	73 994	80 704
Services	104 958	108 033	26 443	26 932	29 195	25 463	25 123	26 463
Total imports	371 532	411 595	100 541	100 102	102 647	108 305	94 259	94 353
Goods	266 413	296 000	74 559	71 243	70 641	79 557	66 740	65 010
Services	105 119	115 595	25 982	28 859	32 006	28 748	27 519	29 343
Balance of goods and services	77 099	2 482	11 385	2 719	-3 229	-8 394	4 858	12 814
Primary income and transfers from abroad	47 588	58 458	14 498	15 194	14 314	14 452	14 142	12 993
Compensation of employees.	1 500	1 500	375	375	375	375	375	375
Interest	28 798	38 107	9 462	10 210	9 233	9 202	8 762	7 824
Dividends etc.	3 172	3 797	763	1 370	615	1 049	514	1 520
Reinvested earnings	5 410	5 534	1 459	974	1 705	1 396	1 845	1 061
Current transfers	8 708	9 520	2 439	2 265	2 386	2 430	2 646	2 213
Primary income and transfers to abroad	68 564	77 207	18 163	18 831	18 005	22 208	18 949	19 564
Compensation of employees.	3 724	3 786	947	967	943	929	914	905
Interest	28 203	33 838	8 065	7 789	7 843	10 141	8 822	8 964
Dividends etc.	11 660	13 643	4 845	6 713	1 107	978	2 517	6 107
Reinvested earnings	6 223	4 430	-521	-1 609	3 221	3 339	1 774	-1 210
Current transfers from general government	7 328	8 588	1 710	2 122	1 402	3 354	1 833	1 948
Other current transfers	11 426	12 922	3 117	2 849	3 489	3 467	3 089	2 850
Primary income and transfers from abroad, net.	-20 976	-18 749	-3 665	-3 637	-3 691	-7 756	-4 807	-6 571
Current external balance.	56 123	-16 267	7 720	-918	-6 920	-16 150	51	6 243
Capital transfers, net.	-1 287	-754	-68	-292	90	-484	-135	-27
Net lending	54 836	-17 021	7 652	-1 210	-6 830	-16 634	-84	6 216
Increase in Norway's net assets	39 254	-540	8 938	-719	-3 967	-4 793	-9 211	923

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NATIONAL ACCOUNTS FOR NORWAY

Tabell A16. Employed persons by industry. Employees and self-employed. 1000

	1997	1998	97:3	97:4	98:1	98:2	98:3	98:4	99:1	99:2
Total	2 212.8	2 263.1	2 233.5	2 227.3	2 238.1	2 266.3	2 282.8	2 264.8	2 258.6	2 281.2
Agriculture and hunting	77.4	76.2	81.4	74.1	74.4	78.1	77.1	75.0	71.5	74.4
Forestry and logging	5.9	5.7	5.8	5.5	5.5	6.2	5.7	5.2	5.0	5.7
Fishing and fish farming	18.0	17.9	17.4	18.5	17.3	18.1	20.1	16.2	16.0	17.5
Oil and gas extraction incl. services	22.4	23.1	22.8	22.6	22.3	22.6	23.5	23.8	23.1	22.0
Oil and gas extraction	16.2	16.5	16.4	16.2	16.1	16.4	16.9	16.7	16.6	15.6
Service activities incidental to oil and gas ext.	6.2	6.5	6.4	6.4	6.2	6.2	6.6	7.1	6.5	6.3
Mining and quarrying	4.2	4.2	4.3	4.1	4.0	4.2	4.3	4.2	4.2	4.2
Manufacturing	314.8	316.8	319.5	313.0	317.0	319.2	317.7	313.4	311.0	311.1
Food products, beverages and tobacco	56.0	55.1	56.6	55.5	55.7	55.5	54.8	54.1	53.9	53.5
Textiles, wearing apparel, leather	9.1	8.9	9.0	9.1	8.9	8.5	9.0	9.1	8.6	8.5
Wood and wood products	17.2	17.0	17.8	17.1	17.1	17.1	17.7	16.1	15.8	16.4
Pulp, paper and paper products	11.4	11.5	11.5	11.3	11.2	11.9	11.9	10.8	10.4	11.4
Publishing, printing, reproduction	42.2	42.7	42.2	41.6	42.2	43.4	41.9	43.3	42.9	42.8
Refined petroleum products	1.6	1.5	1.7	1.6	1.4	1.5	1.5	1.5	1.2	1.2
Basic chemicals	8.6	8.7	8.8	8.6	8.6	8.7	8.8	8.7	8.5	8.5
Chemical and mineral products	22.8	22.9	23.5	22.6	23.7	23.1	22.8	22.1	23.0	23.3
Basic metals	17.5	17.6	18.1	17.2	17.0	17.7	17.8	17.7	16.5	17.7
Machinery and other equipment n.e.c.	80.1	80.7	81.1	79.9	80.9	80.8	81.7	79.6	80.6	78.4
Building of ships, oil platforms and moduls	33.8	35.1	34.4	33.5	34.7	35.6	34.8	35.5	35.3	35.0
Furniture and other manufacturing n.e.c.	14.7	15.2	14.8	14.9	15.5	15.3	15.0	14.8	14.4	14.4
Electricity and gas supply	19.6	18.8	19.9	19.3	18.8	18.8	18.9	18.7	17.9	18.5
Construction	115.0	122.1	117.3	118.5	119.6	122.2	123.5	123.0	120.0	121.8
Services activities excluded general government	955.5	988.5	966.3	963.9	970.6	990.6	1 002.1	990.3	993.3	1 007.5
Wholesale and retail trade	315.1	323.7	314.6	319.5	319.4	326.7	326.1	322.5	325.6	328.2
Hotels and restaurants	62.1	64.1	65.2	61.4	60.4	63.9	66.9	65.3	62.5	65.8
Transport via pipelines	0.3	0.3	0.3	0.4	0.2	0.3	0.3	0.3	0.2	0.3
Water transport	50.3	51.3	51.4	50.1	50.8	51.2	52.2	50.9	50.0	50.8
Ocean transport	41.5	42.4	42.2	41.4	42.3	42.3	42.9	42.2	41.4	41.7
Inland water and costal transport	8.9	8.9	9.2	8.6	8.5	8.9	9.3	8.7	8.6	9.1
Other transport activities	91.0	93.8	91.6	92.3	91.8	92.6	94.8	96.0	96.0	96.1
Post and telecommunications	51.5	52.3	51.7	49.7	52.0	52.0	53.4	52.0	51.7	52.3
Financial intermediation	49.9	48.9	50.0	49.5	49.4	49.2	49.0	48.0	49.2	50.1
Dwelling services	1.2	1.3	1.3	1.0	1.2	1.3	1.3	1.3	1.2	1.3
Business services etc.	141.7	154.2	145.0	145.0	148.1	154.1	158.4	156.0	159.7	162.3
Personal services	192.5	198.6	195.3	195.0	197.3	199.3	199.7	198.0	197.2	200.4
General government	680.0	689.9	678.8	687.9	688.6	686.2	689.8	695.0	696.6	698.5
Central government	152.8	152.1	152.2	153.5	153.7	150.4	151.8	152.5	153.9	152.1
Civilian central government	109.1	109.1	108.6	110.0	109.9	107.6	109.1	109.6	110.0	108.0
Defence	43.7	43.1	43.6	43.5	43.8	42.8	42.7	43.0	43.9	44.1
Local government	527.1	537.8	526.6	534.4	534.8	535.8	538.0	542.5	542.8	546.4
Mainland Norway	2 148.6	2 197.3	2 168.3	2 162.9	2 173.4	2 201.0	2 216.1	2 198.4	2 193.9	2 217.3

NATIONAL ACCOUNTS FOR NORWAY

Tabell A17. Employed persons by industry. Employees and self-employed.
Percentage change from the same period in previous year

	1997	1998	97:3	97:4	98:1	98:2	98:3	98:4	99:1	99:2
Total	2.9	2.3	2.9	2.9	2.8	2.5	2.2	1.7	0.9	0.9
Agriculture and hunting	-2.2	-1.5	-0.6	3.6	0.6	-2.2	-5.3	1.1	-3.9	-3.9
Forestry and logging	-0.5	-4.0	5.0	-2.6	-9.6	-1.2	-0.9	-4.6	-10.0	-10.0
Fishing and fish farming	-0.3	-0.7	2.4	5.3	-2.6	-2.5	15.5	-12.2	-7.7	-7.7
Oil and gas extraction incl. services	3.9	2.8	4.7	4.1	1.1	1.6	3.1	5.4	3.6	3.6
Oil and gas extraction	-2.1	2.0	-1.0	-1.6	-0.3	2.3	2.7	3.2	3.4	3.4
Service activities incidental to oil and gas ext.	23.1	5.0	23.1	22.0	5.1	-0.2	4.2	10.8	4.1	4.1
Mining and quarrying	-4.3	-1.4	-3.9	-2.7	-3.7	-2.9	-0.9	1.9	3.8	3.8
Manufacturing	3.4	0.6	3.1	2.0	1.8	1.3	-0.6	0.1	-1.9	-1.9
Food products, beverages and tobacco	2.6	-1.7	1.1	-0.3	-0.3	-0.8	-3.2	-2.4	-3.2	-3.2
Textiles, wearing apparel, leather	-5.2	-2.2	-7.1	0.7	-2.4	-5.8	-0.2	-0.3	-4.0	-4.0
Wood and wood products	4.5	-1.2	5.3	4.9	2.3	-0.1	-0.8	-6.2	-7.7	-7.7
Pulp, paper and paper products	3.5	0.8	0.9	10.9	0.9	3.6	3.2	-4.5	-7.5	-7.5
Publishing, printing, reproduction	4.0	1.2	3.5	3.4	-0.3	1.9	-0.8	4.1	1.6	1.6
Refined petroleum products	9.1	-6.4	8.3	8.6	-2.5	-9.2	-10.1	-2.9	-14.9	-14.9
Basic chemicals	-1.1	0.9	-0.8	-1.2	1.1	0.9	0.0	1.7	-1.2	-1.2
Chemical and mineral products	1.9	0.6	2.9	-0.3	5.5	2.0	-2.8	-2.2	-3.0	-3.0
Basic metals	4.4	0.7	4.3	4.5	0.3	0.8	-1.3	3.1	-2.7	-2.7
Machinery and other equipment n.e.c.	4.6	0.9	5.0	1.5	2.3	0.9	0.7	-0.5	-0.4	-0.4
Building of ships, oil platforms and moduls	3.5	4.1	2.9	1.6	3.9	5.4	1.2	5.8	1.7	1.7
Furniture and other manufacturing n.e.c.	6.3	3.4	6.5	4.3	7.9	4.9	1.8	-0.7	-7.1	-7.1
Electricity and gas supply	-0.1	-4.0	-0.9	-1.0	-3.6	-4.2	-4.9	-3.1	-4.8	-4.8
Construction	8.4	6.2	6.8	10.7	9.4	6.5	5.3	3.8	0.3	0.3
Services activities excluded general government	3.4	3.5	3.5	2.9	3.5	3.9	3.7	2.7	2.3	2.3
Wholesale and retail trade	4.2	2.7	4.0	3.8	2.3	4.1	3.7	0.9	1.9	1.9
Hotels and restaurants	3.6	3.3	3.2	0.4	2.1	2.2	2.6	6.2	3.4	3.4
Transport via pipelines	25.2	-6.7	15.4	53.8	-7.2	-7.2	-5.8	-6.5	-7.5	-7.5
Water transport	1.0	1.9	0.9	-0.7	1.8	2.7	1.6	1.6	-1.6	-1.6
Ocean transport	1.2	2.3	1.5	-0.2	2.5	3.2	1.8	1.8	-2.2	-2.2
Inland water and costal transport	0.1	-0.1	-1.7	-3.2	-1.5	0.1	0.9	0.3	1.2	1.2
Other transport activities	2.4	3.0	1.2	2.6	2.7	1.8	3.5	4.0	4.6	4.6
Post and telecommunications	-0.1	1.7	-0.2	-2.0	-0.2	-0.6	3.2	4.5	-0.5	-0.5
Financial intermediation	-0.8	-2.0	-1.6	-1.3	-1.7	-1.4	-1.9	-3.0	-0.4	-0.4
Dwelling services	-0.0	5.9	0.4	-11.7	-5.3	0.1	-0.7	37.1	-3.3	-3.3
Business services etc.	8.7	8.9	9.2	7.1	10.0	8.7	9.2	7.6	7.9	7.9
Personal services	1.5	3.2	3.3	3.0	4.8	4.3	2.2	1.5	-0.1	-0.1
General government	2.0	1.5	1.6	2.0	1.8	1.4	1.6	1.0	1.2	1.2
Central government	0.4	-0.5	0.2	0.5	0.3	-1.3	-0.2	-0.6	0.1	0.1
Civilian central government	2.2	-0.1	1.9	2.5	0.7	-1.1	0.5	-0.4	0.0	0.0
Defence	-3.7	-1.5	-3.7	-4.2	-0.9	-1.8	-2.1	-1.3	0.3	0.3
Local government	2.5	2.0	2.1	2.4	2.2	2.2	2.2	1.5	1.5	1.5
Mainland Norway	2.9	2.3	2.9	2.9	2.8	2.5	2.2	1.6	0.9	0.9

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