

International economy

Growth in the level of activity in the OECD area as a whole appear to be appreciably higher in 2000 than in 1999. GDP growth among our main trading partners is set to be a little more than 3 1/2 per cent this year, compared with 2 1/2 per cent in the previous two years. Growth is projected at 3.0 per cent in 2001 and 2.7 per cent in 2002. The US has continued to expand at a considerably faster rate than EU countries, with growth this year estimated at 5.2 and 3.4 per cent respectively. Third-quarter figures from the US indicate, however, that the long-awaited slowdown has now begun, and lower growth in the US is expected to push down growth in the EU as well. The moderation in growth appears, however, to be far more pronounced in the US than in Europe, and the forecasts thus indicate that the growth differential between the two areas will narrow the next two years. GDP growth in the EU is nevertheless not likely to catch up with the rate in the US.

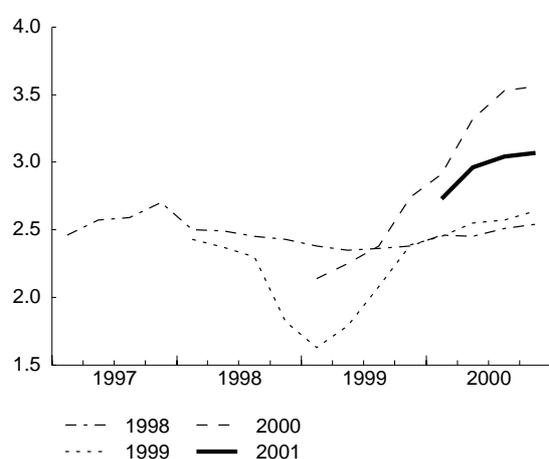
Despite prolonged and vigorous growth in the US economy, inflation in the US was moderate for a long time. This year, however, price inflation has quickened, and in recent months has been about 3.5 per cent. Inflation is also rising in the euro area, and the European Central Bank's inflation target of 2 per cent has now been exceeded five consecutive months. Rising price inflation has resulted in several interest rate increases on both sides of the Atlantic, but in the last six months signs of a slowdown in the US economy have kept interest rates unchanged there. Most forecasters expect a markedly lower rise in prices in the US and a slight reduction in the EU next year, but the OECD still expects interest rates to rise marginally in both areas.

The greatest uncertainty is now linked to whether the end of the expansion in the US will be soft or hard. Developments in the US are particularly important since Europe and the rest of the world still seem to be heavily dependent on what happens there. An unexpectedly strong monetary policy tightening in the euro area, for example due to continued high oil prices and/or higher-than-expected wage growth, may also create problems.

Continued strong growth in international trade

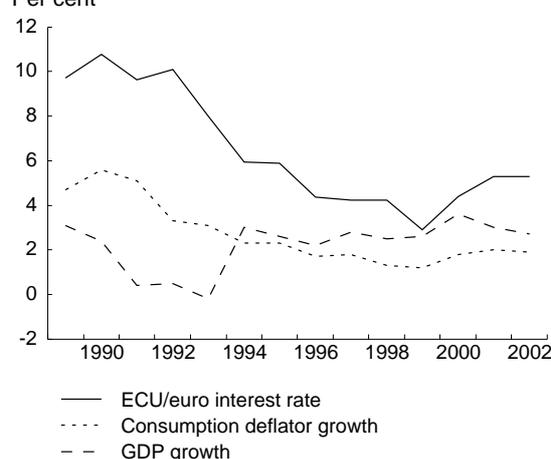
Following a pronounced upswing in world trade towards the end of last year and very brisk growth this year, growth is expected to slow somewhat the next two years. The OECD projects that international trade will expand in volume terms by about 10 per cent next year and 8 per cent in 2002, compared with more than 13 per cent this year. Continued high US imports have been an important driving force behind growth in world trade, and expectations of lower growth in the US are the main reason that world trade is projected to grow at a slower pace the next two years. However, important growth impulses have also come from Asia, Latin America and Central and Eastern Europe. In the EU, the depreciation of the euro has contributed to curbing the effect of relatively strong domestic demand growth on imports. If our projections of an appreciation of the euro and some reduction in growth in the EU are correct, this will result in one positive and one negative growth impetus for imports in the area in the period ahead. Trade imbalances seem to persist, with large trade deficits in the US and large surpluses in Japan.

GDP growth forecasts for Norway's main trading partners for 1998 - 2001 given on different dates



Source: Consensus Forecasts.

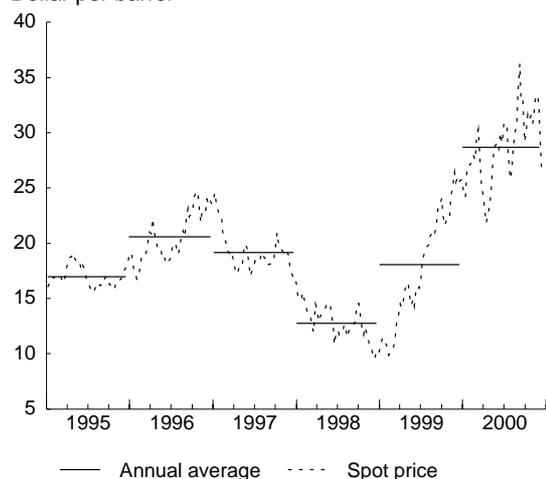
GDP and consumption deflator growth for Norway's main trading partners, and 3 months ECU/euro rate



Sources: OECD and Statistics Norway.

Spot price, Brent Blend. 1995-2000

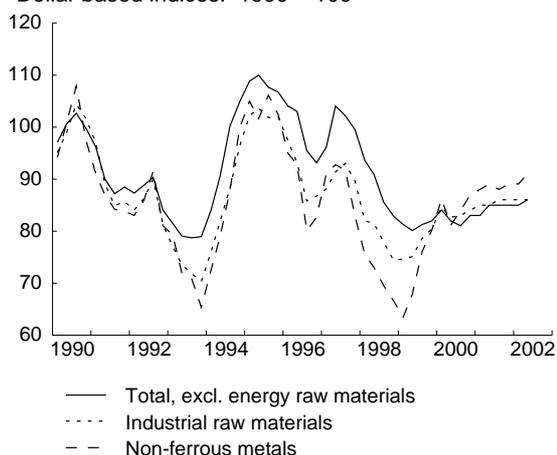
Dollar per barrel



Source: Norges Bank.

Commodity prices on the world market 1990 - 2002

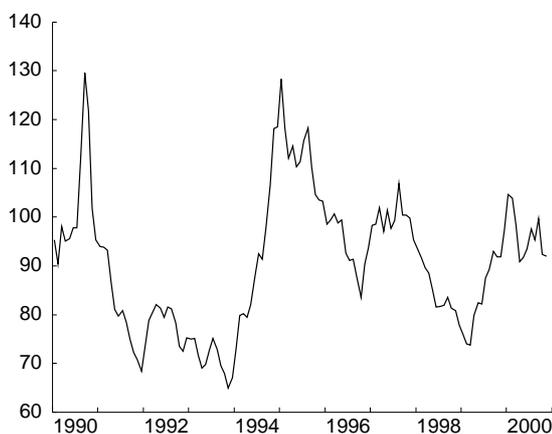
Dollar based indices. 1990 = 100



Source: HWWA-Institut für Wirtschaftsforschung and AIECE.

Aluminium price. 1990 - 2000

Dollar based index. 1979=100



Source: Norges Bank.

In step with the expansion in international demand, the fall in commodity prices was reversed to an increase in the course of 1999. In addition to crude oil prices, this particularly applied to industrial raw materials, while food and agricultural prices lagged behind until the end of the year. According to *The Economist's* indices, non-oil commodity prices have drifted down measured in US dollar terms through this year. Nevertheless, the average level in the first 11 months of 2000 is still somewhat higher than in the same period last year. The sluggish trend in prices must be viewed in connection with the appreciation of the US dollar. Measured in pound sterling or the euro, commodity prices have risen markedly since the beginning of the year, whereas they are virtually unchanged measured in Japanese yen. So far this year, prices for metals and industrial raw materials have risen at a noticeably faster pace than prices for food and agricultural products compared with the same period in 1999. The Association of European Conjuncture Institutes (AIECE) projects a very moderate rise in dollar prices for non-oil commodities, and a depreciation of the dollar of about 5 per cent against the euro in 2001.

Continued high oil prices

From a low in February 1999 to a preliminary peak in March this year, the spot price of Brent Blend rose from about USD 10 to over USD 30 per barrel. Oil prices then fluctuated between USD 20 and 37, and on average were just below USD 29 per barrel in the first 11 months of this year.

The most important reason for the rise in prices through last year was OPEC's decision in March 1999 to reduce production by 1.7 million b/d after the cartel had already cut production twice in 1998. Moreover, economic growth in North America remained buoyant, while demand for oil gradually picked up again in Asia following the economic crisis in 1998.

This year, OPEC has increased production four times, without this resulting in any lasting drop in prices. In the light of this experience, OPEC suspended its guideline which stated that if the oil price should remain outside the range USD 22-28 per barrel for twenty days, the cartel would adjust production to the level required to bring prices back to that range. High oil prices must be seen in connection with stocks of crude oil and finished products. In particular, the low stock figures for refined petroleum products in the US, and to some extent Europe, have resulted in growing concern about the ability to satisfy future consumption. Furthermore, it is likely that unrest in the Middle East and uncertainty concerning Iraq's next oil-for-food agreement have contributed to the high level of oil prices.

As a result of the high oil price, the International Energy Agency (IEA) has lowered its projection for global oil demand this year, while the projection for non-

OPEC production has been revised upwards. Even with a normally cold winter, stocks of crude oil may increase by about 1.5 million b/d in the fourth quarter of 2000 and first quarter of next year as a whole, a period when stocks are normally reduced. There have also been recent signs that stocks of heating oil in the US are beginning to increase again.

Continued high demand for heating oil may contribute to maintaining high oil prices through the winter. In addition, unrest in the Middle East and any reduction of production in Iraq may contribute to high prices. Reduced demand for heating oil and an increase in stocks will, on the other hand, contribute to curbing prices in the period ahead. We are nevertheless of the view that prices will not remain below USD 22 per barrel for a prolonged period of time, because OPEC will probably attempt to reactivate its guideline should such a situation appear.

Towards slower growth in the US

Following annualized growth in GDP of 5.6 per cent in the second quarter, preliminary figures for the third quarter show a sharp drop in the growth rate to an estimated 2.4 per cent. Due to a temporary and sharp decline in government expenditure, these figures probably overestimate the slowdown in the economy. However, third-quarter figures indicate that a change is under way in the US. The latest forecasts from the OECD point to GDP growth of about 3.5 per cent in both 2001 and 2002, against 5.2 per cent in 2000.

Several factors are contributing to expectations of slower growth the next two years. First, it is pointed out that the high second-quarter figures are partly related to the build-up of inventories and higher public sector demand, developments that appear to have been reversed in the third quarter. Moreover, the increase in interest rates over the past year and persistently high oil prices are curbing the growth impetus from business investment, which has been strong throughout the expansion. In addition, growth in private consumption has slowed this year. Consumption growth has been the most important driving force behind the upturn the last few years, fuelled by the sharp increase in equity prices. Through most of 2000, on the other hand, equity prices have fallen, and wealth changes are now having the effect of pushing down consumption growth. Delayed effects of interest rate increases have the same impact. High oil prices also mean that consumers have less money at their disposal and thus reduce their demand for other goods. This effect is stronger in the US than in Europe inasmuch as the US has very low environmental taxes on oil products and consumers thus feel the effects of changes in prices for crude oil more clearly in prices for final products, in addition to the fact that their pattern of consumption is more oil-intensive. However, the increase in consumption has also been fuelled by higher employment and rising real wages,

Economic forecasts for Norway's main trading partners

Annual percentage change

Country (Share of Norwegian exports ¹)	1999	2000	2001	2002
USA (8.0)				
GDP	4.2	5.2	3.5	3.3
Consumption deflator	1.8	2.5	2.1	2.2
Unemployment rate ² (level)	4.2	4.0	4.2	4.5
Japan (4.5)				
GDP	0.2	1.9	2.3	2.0
Consumption deflator	-0.5	-0.5	0.0	-0.1
Unemployment rate ² (level)	4.7	4.7	4.6	4.6
Germany (11.3)				
GDP	1.6	3.0	2.7	2.5
Consumption deflator	0.3	1.5	1.6	1.6
Unemployment rate ² (level)	8.3	7.7	6.9	6.3
France (6.0)				
GDP	2.9	3.3	2.9	2.5
Consumption deflator	0.7	1.5	2.1	2.0
Unemployment rate ² (level)	11.1	9.7	8.8	8.2
United Kingdom (11.7)				
GDP	2.2	3.0	2.6	2.3
Consumption deflator	2.0	1.4	2.4	2.3
Unemployment rate ² (level)	6.0	5.5	5.4	5.5
Italy (3.1)				
GDP	1.4	2.8	2.7	2.6
Consumption deflator	2.2	2.7	2.5	2.0
Unemployment rate ² (level)	11.5	10.8	10.1	9.4
Sweden (12.9)				
GDP	3.8	4.0	3.2	2.4
Consumption deflator	0.7	1.0	1.8	2.3
Unemployment rate ² (level)	5.6	4.7	4.1	3.7
Denmark (7.6)				
GDP	1.7	2.8	2.5	2.5
Consumption deflator	2.6	2.9	2.7	2.6
Unemployment rate ² (level)	5.2	5.2	5.1	5.1
The Netherlands (5.5)				
GDP	3.9	4.5	3.9	3.4
Consumption deflator	1.9	3.0	4.1	2.5
Unemployment rate ² (level)	3.2	2.8	2.5	2.3
Memorandum items:				
GDP EU	2.4	3.4	3.0	2.7
GDP trading partners	2.6	3.6	3.0	2.7
Consumption deflator trading partners	1.2	1.8	2.0	1.9
Euro interest rate	2.9	4.4	5.3	5.3

¹ Exports of traditional goods. Figures for 1999 in per cent, according to Monthly Bulletin of External Trade, Statistics Norway.

² Per cent of labour force.

Sources: OECD. We usually present projections from Consensus Forecasts, but their projections for 2002 are not yet available. For 2000 and 2001, their GDP figures are much the same as those projected by OECD, while unemployment figures show considerable deviations for some countries. Note also that the OECD does not provide forecasts for the CPI, only for the consumption deflator. As an average for our trading partners, the rise in the consumption deflator deviates very little from the rise in the CPI. For some countries, however, the deviations may be considerable. For the US, CF projects a rise in the CPI of 3.4 per cent in 2000 and 2.7 per cent in 2001. The estimates for interest rates are from Statistics Norway.

and the latter factor is expected to make a positive contribution also next year. Despite sharp growth in the level of activity, the trade deficit seems to have been reduced the last few quarters. A narrowing of

the growth rate differential between the EU and US the next few years may also imply a less negative impetus from foreign trade in the period ahead. The slowdown is therefore expected to be mild, with the prospect of higher GDP growth in the US than in the EU again in 2001 and 2002.

There is still considerable uncertainty concerning how strong the dampening effects will be in the US economy, and whether the shift to slightly slower growth will take place gradually or be hard and brutal. Current account imbalances in the US have so far not created problems, but remain an important element of uncertainty. If the trade deficit triggers a rapid depreciation of the dollar, higher inflation may result in further increases in interest rates. In this event, the cooling effects may entail an abrupt slowdown in the US.

Inflation in the US has picked up markedly over the last few years in spite of the strong dollar. The rise in oil prices is an important reason why the year-on-year rise in the consumer price index has remained at or above 3 per cent since February this year, but other prices also began to rise at a faster pace in the first half of 2000. A very high capacity utilization rate with unemployment at a historically low level may contribute to amplifying domestic inflationary impulses in the period ahead. Admittedly, strong productivity gains have resulted in only a very moderate rise in labour costs so far, but the acceleration in recent months is still noticeable. If the economy now starts to expand at a slower rate, productivity growth may be curbed inasmuch as there is a tendency for productivity to grow more strongly during an upturn than during a downturn. This would then reduce the scope for increasing wages without an accompanying increase in unit production costs, and this in turn might lead to stronger price pressure in the US economy. If the dollar exchange rate is reversed to some extent, external price impulses will have the same effect. Expectations of lower oil prices and more moderate growth the next few years may, on the other hand, contribute to lower price inflation. The Federal Reserve has therefore left interest rates unchanged the last few months. This does not mean, however, that the possibility of additional interest rate increases no longer exists; for example, the OECD recommends an increase of 0.5 percentage point in 2001.

Improvement in Japan

Japan's GDP fell in the second half of 1999 but expanded by a seasonally adjusted quarterly rate of 2.5 and 1.0 per cent in the first and second quarter of 2000 respectively. The latest projection from the OECD indicates GDP growth of just under 2 per cent this year. This forecast is one of a series of noticeable upward revisions of growth projections over the past year. The improvement has primarily been fuelled by a sharp rise in public sector investment and higher exports.

Industrial production has expanded every month for over a year. It is difficult, however, to envisage robust growth that is solely based on an impetus from the public sector and abroad. Household consumption remains sluggish even though so far this year this component has developed better than many had feared. Low wage growth, higher unemployment and an unusually high saving ratio still give grounds for concern even though tax reductions have had a positive effect. A possible improvement in the labour market may result in a slight decline in the saving ratio next year. Moreover, the authorities appear willing to provide a further stimulus to the economy through higher public sector demand in spite of high government debt. A new government stimulus package was adopted as recently as November. In August, the Japanese central bank abandoned its 18-month policy of zero interest rates, and even though the increase was only 0.25 percentage point both the Government and economic analysts expressed considerable scepticism about this move. It appears that prices will continue to fall in Japan this year and next, and even nominal interest rates close to zero thus entail positive real interest rates. In addition, the strong yen is having a tightening effect. This implies that the growth rate will be low in the period ahead, and the OECD projects that GDP will expand by just over than 2 per cent annually the next two years.

Unlike the Japanese economy, the recovery in many other Southeast Asian economies has been swifter and stronger than expected following the problems experienced in 1997 and 1998. The favourable developments appear to have continued in 2000. Whereas the recovery at the start was highly export-based, growth in domestic demand has become a more important factor this year. Combined with expectations of continued high growth in China and some improvement in Japan, this means that a number of countries are likely to stabilize growth at a high level in both 2001 and 2002 despite expectations of more moderate growth in the US.

Peak has been passed in Europe

The forecasts for EU countries indicate that GDP growth may be about one percentage point higher this year than in 1999 and then slow somewhat the next two years. An important reason for expectations of lower economic growth is the prospect of a slowdown of growth in the US inasmuch as higher export demand has been and still is a very important factor behind the upturn in Europe.

GDP growth in EU countries was 3.2 per cent in both the first and second quarter compared with the previous quarter and annualized. Domestic demand has picked up markedly and both household demand and private investment have made a substantial contribution. Exports have expanded at an even stronger pace, but growth in imports of about the same magni-

tude has reduced the contribution of foreign trade to GDP growth.

The upturn has been particularly strong in Germany and Italy after these countries recorded very low activity levels in the wake of the Asian crisis. Growth in net exports as a result of a weak euro and brisk international activity has been an important driving force. In Germany, investment generated a strong growth impetus in the first quarter, while household demand showed an appreciable rise in the second quarter. Earlier this year, France was set to boost the EU average for GDP growth. However, growth projections have been lowered somewhat in recent months, and it now appears that the country will end up close to the average for the area. The downward revision can primarily be ascribed to weaker-than-expected growth in household consumption in the first half of 2000. The introduction of a 35-hour working week has resulted in higher employment, but also lower growth in real wages as a concession for reduced working hours. This comes on top of the fall in real disposable income as a result of the rise in oil prices. Moreover, enterprises report that capacity constraints are now just as important a factor in limiting production as a lack of demand. Unlike countries in the euro area, UK exports have been hampered by a strong currency in recent months. GDP growth has nevertheless rebounded this year following a mild slowdown in 1999. Growth has primarily been fuelled by household demand. In Sweden, growth has been very strong the last few years, and it appears that the country will be one of the fastest growing EU economies this year, with growth in household consumption, investment and exports.

The OECD expects slightly lower growth in the EU area the next two years, although it will still be relatively high compared with the last 20 years. The OECD projects growth at 3.0 per cent in 2001 and 2.7 per cent in 2002. Fiscal policy is expected to be neutral or expansionary in the projection period, with substantial tax reductions in Germany, France and some smaller EU countries. Monetary policy, on the other hand, may be somewhat tighter in order to counter tendencies of higher inflation. Combined with rising employment, tax reductions will make a positive contribution to household demand, and high demand will stimulate investment in order to avoid capacity problems. Moreover, some countries have approved reductions in corporate taxes. However, if the expected decline in oil prices fails to materialize, this will reduce real disposable income for both households and enterprises. Slower growth in the US and continued moderate growth in Japan also imply a reduced external growth impetus. If the euro also appreciates, some of the euro area's exchange rate competitive edge will be eroded. In addition, indicators such as manufacturing statistics and surveys of industrial leaders and

households suggest that the growth peak has already been passed, albeit without implying a downturn.

Developments in France and Germany are expected to continue more or less along the same lines as in the last half of 2000, while the UK is expected to show slower growth in 2001 and 2002 despite growth in public sector expenditure. It also appears that Sweden is set for a soft landing where capacity is fully utilized and employment growth is low.

Higher growth in the EU has been accompanied by a marked acceleration in inflation, and the year-on-year inflation rate in the euro area has been higher than the ECB's target of 2 per cent over the last five months. It is highly probable that it will exceed the target range for the year as a whole, and the latest projections from Consensus Forecasts also indicate that inflation in 2001 will be very close to or above this target. The entire euro area is now recording higher price inflation, albeit to varying degrees. In the last two months, inflation has been higher than 2 per cent in every EMU country, although the variations are considerable, from Ireland's 6.0 per cent to Austria and France which both recorded inflation of 2.1 per cent in October. The main reasons are the rise in oil prices over the last 18 months and the euro's sharp depreciation, while the domestic inflationary impetus remains moderate and well below 2 per cent. Falling oil prices and a stronger euro are expected to reduce external inflationary impulses the next two years. These forecasts are uncertain, however, and with relatively robust economic growth, a steadily tighter labour market and a delayed feed-through of high oil prices to domestic prices, increased domestic inflationary pressures must be expected in the projection period. Admittedly, wages in most EU countries are expected to rise very moderately, but on balance the European Central Bank (ECB) may still resort to additional interest rate increases. So far this year, the ECB has raised interest rates by 1.75 percentage points, and the OECD expects a further rise of 0.5 percentage point next year.

The picture of continued brisk growth in the EU may be jeopardized by both internal and external factors. Despite the upswing in domestic activity, the area is dependent on developments in the US. A hard landing there will also have an impact on the EU via reduced exports. The same applies if the euro should appreciate more strongly than expected and thereby eliminate the euro area's exchange rate competitive advantage. Growth may also be hampered if oil prices remain at a high level longer than expected or rise further, with the result that real income growth slows and/or monetary policy is tightened. An unexpectedly strong monetary policy tightening may also be triggered by wage growth in excess of the rate forecasted, which may conceivably be the result of both higher price inflation and a tighter labour market.

Norwegian economy

Developments in 2000

The Norwegian economy exhibited a sluggish trend in the third quarter. Seasonally adjusted figures from the quarterly national accounts (QNA) show a levelling off in mainland production and demand following close to trend growth through the previous year. The number of persons employed has risen moderately through 2000, and in the third quarter it was a good half a percentage point higher than the average for 1999. Unemployment has also edged up from the trough recorded around the beginning of 1999. The

consumer price index increased by 3.5 per cent in the year to the third quarter of 2000, while the year-on-year rate of price inflation was reduced to 3.1 per cent in October. The surplus on the current account reached as much as NOK 52 billion in the third quarter, primarily as a result of a further surge in oil prices.

If we look at 2000 as a whole, mainland GDP growth is now set to be a little less than 2 per cent. This is substantially weaker than the growth rates recorded during the period of expansion in the 1990s, but

Macroeconomic indicators. 1998-2000

Growth from previous period unless otherwise noted. Per cent

	1998	1999	Seasonally adjusted			
			99.4	00.1	00.2	00.3
Demand and output						
Consumption in households and non-profit organizations	3.3	2.4	0.3	1.2	0.5	-0.2
General government consumption	3.8	2.7	-0.4	0.7	0.3	0.8
Gross fixed investment	5.8	-5.6	-13.7	9.3	-4.9	-7.2
- Mainland Norway	1.6	-2.1	-1.1	2.5	-1.0	-3.0
- Petroleum activities ¹	20.4	-12.6	-34.6	16.0	-13.9	-6.9
Final domestic demand from Mainland Norway ²	3.1	1.6	-0.1	1.3	0.2	-0.5
Exports	0.3	1.7	3.0	-2.2	-0.8	1.4
- Crude oil and natural gas	-3.6	-0.1	6.1	0.5	-4.0	4.3
- Traditional goods	3.3	2.6	3.8	-1.8	2.1	-2.0
Imports	9.3	-3.1	-2.5	3.0	0.8	-2.5
- Traditional goods	8.6	-2.0	3.7	-2.1	6.2	-0.5
Gross domestic product	2.0	0.9	0.3	1.2	-0.8	0.3
- Mainland Norway	3.3	0.8	-0.0	0.8	0.3	-0.4
Labour market ³						
Man-hours worked	2.2	0.2	0.1	0.4	1.0	-1.3
Employed persons	2.4	0.7	0.7	0.0	0.6	-0.4
Labour force	1.4	0.8	1.0	0.1	0.1	-0.2
Unemployment rate, level ⁴	3.2	3.2	3.6	3.7	3.2	3.4
Prices						
Consumer price index ⁵	2.3	2.3	2.7	2.9	2.9	3.5
Export prices, traditional goods	1.2	0.1	2.2	4.0	4.0	0.9
Import prices, traditional goods	1.6	-2.3	1.3	4.4	-0.3	1.1
Balance of payment						
Current balance, bill. NOK	-14.3	46.9	27.2	37.3	36.5	52.1
Memorandum items (Unadjusted, level)						
Money market rate (3 month NIBOR)	5.7	6.4	6.0	5.8	6.4	7.0
Average borrowing rate ⁶	7.4	8.4	7.7	7.6	7.7	8.2
Crude oil price NOK ⁷	96.3	141.2	191.4	221.3	236.0	272.6
Importweighted krone exchange rate, 44 countries 1997=100	102.3	101.1	101.1	101.7	104.4	104.2
NOK per ECU/euro	8.46	8.31	8.19	8.11	8.20	8.10

¹ Figures for petroleum activities cover 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 1998 and 1999 are from the national accounts. The quarterly figures are from Statistics Norway's Labour force survey (LFS), since the new quarterly national accounts series for employment are too short for seasonal adjustment.

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

⁵ Percentage change from same period previous year.

⁶ Households' borrowing rate in private financial institutions.

⁷ Average spot price, Brent Blend.

stronger than in 1999. However, almost a third of the growth in the level of activity from 1999 to 2000 reflects a very sharp rise in electricity production.

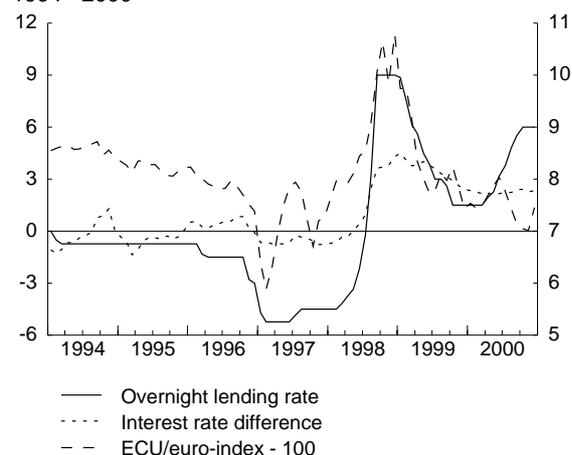
These developments are related more to the level of precipitation than to changes in activity levels in the rest of the Norwegian economy. Value added in manufacturing industry appears to be falling at about the same pace as in 1999, while the level of activity in private service industries is still boosting the average. As a result of some investment growth, mainland demand will increase slightly more in 2000 than in 1999 even though the increase in interest rates appears to be curbing growth in household demand in the second half of the year. Traditional merchandise exports will probably expand at about the same pace as last year, while developments in petroleum investment are restraining aggregate demand. Given the projection of fairly sluggish trends in the fourth quarter, employment is expected to show a rise of about half a percentage point also on an annual basis. Moderately stronger growth in the labour force may nevertheless mean that unemployment will edge up a few tenths of a point from 1999. If oil prices remain high until the end of the year, the current account surplus may reach about NOK 190 billion, equivalent to 13 1/2 per cent of GDP.

Monetary policy tightening contributes to curbing growth in the second half of 2000

According to the Ministry of Finance's budget indicator, the fiscal policy programme for 2000 may be considered cyclically neutral. Preliminary QNA figures on general government demand show developments that underpin this picture. On the other hand, monetary policy has shifted to a contractionary stance this year. Whereas Norges Bank reduced its key rates by 2.5 percentage points through the first three quarters of 1999, the central bank has increased them by 1.5 percentage points in the second and third quarter of this year. It appears that this policy shift will result in a money market rate of about 7 1/4 per cent at the end of the year. This is 3/4 percentage point above the estimated annual average and just 1/2 a percentage point below the level in the fourth quarter of 1998, which was the previous interest rate peak. Banks' lending rates have moved up with money market rates the last two quarters, and stood at about 8.5 per cent at the end of the third quarter. It is likely that these interest rates will edge up further in the fourth quarter.

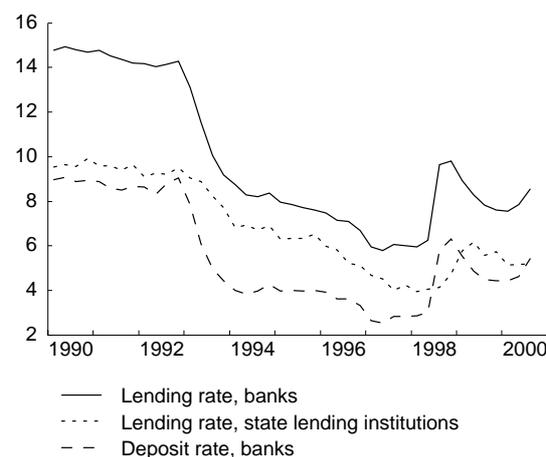
This year, the Norwegian krone has generally been stronger against the euro than in 1999, and stronger than a stabilization of the exchange rate would imply in the long term. A considerable interest rate differential between the Norwegian krone and the euro may have contributed to this situation, along with high oil prices and a strong dollar. Measured by an import-weighted basket of the currencies of 44 of our trading

Interest rate difference and exchange rate against ECU/euro, and Norges Bank's overnight lending rate 1994 - 2000



Source: Norges Bank.

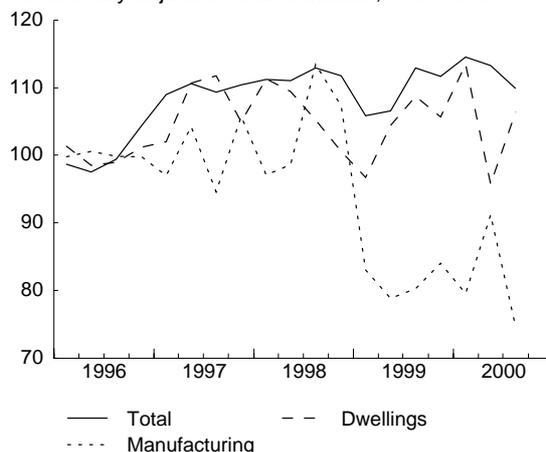
Lending rate and deposit rate Quarterly figures. Per cent



Source: Norges Bank.

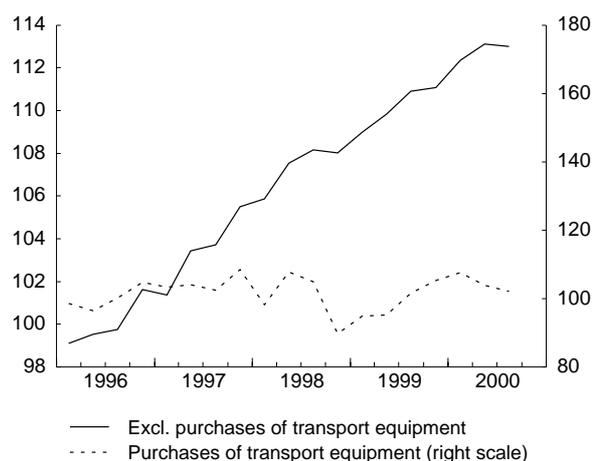
Gross fixed capital formation, Mainland Norway. 1996 - 2000

Seasonally adjusted volume indices, 1996=100



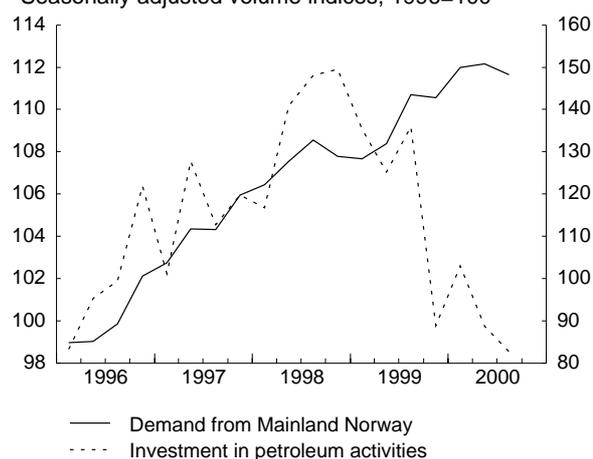
Source: Statistics Norway.

Consumption in households. 1996 - 2000
Seasonally adjusted volume indices, 1996=100



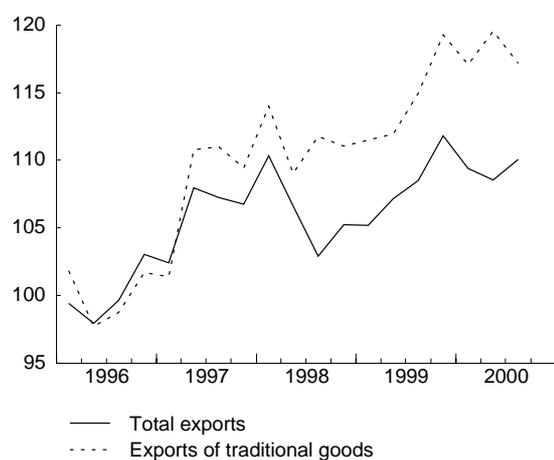
Source: Statistics Norway.

Demand from Mainland Norway and investment in petroleum activities. 1996 - 2000
Seasonally adjusted volume indices, 1996=100



Source: Statistics Norway.

Exports. 1996 - 2000
Seasonally adjusted volume indices, 1996=100



Source: Statistics Norway.

partners, the krone depreciated through the second half of 1999 and first half of 2000. This is partly ascribable to a substantial depreciation of the krone against the dollar and to a lesser extent against pound sterling and the Swedish krona. Over the last half year, however, the Norwegian krone has remained stable against pound sterling and strengthened against the Swedish krona. Despite a further weakening against the dollar, this has contributed to stabilizing the import-weighted krone exchange rate (measured on a quarterly basis). On an annual basis, the krone is thus likely to show a depreciation of more than 2.5 per cent measured by this exchange rate indicator.

Levelling off in mainland demand in the second half of 2000

Mainland demand fell moderately in the third quarter of 2000. This was primarily ascribable to private mainland investment, with investment in manufacturing and other goods-producing industries contracting sharply. At the same time, the estimates for investment in the first and second quarter have been revised upwards to some extent compared with the previous report: Investment in goods-producing industries, excluding manufacturing, and in private service industries, excluding dwellings, has been revised upwards, while housing investment has been revised downwards to a considerable extent. The rise in housing investment from the second to third quarter and growth in housing starts through the quarter nevertheless imply that housing investment will show an increase on an annual basis, but not as much as previously assumed. Statistics Norway's investment intentions survey for the fourth quarter of 2000 also indicates that manufacturing investment will not fall further in the fourth quarter. Viewed in the light of the relatively high level of private mainland investment around the beginning of the year, it is thus likely that total investment will show some growth on an annual basis.

A further rise in housing investment in the period ahead is likely inasmuch as sharp growth in housing demand over a number of years has not been matched by an increase in residential construction. This has had an impact on prices for existing dwellings, which in real terms have risen by an average of 7 per cent annually over the last six years. This year, the rise in prices for existing dwellings appears to be markedly higher than this even though the increase in interest rates resulted in a levelling off and even a decline in market prices in the third quarter.

Household consumption also exhibited a sluggish trend in the third quarter of 2000 after expanding by 1/2 per cent in the previous quarter. Stagnation in consumption is in evidence for both purchases of new cars and other consumption items. Estimated figures for purchases of second-hand cars from the business

sector push down the total further. Movements in the retail sales index up to end-October and figures on new car registrations up to end-November do not point to a rise in consumption in the fourth quarter of this year. Total household consumption growth is thus likely to be about 2.5 per cent on an annual basis.

It is natural to view the slowdown in household consumption in the third quarter of 2000 in connection with the rise in interest rates through the second and third quarter and comments by market operators that the general interest rate level would increase further in the fourth quarter. As in 1998, it seems that households reacted so quickly to signals of higher interest rates that after the event this may appear to be an overreaction. This is particularly likely if the perception that the interest rate peak has now been reached takes root.

Household real disposable income is set to increase by a little less than 2.5 per cent this year. This means that the saving ratio will remain at about the same level as in 1998 and 1999. Transfer payments are contributing to pushing up growth in disposable income. With relatively moderate growth in household investment in dwellings and other fixed assets, it appears that net lending for the sector will remain at about the same level as in 1999. Credit market statistics for the first half of the year suggest, however, that net financial assets showed a weaker rise than this when adjusted for equity price movements. Discrepancies between these sources are not uncommon, however, even though the deviation may seem to be slightly higher than usual in 2000.

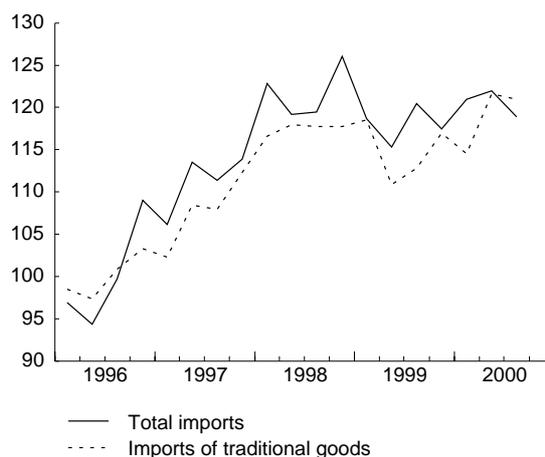
Sharp decline in petroleum investment

Petroleum investment has generally contracted the last two years, and is now about 25 per cent below the average for 1999 and almost 35 per cent below the level in 1998. The estimates in Statistics Norway's investment statistics for the fourth quarter indicate that petroleum investment will show little change through the remainder of this year. All in all, it thus appears that developments in petroleum investment entail a decline in demand for goods and services from Norwegian and foreign suppliers equivalent to 1 per cent of mainland GDP this year, following a negative demand impetus equivalent to 1 3/4 per cent of mainland GDP last year. By way of comparison, petroleum investment made a positive contribution to demand of 1 and 1.4 per cent of mainland GDP in the years of expansion 1997 and 1998.

Weak growth in traditional exports

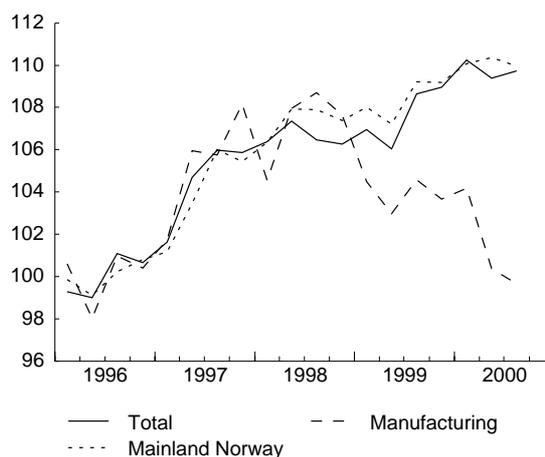
Over the last five-six years, growth in hourly wages in manufacturing has generally been higher in Norway than among our main trading partners. In the same period, the Norwegian krone appreciated against an export-weighted basket of our trading partners' cur-

Imports. 1996 - 2000
Seasonally adjusted volume indices, 1996=100



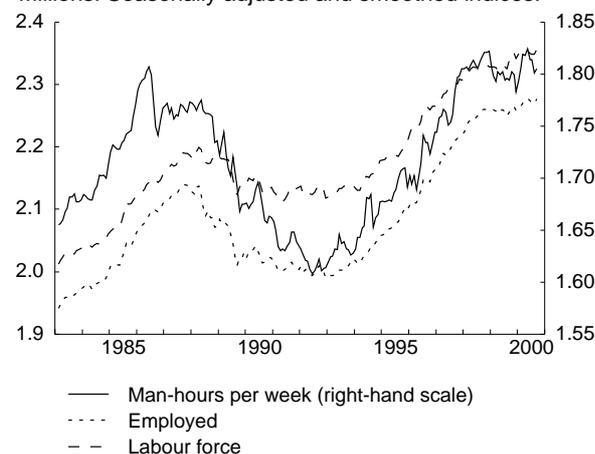
Source: Statistics Norway.

Gross domestic product. 1996 - 2000
Seasonally adjusted volume indices, 1996=100



Source: Statistics Norway.

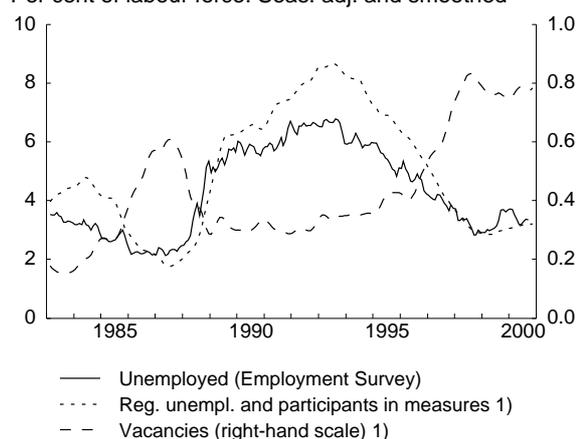
Labour force, employment and number of man-hours worked per week. 1983-2000
Millions. Seasonally adjusted and smoothed indices.



Source: Statistics Norway.

Unemployed and number of vacancies, monthly figures. 1983-2000

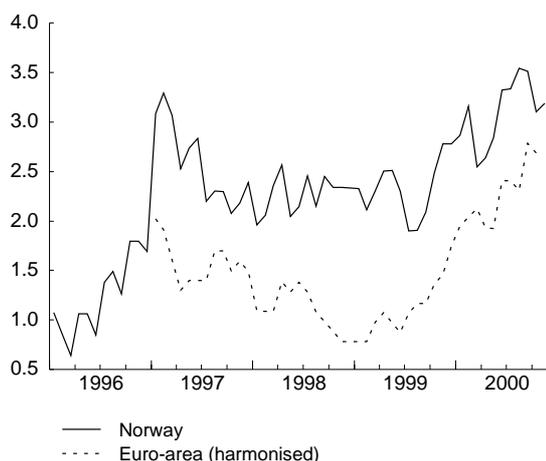
Per cent of labour force. Seas. adj. and smoothed



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

The consumer price index, Norway and euro-area

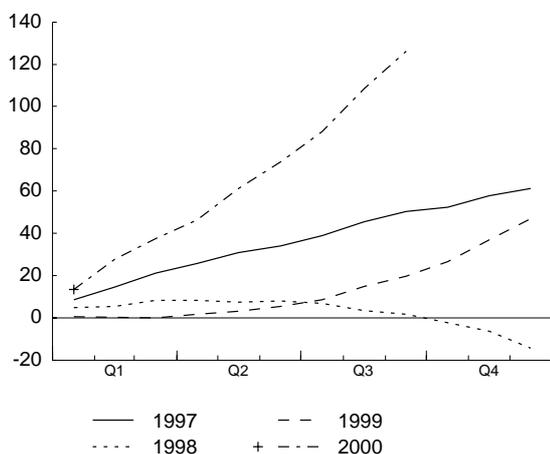
Percentage change from the same month the previous year



Source: Statistics Norway .

Current external balance 1997-2000

Cumulative figures in NOK billions month by month



Source: Statistics Norway.

rencies, albeit not to the extent that prevented hourly wage costs measured in a common currency from increasing on average by a good half a percentage point faster per year in Norway than among our competitors. This may have contributed to a decline in market shares for traditional merchandise exports both in 1999 and 1998, developments that appear to have continued this year.

Measured at constant prices and adjusted for normal seasonal variations, traditional merchandise exports fell by 2 per cent in the third quarter of 2000. For the first three quarters of the year as a whole, these exports were on a par with the level recorded in the second half of 1999, but nearly 3 per cent higher than the average for 1999 as a whole. About a third of this growth is ascribable to higher exports of electricity and a third to increased exports of engineering products. External trade statistics for the period to the end of October this year do not point to any marked rise in exports in the fourth quarter. Growth on an annual basis will thus be approximately on a par with the result recorded in the previous two years, and considerably weaker than in the period 1994-1997.

Prices for Norway's traditional export goods have as a whole risen sharply over the past year after having remained fairly stable through the previous four years. In the first three quarters of the year combined, prices were about 12 per cent higher than in the same period one year earlier. About half of this rise in prices reflects changes in prices for refined petroleum products. Price movements over the past year are partly related to the sharp rise in the dollar price for crude oil and some other commodity prices and partly to the appreciation of the dollar.

Pronounced rise in traditional merchandise imports

So far this year, the volume of imports has risen approximately in step with activity in the mainland economy. However, developments in imports of traditional goods have boosted the figure. This import component rose sharply in the second quarter, which must be seen in connection with an unusually brisk rise in imports of metals (particularly aluminium), measured in volume terms. The corollary to the increase in imports of metals in the second quarter is a rise of about the same magnitude in the item inventories and statistical errors.

Prices for traditional merchandise imports rose markedly from the fourth quarter of 1999 to the first quarter of 2000, but then remained fairly stable at a level that was nearly 6 per cent above the average for last year. As with exports, crude oil prices in particular have boosted the average. Including refined petroleum products, Norway has recorded a terms-of-trade gain for trade in traditional goods of about 5.5 per cent from the first three quarters of 1999 to the same

period this year. If we exclude prices for refined petroleum products, which are more important for export prices than import prices, the gain is reduced to a little less than 3.5 per cent.

Contraction in manufacturing production contributes to sluggish mainland GDP growth

So far this year, activity in the mainland economy has been growing at a slower pace than both mainland demand and traditional merchandise exports. This is naturally related to the sharp decline in petroleum investment, which has a particularly adverse impact on manufacturing. Value added in manufacturing has generally fallen since mid-1998. This year, it appears that value added will contract by about 2.5 per cent, approximately the same as in 1999. Private service industries, however, continue to show fairly high growth, albeit markedly weaker than during the cyclical upturn in the 1990s. There is considerable uncertainty, however, associated with the preliminary figures for production and demand for private service industries. So far this year, there are thus signs of a substantial deviation between the estimates for the supply and use of products from these industries. The deviations indicate that the estimated growth in production is too high and/or the estimated growth in demand (including supplies of intermediate goods to other industries) is too low.

Growth in goods-producing industries, excluding manufacturing, is set to be very high this year. This is related to a sharp rise in electricity production around the beginning of this year. With a seasonally adjusted unchanged level of activity from the third quarter until the end of the year, this industry will record output growth of nearly 20 per cent on an annual basis. Growth in this industry will thereby contribute a good half a percentage point to mainland GDP growth this year. This corresponds to nearly one third of the projected growth of 1.8 per cent on an annual basis.

Relatively stable labour market

Stronger growth in labour productivity this year compared with the previous five years points to a decline in the number of man-hours worked of around 1/2 per cent. Since there are two fewer working days this year than in 1999, employment will nevertheless probably increase by about 1/2 per cent on an annual basis. This is generally consistent with developments through the first three quarters of the year. Growth is primarily being fuelled by employment in the construction industry and in private and public service industries, while employment in primary industries and particularly in manufacturing will decline further this year.

It also appears that the labour force will expand by about 3/4 percentage point this year, i.e. moderately stronger than the growth implied by unchanged age- and gender-specific labour force activity (at the LFS

publication level). Measured as a share of the population in the age group 16-74 years, the labour force may increase from 73.5 per cent in 1999 to nearly 74 per cent this year. Seen in relation to the expected growth in employment, developments in the labour force imply that unemployment will edge up from 3.2 per cent in 1999 to 3.4 per cent this year. The Directorate of Labour's figures for the sum of registered unemployed and persons participating in labour market programmes have also moved up the past year, while the number of vacancies appears to have levelled off at the level recorded in 1998. The number laid-off also seems to have stabilized after showing a sharp rise through the first half of 1999.

Higher price inflation than in 1999, but slightly lower wage growth

As an average for the first ten months of the year, the consumer price index was 3.1 per cent higher than in the same period one year earlier. It now appears that price inflation will be of the same magnitude for the year as a whole. This is the highest rate of inflation in Norway since 1991, and 0.8 percentage point higher than the expected rate of inflation in the euro area this year. Movements in prices for housing services, petrol, electricity and beverages and tobacco have contributed to pushing up the year-on-year rise in prices this year, whereas changes in telecommunication rates and prices for food, clothing and footwear have had the opposite effect.

According to preliminary national accounts figures, wages per normal man-year rose by 5.2 per cent last year. The Technical Reporting Committee on Income Settlements has estimated that the average wage carry-over into 2000 was 1.3 per cent, against 3.1 per cent the previous year. Even though pay increases have been higher, and in some cases considerably higher, in 2000 than last year, the low carry-over will contribute to wage growth per normal man-year that is still nearly one percentage point lower than in 1999. As noted earlier, however, there are two fewer working days this year than in 1999. For salaried employees, this means that wage growth will be slightly higher measured per man-hour than when measured per normal man-year, estimated at 0.9 percentage point. An increase in sickness absence points in the same direction. Employers will also incur additional costs this year in connection with the agreed two extra vacation days in 2001.

Record improvement in the balance of payments

The current account of the balance of payments showed a surplus of nearly NOK 126 billion in the first three quarters of the year, an improvement of NOK 106 billion from the same period last year. The improvement in the current account reflects in its entirety the rise in prices for exports of crude oil and refined petroleum products. Despite a considerable

increase in Norway's net foreign assets since the end of last year, the interest and transfers balance showed little change. This may be because gross liabilities also increased considerably in the period and the average interest rate for foreign debt is higher than the average rate for financial assets. One factor that helps to explain this is that 40 per cent of the Government Petroleum Fund's capital is invested in equities, and that the portion of the return on equities in the form of capital gains is recorded as valuation changes in the balance of payments. A continued rise in crude oil prices from the third quarter until end-November points to a further increase in the current account surplus in the fourth quarter. On an annual basis, the surplus is now estimated at about NOK 190 billion. Based on the Ministry of Finance's estimate for the return on total wealth in the petroleum sector, an estimated NOK 130 billion of the projected surplus in 2000 may be considered a transfer of petroleum wealth to financial assets, while the remainder is a part of national saving.

Outlook for 2001 and 2002

Slower international growth

As discussed earlier in this report, GDP growth among Norway's trading partners is set to be 1 percentage point higher in 2000 than in 1999. Growth is then expected to slow gradually, with growth in 2002 down to about the same level as in 1999. Developments in the US are the main reason for this. Given these projections for our trading partners, market growth for Norway's traditional export goods will be 7 per cent in 2000, but will then decline in step with international GDP growth to 6.5 per cent in 2001 and close to 6 per cent in 2002. This scenario is identical to the one described in our September report. The relatively high level of cost inflation in Norway in recent years means, however, that traditional merchandise exports will grow at a substantially slower pace than market growth this year and the next, although this differential is expected to narrow in 2002. As a result of slower international growth, international interest rates are expected to remain relatively stable even though a marginal increase is possible both in the euro area and in the US next year.

The increase in the dollar price of crude oil the last two years has been stronger and more prolonged than most observers expected. In addition, the appreciation of the US dollar contributes to an even sharper increase in the price measured in krone terms. The average price in the first 11 months of this year was about NOK 250 per barrel, against NOK 135 in the same period last year. International commodity prices, excluding oil, have also edged up measured in dollar terms from the low level recorded in the wake of the Asian crisis. The appreciation of the dollar also means that the rise in prices has been considerably stronger measured in krone terms. Furthermore,

prices for a number of important Norwegian export goods, such as aluminium, have risen at a noticeably faster pace than the average for commodities and semi-manufactures as a whole.

The inflation rate abroad has risen considerably through 2000. In the US, the inflation rate is higher than or approximately the same as the rate in Norway, while the inflation rate in the EU is slightly lower. The rise in commodity prices has contributed to the increasing inflation rates as has growth in activity levels. In the period ahead, it is projected that a slower rise in prices, and to some extent a fall in commodity prices, will contribute to reducing inflation to about 2 per cent in the euro area in 2001. This will also contribute to a moderate rise in prices on the world market for processed manufactured goods. Monetary policy and estimates for exchange rates The import-weighted krone exchange rate appears to have depreciated by about 2.6 per cent from 1999 to 2000. This autumn, the US dollar has been unusually strong, and the euro correspondingly weak. Since the end of November, however, the picture seems to have been reversed. In line with typical market assumptions, we assume that in the period ahead the dollar will depreciate against the euro, while the Norwegian krone will only depreciate marginally against the euro and then remain close to an interval that is commonly thought to represent a stable exchange rate against the euro. All in all, we assume that the import-weighted krone exchange rate on an annual basis will show little change in 2001 and appreciate by 1.5 per cent in 2002.

Import prices measured in krone terms have increased considerably in 2000, partly as a result of the depreciation of the krone. With a fall in commodity prices and a strengthening of the import-weighted krone exchange rate, prices for traditional merchandise imports are expected to remain stable from 2000 to 2001 and then edge down in 2002. This is generally in line with our previous estimates. This change in import price movements, from clearly positive in 2000 to slightly negative in 2002, is part of the reason that price inflation in Norway is projected to be lower the next two years.

It is assumed that the money market rate will remain approximately unchanged from the current level and through the first half of 2001. In line with a slower rate of inflation and lower growth in the Norwegian economy next year, we project that interest rates will fall slightly in the second half of next year. It is still assumed that the money market rate in the euro area will increase to a little more than 5 per cent at the beginning of next year and then remain constant. We are of the view that this is compatible with expectations of slightly lower inflation in the euro area next year and moderate economic growth. These estimates for interest rates in Norway and the euro area are the

same as those presented in the September report. This means that the real interest rate in Norway will be appreciably higher than in the euro area in 2001, but particularly in 2002, since inflation in Norway is also expected to be slightly lower than in the euro area.

Considerable inflationary impetus from fiscal policy in 2001 and 2002

Following this autumn's budget negotiations in the Storting (Norway's parliament), relatively major

changes were made in relation to the Government's budget proposal. These changes primarily relate to tax policy and only to a limited extent to spending on purchases of goods and services and transfers for which our assumptions are based on estimates in the National Budget. In relation to the tax system in 2000, the following changes are of considerable importance in 2001:

- The general VAT rate is increased from 23 to 24 per cent (from 1 January)

Main economic indicators 1999-2002. Accounts and forecasts

Percentage change from previous year unless otherwise noted

	Accounts 1999	Forecasts							
		2000			2001			2002	
		SSB	MoF	NB	SSB	MoF	NB	SSB	NB
Demand and output									
Consumption in households and non-profit organizations	2.4	2.5	2.9	3	1.7	2.4	1 3/4	2.1	2
General government consumption	2.7	2.0	2.8	2 1/4	2.4	2.4	2	1.9	2
Gross fixed investment	-5.6	-2.1	-3.8	-3	-3.3	-3.2	-2 1/4	1.9	1/4
Petroleum activities	-12.6	-26.8	-22.6	-23	-8.7	-15.9	-12	4.9	2
Mainland Norway	-2.1	3.4	3.0	4	0.4	-0.1	1/2	1.9	0
Firms	-3.3	3.9	2.0	2 3/4	-1.2	-1.0	-2 1/4	0.9	-1 1/2
Housing	-2.2	3.5	8.2	11	12.8	8.5	8	6.9	2 1/2
General government	1.3	2.0	1.8	2 1/2	-4.3	-4.4	2	0.1	1 3/4
Demand from Mainland Norway ¹	1.6	2.5	2.9	3	1.6	2.0	1 1/2	2.0	1 3/4
Stockbuilding ²	-1.3	0.9	0.0	..	0.0	0.0	..	0.0	..
Exports	1.7	2.3	6.8	6	4.9	6.0	4 3/4	3.4	3
Crude oil and natural gas	-0.1	6.2	12.8	10	4.6	6.9	7	0.9	2 1/4
Traditional goods	2.6	3.5	6.0	4 1/2	3.3	4.7	4	4.5	4
Imports	-3.1	2.0	1.6	1 1/2	3.0	2.6	1 1/2	4.6	3 1/2
Traditional goods	-2.0	3.6	3.0	3 1/2	3.7	3.2	1 1/2	4.1	3 1/2
Gross domestic product	0.9	2.3	3.4	3 1/2	1.6	2.6	2 1/4	1.6	1 3/4
Mainland Norway	0.8	1.8	2.2	2 1/4	1.0	1.8	1 1/4	1.7	1 1/4
Labour market									
Employed persons	0.7	0.6	0.8	1/2	0.4	0.6	1/2	0.5	1/4
Unemployment rate (level)	3.2	3.4	3.3	3 1/4	3.5	3.3	3 1/4	3.5	3 1/2
Prices and wages									
Wages per standard man-year	5.2	4.4	4 1/4	4 1/4	4.1	4	3 3/4	3.6	4
Consumer price index	2.3	3.1	3	3	2.5	2 3/4	2 3/4	1.4	2 1/4
Export prices, traditional goods	0.1	11.0	7.7	10	1.0	1.2	2	-3.1	1 1/4
Import prices, traditional goods	-2.3	5.3	3.8	4	0.5	1.6	2	-1.3	1 1/4
Real prices, dwellings	7.5	10.9	..	8 3/4	3.6	..	1/2	5.3	3 3/4
Balance of payment									
Current balance (bill. NOK)	46.9	189.2	204.5	215	188.9	159.9	230	176.3	185
Current balance (per cent of GDP)	3.9	13.5	14.6	15	13.1	11.3	16	12.1	12
Memorandum items:									
Household savings ratio (level)	6.8	6.7	6.6	6 1/4	7.1	6.4	6 1/4	8.7	6 1/2
Money market rate (level)	6.4	6.6	6.7	6.7	7.1	7.1	7.4	6.8	6.8
Average borrowing rate (level) ³	8.4	8.1	..	..	8.9	..	..	8.6	..
Crude oil price NOK (level) ⁴	141	255	235	245	215	180	233	196	188
International market growth	5.4	7.0	..	..	6.5	..	..	5.9	..
Importweighted krone exchange rate (44 countries) ⁵	-1.2	2.6	..	2.5	0.1	..	0.0	-1.5	0.0

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

2 Change in stockbuilding. Per cent of GDP.

3 Households' borrowing rate in private financial institutions.

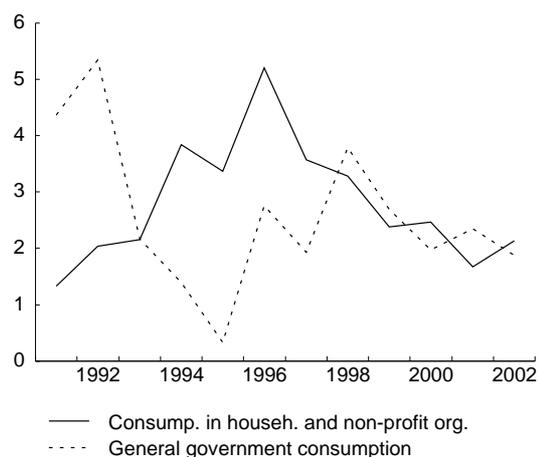
4 Average spot price Brent Blend.

5 Increasing index implies depreciation.

Sources: Statistics Norway (SN), Ministry of Finance, Nasjonalbudsjettet 2001 (MoF), Norges Bank, Inflasjonsrapport 3/2000 (NB).

Consumption

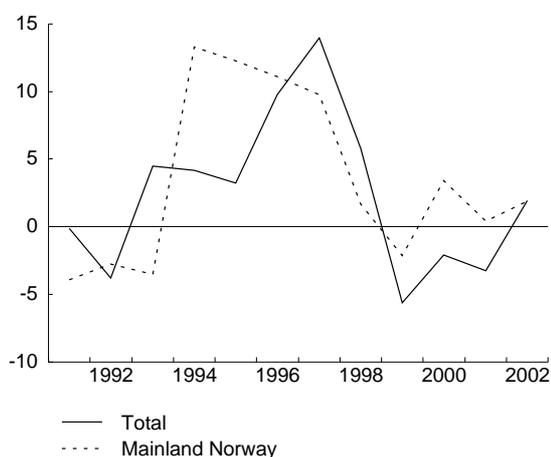
Percentage growth



Source: Statistics Norway

Gross fixed capital formation

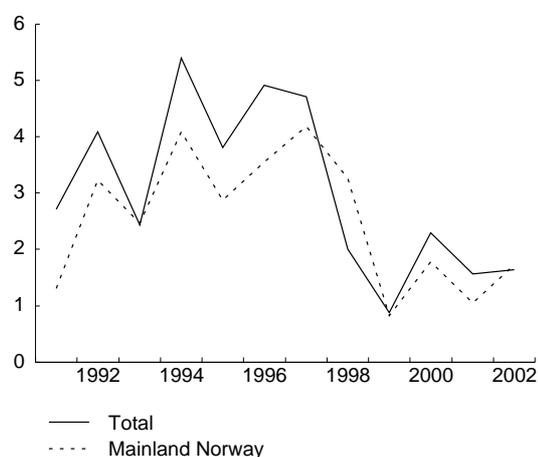
Percentage growth



Source: Statistics Norway

Gross domestic product

Percentage growth



Source: Statistics Norway

- VAT is introduced for a number of services (from 1 July)
- The VAT rate on food is halved to 12 per cent (from 1 July)
- The electricity tax and basic excise on heating oil are increased by 2.5 øre/kWh (from 1 January)
- The petrol tax is reduced in nominal terms in two stages (50 øre from 1 January and 32 øre per litre from 1 July)
- A supplementary tax of 10 per cent of the value of new commercial buildings is introduced (from 1 January)
- Reduced rates for the reducing balance method of depreciation (from 1 January)

In addition, some changes were made to the rules for direct personal taxes, which contribute to a higher tax on dividends and housing, and it was announced that the investment tax would be abolished with effect from 2002.

The changes in indirect taxes influence the inflation rate in both 2001 and 2002. The estimated effects are described in a separate box.

We have assumed a general inflation adjustment of direct and indirect tax rates from 2001 to 2002, in keeping with common practice when drawing up our projections for years when the final tax rates have not been approved.

Uncertainty about the impetus from petroleum activities

Petroleum investment has fallen sharply the last few years. This decline is expected to continue in 2001, albeit not on the same scale as in earlier years. So far, there are no signs indicating that the contraction in investment will come to a halt during the next year. However, surges in oil prices have often gradually resulted in higher investment in the past. We have chosen to apply this historical experience as a basis for our projections in this report and therefore assume that investment will increase somewhat from the end of next year and into 2002.

Oil and gas production in 2000-2002 is assumed to follow the same pattern as estimated in our last report. However, there is still a tendency for production estimates to be revised downwards over time. Gas production is expected to increase considerably the next few years, while oil production is projected to show little increase in 2001 and then decline in 2002. The petroleum sector will thus continue to contribute to higher growth in total GDP than growth in the mainland economy in 2001, whereas growth in these two measures in 2002 will be virtually the same.

The oil price, which has been higher than USD 30 per barrel this autumn, is assumed to fall to USD 26 per barrel in the first quarter of 2001 and then stabilize at USD 24 per barrel. With a declining dollar exchange rate against both the euro and the Norwegian krone, the oil price in krone terms will fall from NOK 255 per barrel in 2000 to a little less than NOK 200 per barrel in 2002. Historically, this is a high price. It is assumed that higher petroleum revenues, which result in substantial surpluses in general government budgets, do not result in a more expansionary policy in 2002 in excess of that which follows from assumptions concerning indirect taxes, as discussed above. This means that the revenue loss as a result of a possible removal of the investment tax in 2002 is assumed to be covered by an increase in other corporate taxes.

Household income and expenditure

It appears that growth in household consumption will be about the same in 2000 as in 1999 and the saving ratio will also remain approximately unchanged. After incorporating new revised figures for housing investment, growth in this component appears to be slightly lower than assumed earlier because the level at the beginning of 2000 has been revised down. Housing starts, however, have risen sharply and growth is expected to continue the next few years. Income growth and the high level of prices in the resale home market imply higher housing investment despite the increase in the real interest rate through 2000.

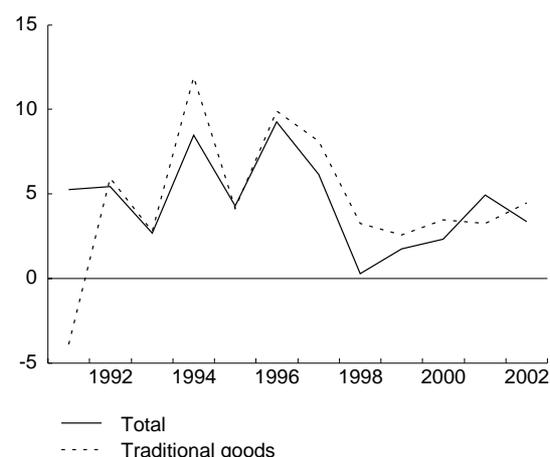
Higher interest rates and a slower rise in asset values (house and equity prices) imply an increase in the household saving ratio in the period ahead and moderate consumption growth in 2001 in line with the projections in our previous report. Such developments have already become apparent in 2000. However, given the sharp growth in housing investment, we expect households' financial saving to edge down next year.

Small changes in mainland investment

It appears that gross fixed investment in the mainland economy will expand slightly in 2000. With the exception of manufacturing investment, growth is fairly evenly distributed across industries. In 2001, slower growth in the economy will curb the need for an increase in the stock of fixed assets and hence investment. General government fixed investment is expected to be lower next year and the decline in manufacturing industry will continue, albeit fairly marginally. The supplementary tax that is being introduced for new commercial buildings must be expected to curb investment in 2001 followed by an increase in 2002, particularly if this tax is abolished. In isolation, this contributes to shifting some investment from 2001 to 2002. The possibility that the investment tax will be abolished in 2002, in line with the budget compro-

Exports

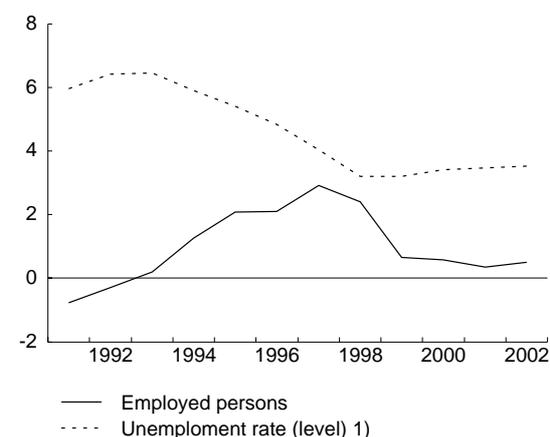
Percentage growth



Source: Statistics Norway

Labour market

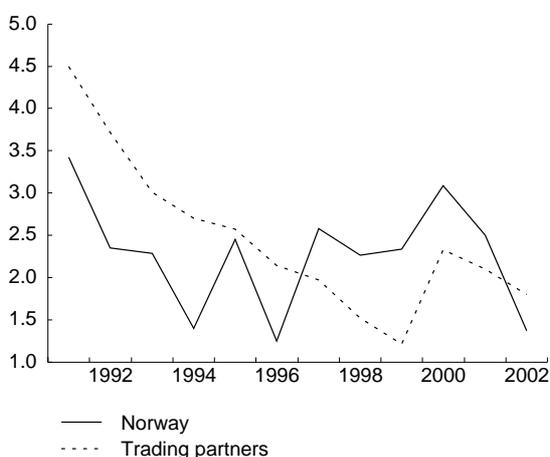
Percentage change



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

Consumer price indices

Percentage growth



Source: Statistics Norway

Consumer price inflation in 2000-2002

The consumer price index (CPI) was 3.1 per cent higher in October 2000 than at the same time last year. Price changes over the past year were substantially influenced by developments in energy prices. Excluding energy prices, the year-on-year rise in the CPI was 2.5 per cent in October this year. Combined with oil price changes, the sharp increase in electricity taxes at the beginning of 2000 has contributed to these developments. Changes in indirect tax rates in excess of a general inflation adjustment pushed up the CPI by an estimated 1/4 per cent in 2000.

The method for computing housing costs in the CPI was changed in August 1999 and January 2000. With effect from January 2000, Statistics Norway changed its method for calculating the CPI, with the incorporation of changes in rent on a monthly – instead of a quarterly – base. In the year of transition such a technical change can have a systematic impact on the consumer price index, and it appears that this has contributed to pushing up the rise in the CPI by about 0.1 percentage point in 2000. The incorporation of a separate index for the rental market and a sharp increase in the weight for owner-occupied dwellings also pushed up the rise in consumer prices in 2000 by about 0.1 percentage point.

In 2001, a number of changes in indirect taxes have been approved. Changes in the VAT system play a particularly important role, but changes in other indirect taxes will also have an influence. In the following, we will look more closely at how these indirect tax changes will affect consumer price inflation through 2001 and 2002. We assume that the approved indirect tax programme for 2001 is continued in 2002, with a general inflation adjustment of unit tax rates. The main points are summarized in a separate table.

Estimated isolated effects of changes in selected indirect taxes (in excess of inflation adjustment) on price inflation (CPI) in percentage points

	2001 I	2001 II	2002 I	2002 II
VAT increase from 23 to 24 %	0.6	0.6	0	0
Half VAT on food	0	-1.3	-1.3	0
VAT on services	0	0.2	0.2	0
Fuel taxes	-0.2	-0.3	-0.1	0
Electricity and heating oil tax	0.2	0.2	0	0
Model-estimated total effect ¹	0.6	-0.6	-1.3	0.1

¹ May deviate from the sum of individual components due to rounding, repercussions from the economy and because the abolition of the radio/television tax with effect from December 2000 is included.

Changes in indirect taxes will influence the rate of price inflation over the next two years to a considerable extent. This is because the halving of VAT on food will not apply until 1 July next year. This effect is amplified by a further reduction in fuel taxes, but is offset by the broadening of the VAT base (VAT on services) from the same date.

In the first half of 2001, the indirect tax changes (initially an increase in the general VAT rate) will contribute 0.6 percentage point to the increase in the year-on-year inflation rate, while indirect taxes in the second half of 2001 will reduce the rate of inflation by 0.6 percentage point. If all ad valorem tax rates are kept unchanged, while unit tax rates are increased in step with the consumer price index, the rate of inflation in the first half of 2002 will be reduced by 1.3 percentage points due to changes from 1 July 2001. In the second half of 2002, indirect tax changes will, on the basis of the above-mentioned assumptions, not make a direct contribution to the rate of inflation.

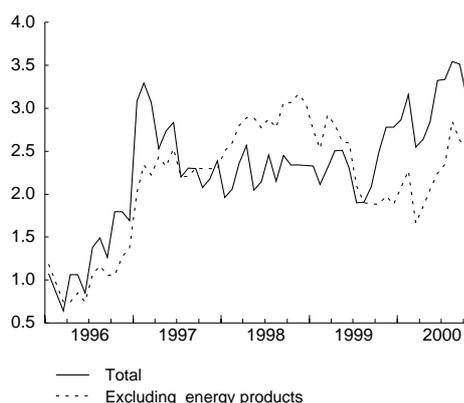
The exact effect of indirect tax changes on inflation in 2001 is shrouded in more uncertainty than usual because there are considerable changes that partly offset each other. The effect of indirect tax changes on the CPI will depend on to what extent the changes feed through directly to consumer prices, something that our figures largely assume is the case.

Inflation outlook

At the beginning of 2002 changes in indirect taxes will contribute to a noticeable rise in the consumer price index and the year-on-year rate of inflation may be well above 3.0 per cent. Reduced oil prices and a weak rise in import prices are gradually expected to contribute to lower inflation. On a year-on-year basis price inflation in 2001 will also be reduced as a result of the increase in oil prices through 2000. However, a slight increase in unit labour costs will have the opposite effect. Between June and July 2001 the

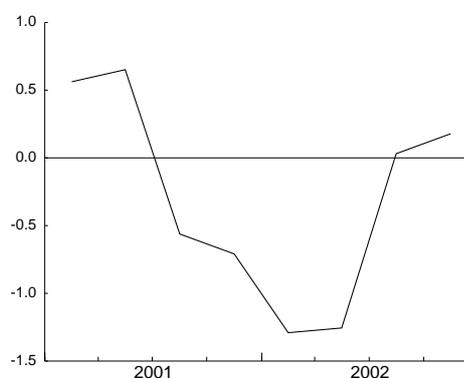
rate of inflation will fall markedly due to the halving of the VAT rate on food. Towards the end of 2001 the rate of inflation may fall to well below 2 per cent. In the first half of 2002, the inflation rate will fall further as the direct effect of the VAT increase is then eliminated, while the effects of VAT on food will still be present. In the second half of 2002, the inflation rate rises markedly as a result of the elimination of the direct effect of the halving of the VAT rate on food, and we are back to an inflation rate that is uninfluenced by the direct effects of indirect tax changes.

The consumer price index
Percentage change from the same month the previous year



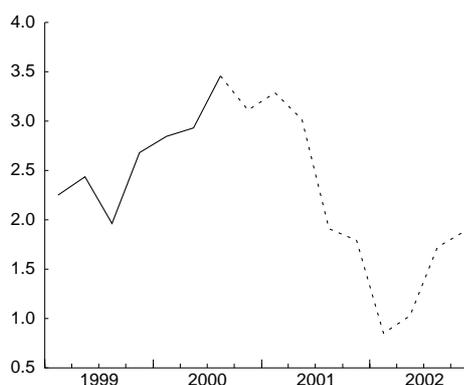
Source: Statistics Norway .

Effects of indirect tax changes on inflation (CPI)
Percentage points



Source: Statistics Norway .

The consumer price index
Percentage change from the same quarter the previous year



Source: Statistics Norway.

mise, has the same effect. On the other hand, reduced depreciation rates for enterprises are not expected to influence investment to any significant extent these two years even though qualitatively this points to lower investment. Higher investment is not expected in the power supply sector, for example in the form of gas-fired power stations. On the other hand, it is assumed that manufacturing investment will edge up from 2001 to 2002, partly as a result of the construction of a new aluminium plant in Sunndalsøra.

Moderate growth in the mainland economy

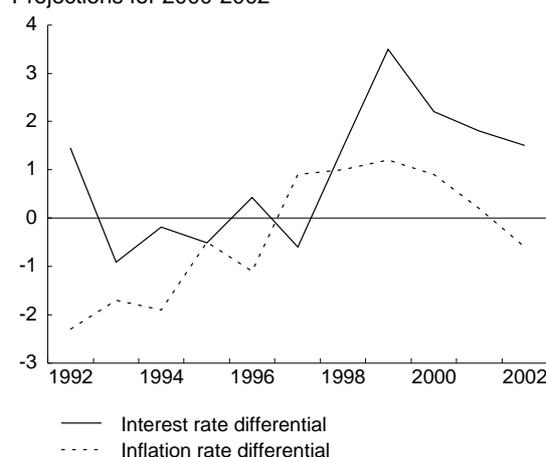
It is now estimated that mainland GDP will expand by a little less than 2 per cent in 2000. Growth is projected to slow next year to about 1 per cent. This partly reflects lower growth in mainland demand as a result of lower growth in consumption and investment compared with the previous year. Growth in traditional merchandise exports and imports, on the other hand, is estimated to show little change. Moreover, lower petroleum investment will contribute to reduced demand impulses for the mainland economy. Special factors, such as a decline in electricity production – which increased at a particularly fast rate in 2000 – also help to explain the low rate of growth in 2001.

For 2002, the growth rate is still expected to be higher, partly reflecting higher consumption growth and the effect of postponed investment from 2001. Moreover, traditional merchandise exports will again make a more positive contribution. The reason for this is that the loss of competitiveness will gradually be reduced, and with relatively stable growth in imports among our trading partners manufacturing industry will receive a boost from exports. In addition, higher ship production and higher petroleum investment will generate a positive impetus to manufacturing industry particularly in 2002. General government production generally shadows developments in man-hours worked in the sector, and it is assumed that man-hours worked will expand fairly steadily over the next two years.

Continued tight labour market

According to LFS figures, the unemployment rate is estimated at 3.4 per cent in 2000, only marginally higher than in 1999. The number of vacancies is still high, indicating pressures in the labour market. An increase in vacation days will, in isolation, contribute to a reduction in the number of man-hours worked, thereby bolstering growth in the number employed. This will recur in 2002. With more moderate growth in the economy next year, unemployment may edge up next year. In 2002, higher growth is expected to curb the decline in the number of man-hours worked. This will be amplified by additional vacation days so that, all in all, the number employed is expected to increase at a somewhat faster pace from 2001 to 2002 than in the previous year. Unemployment is therefore not expected to show any pronounced change in 2002.

Interest rate and inflation differential between NOK, and the ECU/euro. 1992-2002
Projections for 2000-2002



Sources: Norges Bank and Statistics Norway.

Indirect tax changes have varying effects on price inflation

It appears that consumer price inflation will be 3.1 per cent in 2000, which is slightly higher than in 1999. 0.2 percentage point of the increase in the inflation rate in 2000 reflects the revision of the method for computing housing costs in the consumer price index. The approved government budget will have a considerable influence on inflation in 2001. We will have an inflationary impetus from VAT as early as January which, in isolation, will push up price inflation by about 0.6 percentage point. A higher electricity tax will also contribute to higher inflation, but a lower petrol tax will have the opposite effect. With effect from 1 July, the VAT system will be changed with the introduction of VAT on services combined with a halving of the VAT rate on food and a further reduction in petrol taxes. The inflation rate will then fall markedly. In 2002, the direct effect of a higher VAT rate on prices will be eliminated, whereas the changes in mid-2001 will continue to be felt and not be eliminated until the summer of 2002. The effects of this on inflation are described further in a separate box. A faster rise in import prices and higher oil prices help to explain why the inflation projection for 2001 has been revised upwards by 0.3 percentage point compared with the previous quarterly report. The downward revision of price inflation of 0.4 percentage point in 2002 is partly related to the change in indirect taxes.

Along with indirect tax changes, we expect the import price development to play an important role for inflation in the period ahead. As noted above, we assume that the Norwegian krone will gradually appreciate from the second quarter of 2001 and through the projection period. This is primarily due to the assumption that the US dollar will depreciate against the euro, while the krone is expected to be relatively stable against the euro. This is the reason why import prices measured in krone terms will rise at a noticeably

slower pace in both 2001 and 2002 than in 2000 when the rise appears to be a good 5 per cent.

Productivity growth was modest in 1999, but now appears to be considerable in 2000. This largely explains why the sharp rise in import prices has not resulted in a greater increase in the inflation rate from 1999 to 2000 than has been the case. The very high growth in productivity from 2000 is not expected to continue the next few years, although growth will still be about 2.5 per cent, which is close to the historical average the last twenty years.

Wage growth will edge down from 1999 to 2000, according to our estimates. Growth in hourly wages appears to have slowed more in manufacturing industry than in the economy as a whole. In 2001, hourly wage increases will show little change compared with this year, but due to additional vacation days annual wage growth will fall slightly in relation to 2000. Lower international inflation in the period ahead will contribute to curbing wage growth in manufacturing and thereafter in other industries as well. Coupled with noticeably lower consumer price inflation in 2002, this will contribute to a decline in wage growth of about half a percentage point from 2001 to 2002. Pressures in the labour market will show little changes through the projection period and will therefore not contribute to changes in wage growth.

Very large current account surpluses

It appears that the current account surplus will now reach around NOK 190 billion in 2000, or 13.5 per cent of GDP. An appreciable fall in oil prices, which contributes to a terms-of-trade loss in 2001, will be offset by a sharp reduction in the deficit on the interest and transfers balance and slightly stronger growth in the volume of exports compared with the volume of imports. This means that the current account surplus will only decline marginally next year. The current account surplus is expected to decline to a greater extent in 2002 because the terms of trade are expected to deteriorate as a result of lower oil prices, but also because growth in the volume of imports is expected to pick up. Despite this, the calculations show a current account surplus of NOK 176 billion in 2002, equivalent to 12 per cent of GDP that year. The accumulated current account surplus in the years 2000-2002 is estimated at about NOK 550 billion and net foreign assets at NOK 940 billion, or 64 per cent of GDP.

Household sorting of waste at source*

Annegrete Bruvoll, Bente Halvorsen
and Karine Nyborg

How much time and energy are used to sort household waste, and should the time spent on sorting be taken into account? We asked a random sample of the Norwegian population about their waste sorting activities. Nine out of ten reported that they sort at least one type of waste, and on average, each of those asked reported that they use close to a half an hour a week for sorting. Four out of ten reported that they use hot water to clean the materials. On average, they are willing to pay NOK 176 a year so that others can do the sorting for them. And even though some perceive the activity as a mandatory requirement, moral motives for sorting at source are also widespread.

1. Introduction

The Norwegian government has stated as an objective that at least 75 per cent of the waste in Norway shall be recycled or energy recovered by the year 2010 (Report no. 8 to the Storting, 1999-2000). This increased reliance on recycling implies more sorting of different waste components by households.

Households already sort a large amount of waste. We wash mackerel tins, fold milk cartons and carry jam jars to the recycling collection container on the street corner. The share of household waste that was delivered for material recovery increased from 8 to 33 per cent from 1992 to 1998 (Statistics Norway 2000). The systems for collecting and treating sorted household waste have been expanded, but opinions are still divided concerning the environmental effect. The actual size of the additional costs of increased sorting at the source is also unclear, and it is uncertain to what extent households actually perceive their contribution as a cost.

In an analysis of the social costs of waste treatment, a value was placed on the time households spend on sorting waste (Bruvoll 1998). The value constituted a substantial share of the total costs of material recovery. This gave rise to a debate on the valuation of households' use of time. It was maintained that "households' work on sorting is put at a very high

cost" (Holm 1998), that "many households may consider sorting to be so meaningful that it would be unreasonable to place a cost on it at all" (Kronen 1998), and that one must "question how real this cost is (...) both because the time spent on it is very low per day and because the activity is voluntary" (Hanssen and Magnussen 1998).

Against the background of this discussion, it is useful to find out more about the extent of the time spent on sorting and households' attitudes towards this time use. In this article, we present the results from a survey asking the respondents about the extent of and attitudes towards their own waste sorting activities. Data from surveys will always be associated with some methodological problems. However, if we wish to obtain a picture of households' contribution, we must either resort to surveys or to laboratory experiments. So far, very little information about households' waste sorting activities has been available.

The data presented in this article was collected by Statistics Norway's Omnibus Survey, conducted in November and December 1999. The Omnibus Survey includes routine questions about several background variables such as age, gender, family status, income, etc. In addition, commissioned questions are included. In this survey, the respondents were asked questions concerning their attitudes towards source separation (as reported here), smoking and communal work. A sample of 2,000 respondents in the age group 16-79 years were drawn from the Norwegian population in two stages, in accordance with Statistics Norway's standard sampling procedure. The net sample, for which we report the results, consists of 1,162 respondents, i.e. the response rate was slightly less than 60 per cent. For 76 per cent of the sample, the respondents were interviewed in person in their

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own home, while the remainders of the interviews were conducted by telephone.

In interpreting the results below, one should bear in mind that there are several possible sources of errors in surveys like this one. In our case, *interviewer bias* may for example be of importance; i.e. respondents may exaggerate their recycling efforts in order to please the interviewer. Also, it is possible that recycling efforts are different among those who refused to participate in our study than among our actual respondents.

In the following, we discuss the time use, the extent of waste cleaning and use of energy in cleaning the waste in households. Then, we shed some light on the motivation behind waste sorting and to what extent the work is perceived as a burden by the households. We also present figures on the stated willingness to pay in Norwegian households for others to handle the sorting for them. Finally, conclusions from the analysis are drawn and some concluding remarks are made.

2. Time and energy use

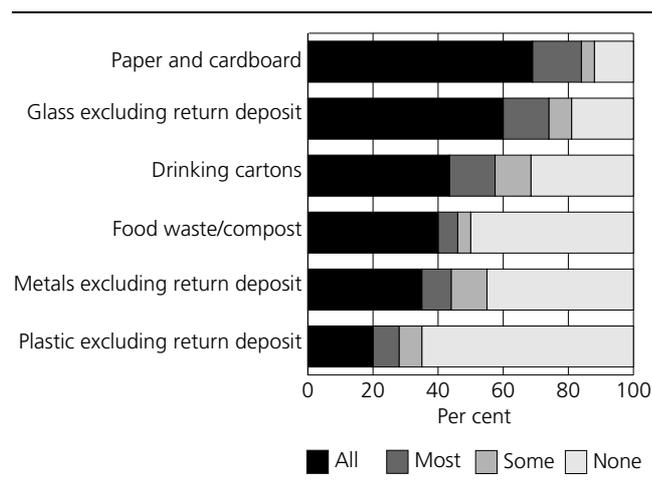
In the survey, 93 per cent reported that they sort waste, at least to some extent. In figure 1, we have plotted the percentage of the sample that reported that they sort all, most, some or none of paper, cardboard, glass, metal and plastic. The figure shows that the effort varies between different waste groups. This is not surprising since the scale and quality of the collection systems vary between the groups. Most respondents reported either to sort all or none of each waste group. Far fewer stated that they sort most or some. This may indicate that most people use rules of thumb concerning how to handle household waste. We see that sorting of paper, cardboard and glass is most widespread. 60-70 per cent reported that they sort all of this waste. Least widespread is the sorting of metal and plastic.¹

The responses presented in figure 1 are relatively high compared to the waste quantities actually collected from households and in relation to the return schemes that exist. For example, in 1998, collection schemes for sorted plastic waste were only available to about 10 per cent of households.² One possible explanation for this may be that the respondents have not taken into account that the return of beverage containers for their deposit was not to be included in the time used for sorting plastic, metal and glass.

2.1. Time-use for waste sorting

Figure 1 provides no information on the amount of time used for sorting waste in the households. However, we also asked the respondents how much extra

Figure 1. Share reporting that they sorted all, most, some or none of the various waste types. Per cent of all asked



Source: Omnibus Survey fourth quarter 1999, Statistics Norway

Table 1. Time spent on sorting waste. Minutes per week per person and hours per year per household. Average

How many minutes extra do you on average use per week for ...	Average for those who sort	Average for entire sample
... cleaning sorted waste	9	9
... folding, sorting and carrying sorted household waste	14	13
... transporting sorted waste to central depot. Disregard return deposit	7	6
Total	30	28
Total time spent per household per year in hours	44	41

Number of respondents: 1084 (those who source separate) and 1162 (entire sample)

Source: Omnibus Survey fourth quarter 1999, Statistics Norway.

time they used on different sorting activities. Table 1 shows the average time used per person, both for the entire sample and for only those respondents that reported to recycle. Respondents who sort their household waste report that they use 30 minutes a week doing this. Of this time, 9 minutes are used for washing the items, 14 minutes for folding milk cartons, sorting and carrying materials, and 7 minutes for transporting the sorted recyclables to a central reception depot.

If we calculate the average use of time for the entire sample, i.e. including the 7 per cent who do not recycle, each person uses an average of 28 minutes a week for sorting at the source. Our survey comprised only adults, and the question related to one's own sorting, not the total contribution in the household. If we assume an average of 1.7 adults in each house-

¹ Here we do not include the return deposit, as for example for soft drink bottles and beer cans.

² Figures for 1999 are not yet available.

hold³ and that all sorting in the household is performed by adults, the total figure in table 1 will correspond to an average use of time per household that sorts of 44 hours a year.

In order to see the contribution in connection with the government's aims on household recycling and the usefulness of the contribution, we have calculated the time-use per tonne of sorted waste. Some materials take a considerably longer time to sort per tonne than others. For example, it takes more time to wash and sort a kilo of milk cartons than to sort a kilo of newspapers. However, we do not have detailed information on how much time is used for each waste type. Thus, we have to calculate an average for all waste that is sorted. If we assume that our survey is representative of the adult population, we can distribute the time-use on the 452,000 tonnes of household waste delivered for material recovery by Norwegian households (Statistics Norway 2000). Then, irrespective of fraction, an average of about 185 hours is used per tonne of sorted household waste.

Is the reported use of time high?

How does the reported time-use compare to the results from other studies? The average 22 minutes weekly per person for cleaning, folding, sorting and carrying waste (see the first two lines of table 1) can be seen in relation to figures from Statistics Norway's Time Budget Survey in 1990-1991 (Statistics Norway 1992). In this survey, each person reported to use an average of 5 hours weekly washing dishes, cleaning and tidying the home. If we assume that the time spent on housework has remained approximately unchanged during the 1990s, it may imply that the time spent on sorting waste is equivalent to between 5 and 10 per cent of total time spent on housework, which may appear high. (Time spent on transporting waste to central reception depots comes in addition to the above figures.) There is some evidence in the literature that direct questions of the type we have asked may result in over-reporting in relation to data collected using time journals as used in the Time Budget Surveys (Marini and Shelton 1993), which is considered a more precise method.

The Swedish Consumer Agency (1997) found in a laboratory experiment that the cleaning of all packaging waste in a household during one week involves an average time-use of 22 minutes. In our data, 73 per cent of respondents who source separate reported to clean the waste, using an average of 14 minutes for this activity. If we assume that there are an average of

1.7 adults in each household, and that only adults are doing the source separation, then each household that cleans waste uses an average 23 minutes weekly on this activity. This is not much different from the Swedish Consumer Agency's figure of 22 minutes. However, the average Norwegian household consists of only 2.2 persons, whereas the Swedish Consumer Agency's test was based on a household of four persons. Our figures may thus be high compared to the Swedish Consumer Agency's estimate.

2.2. Use of energy washing waste

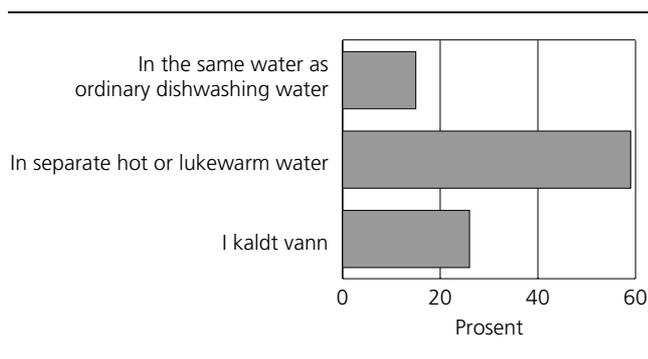
As previously noted, 73 per cent of the respondents sorting at the source report that they clean the waste. Of these respondents, almost 60 per cent use separate hot or lukewarm water (see figure 2). Respondents who state that they wash in hot/warm water use four minutes more weekly on cleaning waste than respondents who use cold water or the same water as for washing dishes. This results in higher energy use and expenditures for the household as well as higher costs associated with the use of water.

We have not asked respondents to estimate how much water they use cleaning waste. In the Swedish Consumer Agency's experiment, 22 minutes and 50 litres of water were used per week. If we assume that the relationship between time and water use to be the same as in the Swedish Consumer Agency's laboratory experiment, we can estimate energy and water consumption in washing recyclables. Using this ratio, we have estimated that households who clean materials in hot or warm water use 3.1 m³ of hot water a year. Assuming the water to be heated by 35 degrees C, this corresponds to an annual consumption of electricity of 126 kWh. This amounts to an annual increase in electricity expenditures of NOK 63⁴ for households cleaning waste in hot or warm water, assuming the electricity price to be NOK 0,5 per kWh (including taxes). If our results are representative for the Norwegian population, the total electricity consumption for washing sorted waste in Norwegian households will be approximately 100 GWh per year. This energy volume represents 0.3 per cent of total electricity consumption in Norwegian households, or half the amount of electricity to be produced at the proposed development of the Beiarn watercourse in Nordland County. If we assume the same relationship between water consumption and time use as above, households that wash waste in cold water use on average 2.5 m³ a year.⁵

3 This was the average number of adults per household in Norway in 1999.

4 NOK 1 ≈ US\$ 0,11.

5 The Norwegian National Health Association states that the average fee paid by households for water consumption is NOK 6.35 per m³ (excluding VAT). This includes both consumption-dependent and fixed charges, and therefore does not necessarily indicate households' extra costs for higher water consumption. Nor does it necessarily indicate the marginal costs of waterworks for obtaining extra water for consumers because the fees shall cover both fixed and variable costs.

Figure 2. Cleaning waste. Per cent of those who report that they clean waste for sorting

Source: Omnibus Survey fourth quarter 1999, Statistics Norway.

So far, we have *only* calculated the use of water for respondents who wash their waste and the use of energy for respondents who wash in separate hot or warm water. Many respondents, however, do not wash the waste, and only a share of those who do clean the materials in hot or warm water. In the first column of table 2, we have calculated the average contribution to sorting at the source for *all* households in the sample, i.e. including those who do not sort at all. The second column shows the estimated contribution per tonne of waste recycled. Here, we assume that households sort an average of 221 kilos of waste per year, which was the average quantity of household waste delivered for material recovery per household in 1998 (Statistics Norway 2000). Applying this, we estimate the use of energy at about 220 kWh per tonne of waste, valued at about NOK 110 (including taxes), and water consumption at 7.3 m³ per tonne of material recovered.

It is important to note that the numbers presented in the second column of table 2 are averages per tonne of *total sorted waste quantities*. The use of energy is distributed on all household waste delivered for material recovery, including newspapers, food and garden waste and textiles. Cartons, plastic, glass and metals, which account for the bulk of the waste that is washed in households, account for less than 10 per cent of the delivered household waste. Both time use and energy use per tonne are therefore higher for the waste types that are washed and less, or zero, for other types of waste.

2.3. Use of energy transporting sorted waste

Respondents who source separate state that they use an average of 7 minutes weekly transporting the sorted waste to a central reception depot (see table 1). It is reasonable to assume that a part of this time is used for driving, but how much is not revealed by our data. For the sake of comparison, we can illustrate the use of energy transporting the sorted waste by the petrol use per minute of driving. If we assume

Table 2. Households' sorting activities¹. Estimates. Average for all households and per tonne sorted waste

Contribution	Average per household	Per tonne waste
Total use of time	41 hours	186 hours
Energy use, washing waste	48 kWh NOK 24	218 kWh NOK 110
Water consumption	1.6 m ³	7.3 m ³

¹ Important assumptions:

- an average 1.7 persons who sort waste in each household.
- same relationship between use of time and water as in Swedish Consumer Agency (1997).

Source: Omnibus Survey fourth quarter 1999, Statistics Norway

an average speed of 40 km/h and a fuel consumption of 0.9 litres of petrol per 10 km, one minute of weekly driving corresponds to three litres of petrol a year per household. This amounts to approximately NOK 30 a year if we assume a petrol price of NOK 10 per litre. This corresponds to a cost of NOK 140 per tonne waste for each additional minute of weekly driving per household.

2.4 Sources of uncertainty

When drawing conclusions about an entire population based on a sample of respondents, there are several sources of uncertainty. In addition to the sources resulting from the procedure of sampling found in all surveys,⁶ some are particular to our survey. Some respondents may want to appear more positive towards waste sorting than they actually are. If this is the case, the reported contribution in the sample is higher and the reported attitudes towards sorting are more positive than is the case in the population in general. There is also a tendency to over-estimate the time used for boring activities, such as housework, in surveys. This may result in too-high figures on the time used for sorting.

In addition, several of the questions may have been difficult to answer for the respondents. First, it may be difficult to have a clear picture of the time used for waste management compared to the time use if one did not sort at source. Second, studies have demonstrated that respondents often have problems remembering how much time they used on activities not clearly distinguished from other daily chores. This may make it difficult to separate the time used for sorting from the time used for other housework, for example preparing dinner or house cleaning. Third, sorting is an activity that takes place frequently, but which does not take very long each time. It may therefore be difficult to estimate the weekly time-use with sufficient precision. In the data we also find that many respondents report "round" figures like 5, 10 or

6 See e.g. Bhattacharyya and Johnson (1977), Ch. 16, for more information.

Table 3. Motives for sorting waste among those who report sorting in the sample. Per cent figures add up to 100 for each of the statements (deviations due to rounding)

I sort partly because	Agree	Partly agree	Partly disagree	Disagree	Don't know
I perceive it as a requirement imposed by the authorities	38	25	11	26	1
It is a pleasant activity in itself	16	22	18	44	1
I want to contribute to a better environment	86	11	2	1	1
I want to think of myself as a responsible person	42	31	8	18	1
I should do what I want others to do	65	23	5	6	1
I want others to think of me as a responsible person	22	19	12	46	2

Number of respondents: 1102 (excluding those who do not sort at the source).
Source: Omnibus Survey fourth quarter 1999, Statistics Norway.

15 minutes per week for each activity, which indicate that the responses are rough estimates. This uncertainty may, for example, result in too high figures if the respondents have a tendency to round off the time estimates upwards.⁷

3. Why do we sort at the source?

As noted in the introduction, it is questionable whether time use for sorting household waste represents a cost for the society when we take into account that sorting is voluntary and that many perceive it as a meaningful task. In order to gain some insight into how households look upon their own contribution, we asked some questions to capture the motives that people have for source separation. We presented the respondents six different assertions and asked them to specify to what extent they agreed with these assertions. The assertions do not provide an exhaustive picture of the existing motives, and there may be motives other than those mentioned. The assertions mentioned were chosen to test some assumptions that figure prominently in the literature.

In table 3, we show the share of respondents sorting at the source who agreed, partly agreed, partly disagreed or totally disagreed with some assertions as to why they sort waste.⁸ In the following, we comment on some of these motives in further detail.

3.1. Because we feel it is mandatory?

Pursuant to the Norwegian Pollution Control Act, municipalities can require that households sort their waste, and can impose fines when this is violated. However, as far as we know, this is not common in practice. Nevertheless, a fairly high percentage of our respondents perceive sorting of household waste as a

mandatory requirement. Table 3 shows that 63 per cent of respondents who sort at the source entirely or partly agreed that they perceive sorting as a requirement imposed by the authorities. About a fourth entirely disagreed that sorting was based on a requirement imposed by the local government.

If a mandatory requirement is the most important motivation factor, we would expect to find that respondents who perceive sorting as voluntary are sorting less than others. We found, however, that respondents who entirely disagreed that they sort because it is required by the authorities use almost as much time sorting waste as others do. They sort just as much paper, drinking cartons and glass, which are the waste types for which collection systems are most widespread. However, they report that they sort somewhat less food waste, plastic and metals than others do. One interpretation of this is that most people are willing to sort some waste on a voluntary basis, but that the willingness to sort declines when sorting is expanded to include many types of waste.

3.2. Because we think sorting is a pleasant activity?

It is not obvious that everyone perceives sorting as a burden. Our survey shows that 38 per cent of the respondents who sort, entirely or partly agreed that sorting is a pleasant activity in itself (see table 3). Those who agreed with this sort waste somewhat more than others, and this applies to all waste types. More than half of the respondents who entirely agreed that sorting is a pleasant activity would prefer to sort themselves even if a firm could take over this activity for them at no extra cost. Of those who entirely disagreed that sorting is a pleasant activity, only 14 per cent replied that they would prefer to sort themselves.

7 For more information about distortions in surveys on the use of time, see Marini and Shelton (1993), Niemi (1993), Press and Townsley (1998) and Robinson and Godbey (1997).

8 In addition to the motives mentioned in table 3, it is well known that economic incentives, such as taxes on residual waste, encourage increased sorting at source (see, for example, Sterner and Bartelings 1999). In almost half of the Norwegian municipalities subscribers can reduce the waste fee by choosing between refuse collection services and those who deliver little waste will often choose the less expensive arrangements. The lottery that is held by Norsk Returkartong, where sorted cartons are drawn and the owner of the carton can win up to NOK 1 million, has proved to be effective for encouraging the sorting of drinking cartons. In addition to the possibility of winning money, people can experience a sense of excitement associated with the possibility of winning money. Our survey, however, provides no information on how important these motives are for our sample.

Nevertheless, most do not share the view that they sort partly because it is a pleasant activity as 62 per cent entirely or partly disagreed with this assertion.

A fourth of the respondents neither agreed that they sort because it is required nor because it is a pleasant activity. Why do they spend time sorting waste? We shall now look more closely at other motives that can contribute to explaining the participation.

3.3. Wanting a good environment

Environmental considerations represent the most obvious reason for sorting at the source. In our survey, 97 per cent of respondents who sort at the source entirely or partly agreed that they did this partly because they wanted to contribute to a better environment. A better environment may be considered desirable both for one's own sake or because others, for example, future generations, will benefit from it.

We also asked the sample to what extent they *believed* that sorting at the source contributes to a better environment. 85 per cent answered yes, while the remainder answered no or was uncertain. A lack of faith in environmental effects reduces sorting activities. Even so, most of respondents who did not believe in environmental effects also sort. More of the respondents who do not think it has environmental effects, sort because they perceive it as a mandatory requirement imposed by the government. As many as 72 per cent of these respondents entirely or partly agreed with this.

Making a considerable effort to benefit the environment will result in a noticeable cost for the individual in the form of time and energy, while the environmental gain of an individual's effort will barely be noticed, either for oneself or others. A person who is *concerned* about the environment will therefore not necessarily *contribute* to a better environment. As we refer to below, most people are not only interested in promoting a good environment but are also concerned about their own role. We shall discuss two variants of this type of motivation: *the pleasure of giving* and *moral responsibility*. These motives share many features, but provide different conclusions to the question of to what extent voluntary sorting at the source is to be considered a social cost.

3.4. The pleasure of giving

Andreoni (1990) suggested that voluntary efforts that benefit society can be explained by people's desire to feel the "warm glow of giving". The pleasure of giving may mean that the effort is worth the trouble for the individual even though the environmental effects of one's own effort is negligible. For a person who is primarily looking for the pleasure of giving, it will be an advantage if the authorities have plans for expanding household sorting arrangements, as long as this is voluntary. If, for example, containers for plastic waste are placed in each household, a small dose of

Table 4. Attitudes towards an expanded sorting system

Assume that the municipality expands the sorting system for households. Sorting is voluntary.	
Which of these statements do you agree with most?	Per cent
It is good that we take greater account of the environment, but for me personally it is a disadvantage that an even greater contribution is expected	26
It is good that we take greater account of the environment, and for me personally it is an advantage that I can increase my contribution	40
It wouldn't mean anything for me	34
Don't know	1

Number of respondents: 990.

Source: Omnibus Survey fourth quarter 1999, Statistics Norway.

good conscience can be felt simply by putting a bit of plastic into the container, while previously it was necessary to travel to the closest central collection depot.

In our survey, 40 per cent reported that it would be a personal advantage if the municipality expanded the arrangements for sorting by households (see table 4). It is thus conceivable that these responses were motivated by the pleasure of giving. In these questions, it was assumed that sorting at the source was good for the environment. It is difficult to imagine that the pleasure of giving motivation could be maintained if households stopped believing that sorting at the source has a positive environmental impact. If perceptions concerning this point were to change substantially, people's motivation must therefore also be expected to change.

3.5. Moral responsibility

Table 4 also shows that 26 per cent of those asked would consider an increase in arrangements for sorting at the source as a personal disadvantage even though the question specified that sorting was voluntary. It is conceivable that sorting is perceived as a duty even when it is not directly required by the authorities. One possibility is that people impose *moral requirements* on themselves. Many wish to look upon themselves as morally responsible individuals and, if necessary, are willing to sacrifice something to achieve it. In our survey, as many as 73 per cent entirely or partly agreed that they sorted because they wanted to think of themselves as responsible (see table 3).

Maintaining a self-image as morally responsible probably requires a genuine desire to do what one considers the right thing, such as making one's contribution to the work on improving the environment. A change in government policy can change people's perception of the individual's responsibility. Expanded arrangements for source separation in households may therefore entail stricter requirements which people impose on themselves if they are to continue

to consider themselves morally responsible. In isolation, this will be a disadvantage for the individual. On the other hand, expanded sorting arrangements may make the actual sorting process simpler so that people can sort more and feel even more responsible than before without using more time. We can therefore not say with certainty what people who are driven by their own moral requirements would have answered to the question in table 4. This is further analysed in Brekke et al. (2000).

In our survey, as many as 88 per cent entirely or partly agreed that they sorted partly because "I should do what I want others to do" (see table 3). This may be interpreted as a moral requirement people impose on themselves, cf. the simple golden rule. We find it reasonable to conclude that a feeling of moral responsibility is a widespread motive for household sorting.

3.6. Social acceptance

It is also conceivable that some feel that their standing among family members, neighbours and friends will diminish if they do not comply with the authorities' programme for sorting at home. An expanded system for sorting may then increase the requirements people feel that they must satisfy in order to gain the neighbour's acceptance. In that case it would, in isolation, be a disadvantage for the individual when the system is expanded. 41 per cent of those asked in our survey reported that they recycled partly because they wanted *others* to look upon them as socially responsible people (entirely or partly agreed, table 3).

3.7. Which motives entail a social cost?

Cost benefit analysis is a way of summarizing advantages and disadvantages of a political measure. It does, however, not provide a politically neutral answer to what is best for society. Considering sorting at the source to be a *social cost* in such an analysis is the same as saying that one believes that the effort represents a disadvantage for those who contribute, irrespective of the environmental consequences that are to be included. Since the various motives discussed above entail varying degrees of disadvantage, the motives underlying the contribution will also be of importance as to what extent the contribution represents a social cost and the possible size of this cost.

Many perceive sorting at the source as a mandatory requirement imposed by the authorities. This implies that the effort should be considered a cost for these respondents. There are also many indications that some respondents recycle on the basis of moral requirements they impose on themselves or because they feel a social pressure. For these people, extended recycling systems for households may be perceived as a requirement even though this requirement is not directly imposed by the authorities. In such cases it is also reasonable that the contribution represents a

social cost, although here there is room for more uncertainty than in the case of direct requirements.

On the other hand, there are some who report that they think sorting at the source is a pleasant activity in itself or who seem to be motivated by the pleasure of giving. For these respondents, source separation may represent a positive element in everyday life, and then the contribution should be considered a net social *gain*.

4. Would we prefer not to sort at the source?

Most respondents in our survey join several different motives. It is therefore difficult to draw clear-cut conclusions concerning the social value of households' waste sorting efforts on a purely theoretical basis. It is too simplistic to assert that sorting at the source is always regarded as compulsory, or to assert that sorting at source is always performed with pleasure. In order to indicate whether people experience their own effort as a personal disadvantage when we disregard the environmental gain from the effort, we asked the respondents several questions concerning their attitude towards and willingness to pay for others undertaking the sorting for them.

4.1. Attitude towards leaving the sorting to others

First, we asked the following question: "*Assume that a recycling company can make use of your waste. New technology makes it possible to sort waste centrally so that the environmental effect will be the same. The company collects the unsorted waste from your home. Would you make use of the offer if this did not increase your expenses, or would you prefer to sort yourself?*"

The question was asked all respondents who reported that they sorted waste at source. 72 per cent replied that they would make use of the offer, while 27 per cent would prefer to sort themselves. This indicates that the actual process of sorting is perceived as a burden for most people – but not for everyone. Among those who prefer to sort themselves, 60 per cent entirely or partly agreed that sorting was a pleasant activity, whereas only 31 per cent of those who would accept the offer agreed with this. It is, however, not certain that all respondents who reported that they would prefer to handle the sorting themselves really understood that the environmental effect was assumed to remain unchanged. If this is the case, they might want to continue sorting themselves in order to ensure a better environment. Moreover, some respondents may not perceive the offer as sufficiently credible, because in practice it is hardly feasible to sort in this way with satisfactory quality without substantial additional costs.

4.2. Willingness to pay to leave sorting to others

We also asked the respondents who agreed to the offer about their maximum willingness to pay for this

sorting system where a company takes over the sorting of all waste delivered from the household. The willingness to pay provides an indication of to what extent sorting at source is perceived as a cost for the household, and the size of this cost in money terms. The respondents were not asked directly about the value of the time spent on sorting. There are factors other than time and energy use for sorting that influence willingness to pay. For example, some respondents may be willing to pay to prevent having drinking cartons lying upside down to dry on the sink. Moreover, some respondents may answer what they think is a reasonable or fair price rather than giving an estimate of what the good or service is worth to them (see Kahnemann et al. 1986). Willingness to pay should therefore not be interpreted as a precise measure, but rather as an indication of the disadvantages of the time and energy used by households.

Of the respondents who would accept the offer, 35 per cent had a willingness to pay equal to 0, while 6 per cent were willing to pay more than NOK 1 000 a year. On average, the willingness to pay was NOK 243 a year among those respondents who would make use of the arrangement. At the same time, 27 per cent of the entire sample stated that they preferred to sort waste themselves. The latter were not asked the willingness to pay question. If we assume that respondents who will not accept the offer of free sorting are also unwilling to pay for it, the average willingness to pay for all respondents who sort at source is NOK 176 a year. Given the way the question was asked, it is reasonable to interpret this as willingness to pay per household, not per person.⁹

4.3. Willingness to pay per tonne

If we compare the reported willingness to pay with the quantities, assuming that each household delivers an average 221 kilo sorted waste per year (the average in 1998, see Statistics Norway 2000), this results in a willingness to pay of about NOK 800 per tonne sorted waste. If we deduct the estimated costs for heating water (see table 2), willingness to pay is about NOK 690 per tonne sorted waste. This is slightly lower than households' time cost estimates used in Bruvoll (1998), but still within the margins of uncertainty in this analysis.¹⁰

4.4. Willingness to pay per hour

Compared with the time spent on sorting reported by the respondents, the willingness to pay per hour is

relatively low. If we deduct the costs of higher electricity expenses, and adjust for the fact that willingness to pay is per household while the time used is per person, average willingness to pay for having the sorting done by others is only about NOK 3.50 per hour. This is a substantially lower valuation than NOK 53 per hour, which is the social value per hour of sorting work that was assumed in Bruvoll (1998). Bruvoll used the average hourly wages after tax as an estimate for the value of time used for leisure activities (see the Cost Calculation Committee 1997, 1998 for a more detailed discussion of the principles for the valuation of time). This must, however, be seen in connection with the time spent on sorting reported by our respondents which, as noted, seems to be fairly high.

However, there are considerable differences between respondents in the sample with regard to willingness to pay per hour. There is a clear tendency that respondents who use little time on sorting have a higher willingness to pay per hour than respondents who use considerable time. If, for example, we only look at households that use five hours or less on sorting per year, the average willingness to pay per hour is as high as NOK 173.¹¹

We would initially expect that respondents who feel that time spent on sorting is not a great burden sort more than others. One interpretation of this result is that the social cost per hour of sorting at source is relatively low as long as the sorting activity is considered voluntary. Those who find that the effort has considerable disadvantages simply refrain from making a major effort. On the other hand, costs may rise substantially if sorting is further expanded through requirements imposed by the authorities because then everyone will be forced to contribute, including those who experience the time spent on sorting as a considerable burden. If more waste is to be sorted at the source through mandatory requirements, this will primarily affect those who today contribute little and have a high willingness to pay per hour. This is also in line with the theoretical reasoning concerning motivation presented above. The social cost per hour must be assumed to be higher the greater the degree of compulsion that is applied.

5. Conclusions

Sorting at the source involves an extra use of time and energy in households. The people who were inter-

9 Note that this is not willingness to pay for a better environment, but rather the willingness to pay for having others take over the sorting work with no change in the environmental effect. Here, we asked about the weekly time use, but willingness to pay per year. This was done in order to make the question as simple to answer as possible. Experience shows, however, that the results can be rather different depending on the unit used, e.g. day, week or year.

10 In Bruvoll (1998) the social costs of households' use of time were estimated at NOK 1003 per tonne waste, with an interval of uncertainty of NOK 290-1715.

11 Note that some respondents who have not reported that they use extra time to sort waste have nevertheless reported a positive willingness to pay. This illustrates that willingness to pay cannot automatically be interpreted as a measure of the disadvantage of using time on sorting. For example, it is conceivable that some are willing to pay so they avoid having to use extra space for more refuse pails.

viewed in our survey reported a use of time on sorting that approximately corresponds to 41 hours per year per household. On the basis of the time respondents estimated that they used for cleaning recyclable materials, an additional cost for heating hot water for this purpose is estimated at NOK 24 per household per year.

It is not clear how sorting activities by households should be valued in cost benefit analyses. Our analysis shows that sorting activities by households are based on many different motives, in addition to the desire for a better environment. If sorting is perceived as a requirement, it should definitely be considered a cost for society. If it is perceived as a social or moral obligation, the answer is more uncertain, while for those who think sorting is a pleasant activity in itself or are motivated by the pleasure of giving, the effort can actually be thought to represent a net social gain. The survey shows that all these motives appear to exist, but this does not provide a basis for determining the motives that should be assigned the highest weight in a cost benefit analysis.

Seven out of ten would agree to have others do the sorting if this were possible. Many of these respondents would also be willing to pay for this offer. If we interpret willingness to pay as a measure of the disadvantages of sorting waste oneself, we find a willingness to pay others to take over the sorting process that corresponds to NOK 800 per tonne of waste. When we calculate willingness to pay per hour, we arrive at a fairly low value, but the time used is also fairly high. However, it is particularly those who use little time on sorting at source that have a high willingness to pay per hour. The hourly social cost of sorting may therefore increase sharply if people are required to make a substantially greater contribution than today. It is primarily those who sort very little and, at the same time, have the highest willingness to pay, who will then have to increase their contribution.

There are several sources of uncertainty associated with the figures we have presented here. Further studies are therefore required to provide more precise estimates of the net social cost of sorting activities by households. It should nevertheless be emphasised that monetary valuation and cost benefit analyses cannot alone provide final answers to which waste treatment alternatives are best for society. Such analyses primarily represent a way of summarising complicated information, but will always have to be supplemented by discretionary judgement.

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