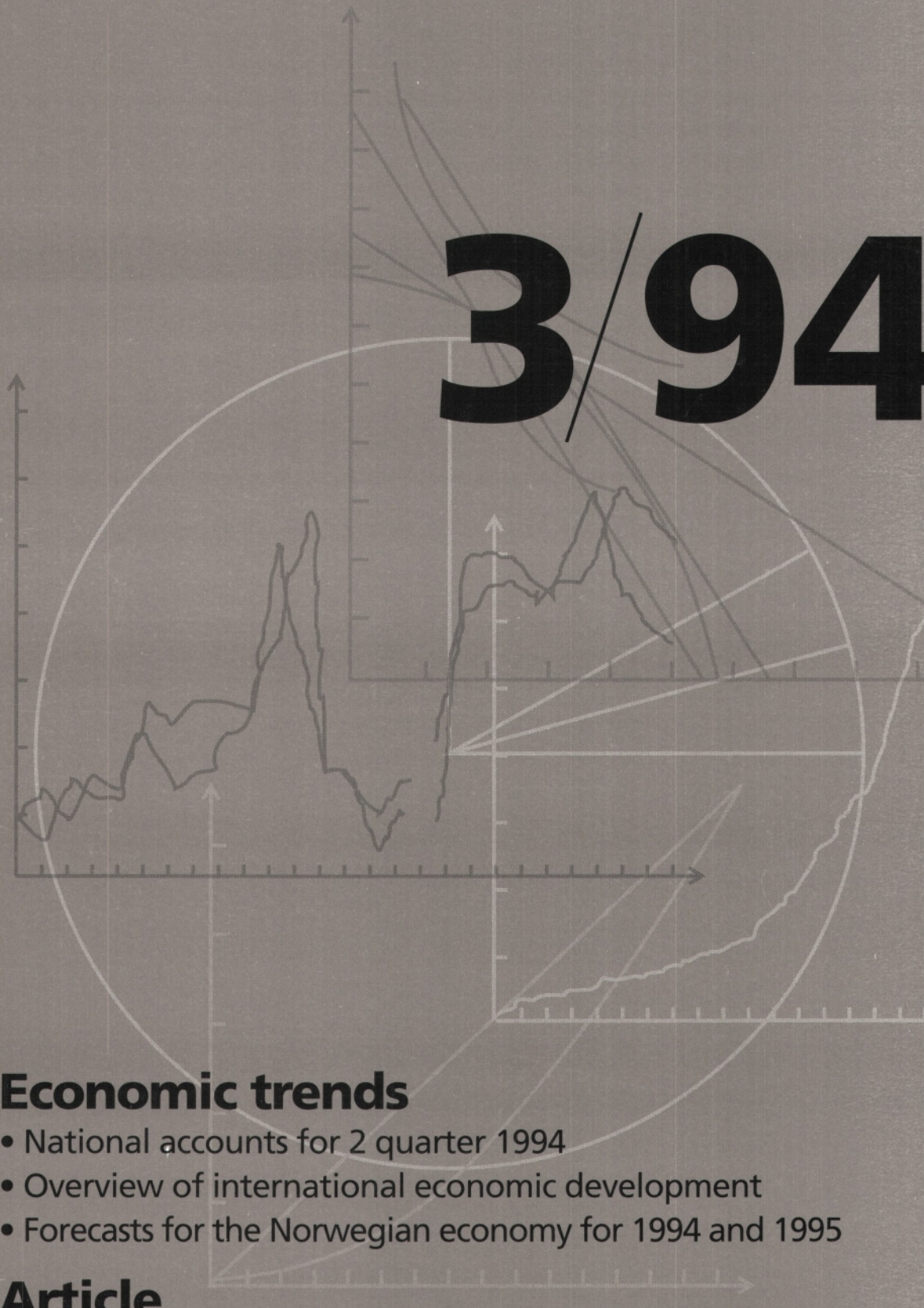
Economic Survey

Statistics Norway

Statistisk sentralbyrå

3/94



Economic trends

- National accounts for 2 quarter 1994
- Overview of international economic development
- Forecasts for the Norwegian economy for 1994 and 1995

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- Reducing NO_x emissions in Norway

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Economic Survey

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Economic Survey

is published four times a year by the Research Department of Statistics Norway. The Research Department was established in 1950. The Department has about 90-100 employees (Feb. 1994). The Research Department is today organized in four divisions. Head of Department is *Olav Bjerkholt.*

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Symbols in Tables	Symbol
Data not available	..
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Nil	0
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Economic trends

The Norwegian economy is experiencing its most pronounced upturn since the credit-fuelled boom of the mid-1980s. Mainland GDP growth will probably be a little less than 3.5 per cent this year and below 2.5 per cent in 1995. These figures are high seen against the background provided by the recession of 1988-1991, but in a long-term context growth rates of 2-3.5 per cent are still modest during an upturn.

Although mainland GDP growth this year does not diverge markedly from the average for the preceding two years, the sectors that are generating momentum are different. This is related to a shift in demand from public consumption and investment in oil activities to traditional merchandise exports, private consumption and housing investment. At the moment, however, there are no clear signs of a broadly based cyclical upswing in mainland fixed investment.

The decline in interest rates in Europe since the end of 1992 has contributed to an economic turnaround in some of Norway's trading partner countries. While growth projections for countries in western Europe were revised downwards from one quarter to the next up to the end of last year, the revisions during the first half of 1994 have been in the opposite direction. There is thus reason to expect a continued growth impetus from traditional merchandise exports next year.

The fall in interest rates through 1993 and into 1994 also contributed to boosting the Norwegian household sector's demand for dwellings and other consumer durables, and to the general rise in private consumption. There are now indications that the effects of this decline in interest rates are fading, and expectations of a continued drop in interest rates are clearly reduced. The scope for a further decline in European rates is limited, and as a result of several factors Norwegian market rates are now higher compared with European levels than just a few months ago.

Main indicators for the Norwegian economy
Growth from previous year. Per cent

	1993	1994	1995
GDP	2.3	4.4	2.5
Private consumption	1.7	4.3	3.3
Unemployment rate[1)]	6.0	5.7	5.3
Consumer price index	2.3	1.3	2.1

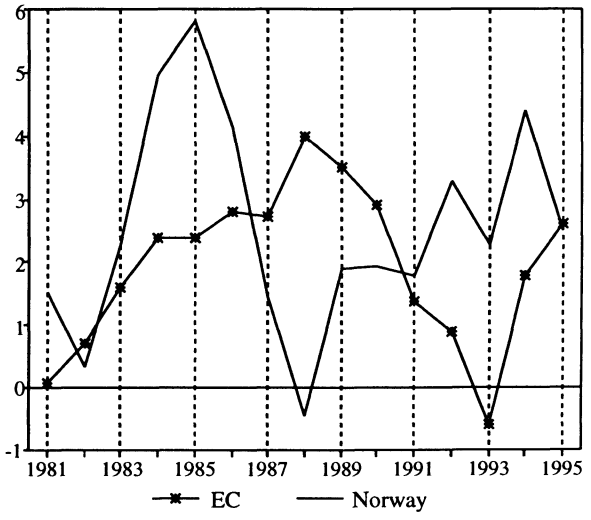
1) Level in per cent.

Price inflation, however, is historically very low, and there are few signs of a rise in the underlying rate. True, the inflation rate is expected to rise by about 1 percentage point between 1994 and 1995, but this must be viewed against the particularly low rate this year, which is partly explained by the effect on housing rents of the fall in interest rates through 1993.

Employment moved on a clear upward trend through last year and up to the second quarter of this year, and the favourable development will probably continue into 1995. With a relatively sharp growth in the labour supply, however, unemployment will only decline moderately in 1994 and next year.

The upturn in the Norwegian economy and the accompanying strengthening of the labour market both point to a reduction in public sector budget deficits. This is partly due to a decline in payments of unemployment benefits and growth in tax revenues when more people are employed, and partly a result of higher indirect tax receipts due to higher consumption, particularly when households shift demand to cars and other heavily taxed goods. In the years ahead there is reason to assume that the growth in oil production and decline in government oil investment will contribute to a marked improvement in public sector budgets, even in the absence of shifts in the economic policy stance. A high level of oil exports will also contribute to relatively large current-account surpluses both in 1994 and 1995.

GDP growth, Norway and European Community (EC)
Annual rates



Source: Statistics Norway and Consensus Forecasts.

International background

The outlook for economic developments in the OECD area appears brighter than just a few months ago. In Anglo-Saxon industrial countries, with the US leading the way, the economic recovery is firmly established, while continental Europe, and possibly Japan, seem to have passed a cyclical trough. It is likely that GDP growth for the OECD area as a whole will be around 2 1/2 per cent this year compared with a growth of 1.2 per cent between 1992 and 1993. Unemployment increased sharply in Europe last year, and is not expected to decline until next year at the earliest, even though economic activity is projected to pick up this year.

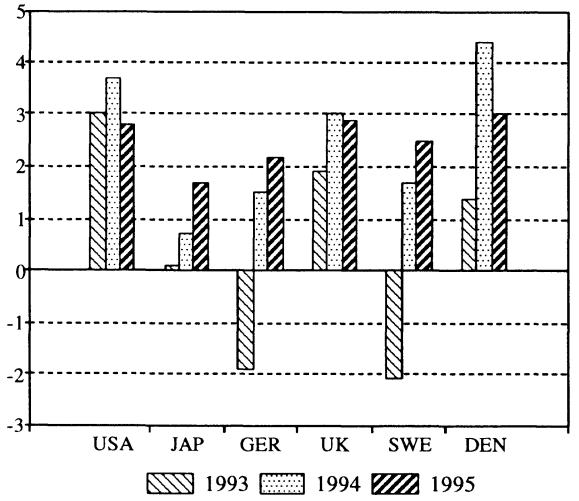
Preliminary second-quarter national accounts figures for the *US* show that GDP expanded at an annual rate of 3.8 per cent from the previous quarter, or slightly less than expected. Growth was primarily fuelled by a rise in exports and investment, although stocks also showed an unexpectedly large increase. The Federal Reserve has continued the progressive tightening of monetary policy to curb inflation. The Federal funds rates have been raised in five steps since February this year, from 3 to 4.75 per cent. The first four increases in rates created considerable turbulence in the bond market and resulted in a sharp rise in long rates, while the last increase in the funds rate was initially well received in financial markets. The increases in interest rates have been motivated by the growing risk of inflation following the strong economic upswing. The consumer price index rose by 2.8 per cent in the twelve months to July 1994, slightly more than earlier this year, but this can largely be attributed to higher prices for coffee and energy. The forecasts point to continued high GDP growth this year, but the rise in interest rates is expected to have a dampening effect in 1995.

In *Japan*, preliminary national accounts figures show that GDP increased by 3.9 percent at an annual rate between the fourth quarter of 1993 and the first quarter of this year. Exports and private consumption made the strongest contribution to growth, while private investment continues to decline. Independent analysts, however, have indicated that the reported first-quarter growth may be highly overstated as a result of new routines for seasonal adjustment. Available short-term data for June and July provide some indications that a turnaround in the Japanese economy is under way, but GDP growth is expected to be modest for 1994 as a whole. The public sector's strong financial position has enabled the authorities to conduct an expansionary policy over the past two years, and government measures are accounting for the positive growth figures. Japan has had four different prime ministers since July last year, and political problems are creating uncertainty about future developments. The surplus on the balance of trade remains high, more than USD 12 billion in July, and talks with the US on the removal of trade barriers are entering a difficult phase.

There is now clearer evidence that many large *European* countries, which have experienced the deepest recession since the Second World War, are recovering. The five largest EU countries are all expected to record positive GDP growth this year.

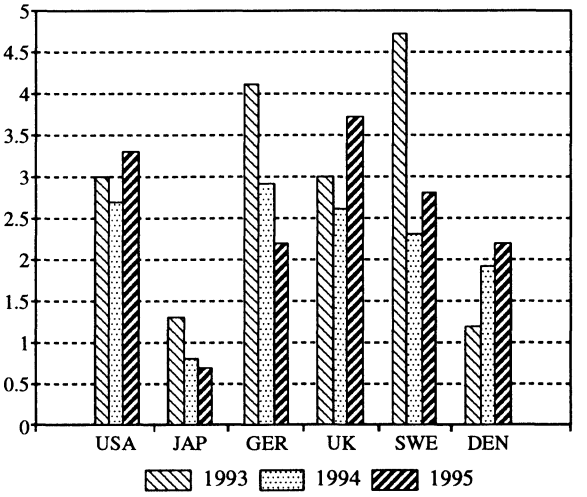
In *Germany* (west), GDP contracted by 1.9 per cent between 1992 and 1993 as a result of a sluggish trend in domestic demand and lower exports. Preliminary first-quarter national accounts figures show that GDP expanded by 2.1 per cent from the same quarter one year earlier. Even though random factors probably helped to boost this

GNP/GDP growth for selected countries
Per cent



Source: Consensus Forecasts and Statistics Norway.

Growth in consumer prices
Per cent



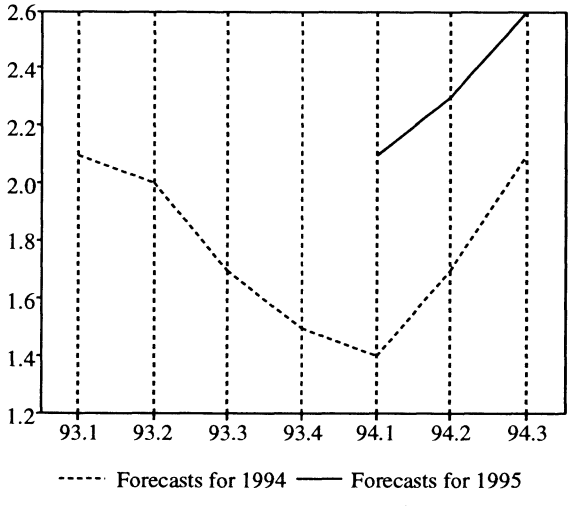
Source: Consensus Forecasts and Statistics Norway.

figure, short-term indicators from June and July also support the impression that a turnaround took place in the German economy during the first half of 1994. GDP is expected to expand by 1.5 per cent this year, rising further to a little more than 2 per cent next year. The somewhat brighter outlook must partly be viewed in connection with the Bundesbank's stepwise reductions in its key rates over the past two years. The discount rate is down to 4.5 per cent, while the Lombard rate is 6 per cent. Unemployment increased sharply last year and the number of persons unemployed continued to rise in the first half of 1994. In June, however, seasonally-adjusted unemployment fell for the first time since 1991, to 8.4 per cent.

In the eastern länder of Germany, GDP grew by 7.1 per cent last year, particularly as a result of strong investment growth financed through transfers from the western länder. A steep rise in exports is now expected to boost output growth, while private consumption will only show moderate growth in the period ahead. The increase in unemployment came to a halt in 1993 and the number of persons unemployed is now about 15 per cent of the labour force.

In the *UK*, it appears that economic growth will continue this year. Preliminary national accounts figures for the first two quarters of this year show an average 3.3 per cent growth from the same period one year earlier. The recovery, which started when the UK left EMS, lowered interest rates and let pound sterling depreciate, has thus far largely been fuelled by growth in private consumption and to some extent higher exports. Current consumption indicators imply that private consumption growth will again be high this year. As a result of substantial tax increases which became effective on 1 April, household real disposable income will probably rise only marginally this year, entailing that the saving ratio will fall between 1993 and 1994. Following the sluggish trend exhibited by private fixed investment in the initial phase of the recovery, there are now signs that investment is picking up, stimulated by low interest rates and high earnings in the business sector. GDP growth is projected at about 3 per cent in both 1994 and 1995. The number of persons unemployed fell substantially through 1993, a trend that has persisted in the first half of this year. Unemployment was 9.3 per cent in July, and is expected to fall further to 8.8 per cent next year.

GDP-growth forecasts for Norway's main trading partners for 1994 and 1995 given on different dates



Source: Consensus Forecasts.

In *Sweden*, exports and industrial production have shown a positive trend so far this year. This notwithstanding, the turbulence in capital and foreign exchange markets and the uncertainty concerning the economic policy to be conducted following the general election this autumn have reduced expectations of the strength of the recovery in the Swedish economy. Faced with steadily rising government debt accompanied by increasing interest expenditure, the Swedish Government was compelled in June to revise upwards its estimate for the 1994/1995 budget deficit. The GDP growth forecast for 1995 was also reduced from 3 to 2.5 per cent. Price inflation in Sweden was low in the first four months of 1994, but accelerated in May and June. In order to avoid a new flare-up of inflation as a result of a further depreciation of the currency, Sweden's central bank decided to raise interest rates in August. Contrary to expectations, the increase in interest rates resulted in a rapid depreciation of the Swedish krona, although the exchange rate has since strengthened somewhat. The labour market has shown signs of improvement over the past year. Unemployment was 8.8 per cent in July compared with 9.6 per cent one year earlier, and the forecasts point to a decline to about 8 per cent in both 1994 and 1995.

In *Denmark*, growth picked up markedly in the second half of 1993, primarily as a result of the expansion in private and public consumption. The turnaround in household demand approximately coincided with the announcement of the Government's expansionary policy. Preliminary first-quarter national accounts figures show a GDP growth as high as 5.2 per cent from the first quarter of last year. Growth is expected to remain high over the next few years in spite of the rise in interest rates. Growth is primarily being fuelled by domestic demand, but the decline in exports through the first half of 1993 has come to a halt. Based on an assumption of a gradual improvement in the international economy, exports are expected to pick up considerably through 1994 and next year. Unemployment rose through 1993 and the first few months of 1994. Later in the spring of this year, however, unemployment edged down, and was 12.3 per cent in June. There is still the prospect of a slight decline in unemployment in the period ahead.

Strong growth in the demand for oil was one of the factors contributing to the rise in *oil prices* – about USD 5 p/b – from the beginning of the year up to the beginning of August. Developments on the supply side, including a strike in Nigeria, have probably also had an influence. Prices have fallen in recent weeks, and at the beginning of September the price of Brent Bland was slightly less than USD 16 p/b compared with USD 14 at the beginning of 1994.

Norwegian economy

Developments thus far this year

Preliminary national accounts figures show that mainland demand continued to expand in the second quarter of this year, primarily as a result of a pronounced growth in fixed investment. Nevertheless, a main feature of the underlying development in the mainland economy over the past three years is growth in total consumption, while investment has fluctuated around a virtually constant level. Whereas public consumption increased markedly in both 1991 and 1992, private consumption has shown the strongest growth through 1993 and so far in 1994.

Figures for the second quarter, however, may indicate that consumption growth is levelling off to some extent. Following a downward revision in estimates for the household sector's electricity consumption in the first quarter of 1994, seasonally-adjusted growth from the fourth quarter of 1993 to the first quarter of this year is now calculated at 1.9 per cent, while second-quarter growth is estimated at 0.2 per cent. A moderate decline in consumption of non-durables was offset by continued buoyant growth in purchases of consumer durables. However, this category also showed slower growth between the first and second quarters of 1994, and the figures for new car registrations for July and August indicate that we may see a further decline in the seasonally-adjusted growth of purchases of consumer durables in the third quarter.

The rise in housing prices also seems to have tapered off slightly over the last few quarters, and housing starts have risen more slowly through the first seven months of 1994 than in the second half of last year. Even though this development may have been influenced by capacity constraints on the supply side, the development in housing starts may be an indication that the strong impetus to increased demand for fixed assets and consumer durables following the fall in interest rates through 1993 and into 1994 is abating.

Even though financial institutions' lending and deposit rates probably fell slightly in the second quarter of this year, there is reason to expect some levelling off in the period ahead. Renegotiations of fixed-rate contracts will contribute to a further decline, but a rise in interest rates in money and capital markets in the second and third quarter nevertheless indicate that there is little likelihood of renewed stimulus from interest rate movements to the real economy in the period ahead.

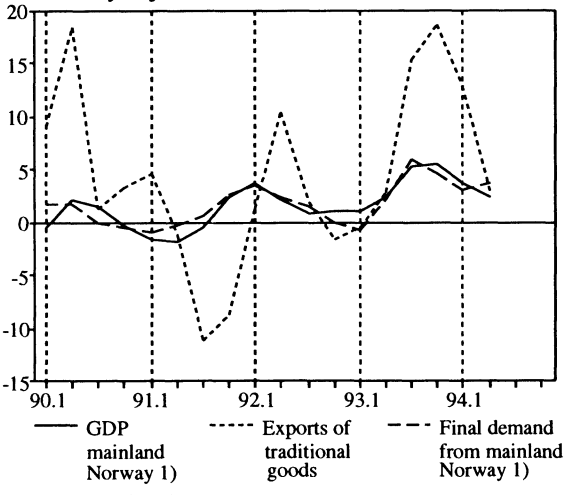
Mainland investment continued to pick up markedly in the second quarter of this year following a sharp decline in the previous quarter. Mainland investment, however, is still considerably below the level recorded during the recession years 1982/1983, even though manufacturing investment is noticeably higher. Statistics Norway's second-quarter investment intentions survey indicates approximately zero growth in manufacturing investment on an annual basis following a pronounced upward revision of the estimates over the past four quarters.

Accrued oil investment (seasonally adjusted) was approximately unchanged between the first and second quarter of 1994, and the second quarter level was a good 5 per cent below the quarterly average for last year. According to Statistics Norway's investment intentions survey for the second quarter, accrued oil investment is likely to decline by NOK 2.5 billion on an annual basis.

Like private consumption, traditional merchandise exports expanded sharply through 1993 and in the first quarter of this year. These exports, however, showed a moderate decline in the second quarter. If exports of energy goods and second-hand aircraft are excluded, however, QNA figures show seasonally-adjusted growth of about 1.5 per cent in both the first and second quarter of this year. A moderate decline in exports of oil and services along with a further pronounced fall in exports of ships and platforms contributed to reducing total exports by about 1 per cent between the first and second quarter.

The steep growth in traditional merchandise imports through 1993 continued in the first half of this year. Imports of engineering products have shown a particularly sharp growth over the past four quarters, probably as a result of changes in the composition of oil investment. Since the fourth quarter of last year, however, imports of cars and some other consumption-related goods have also picked up markedly. As a result of the sluggish trend in service imports and considerable decline in imports of

Cyclical development
(Per cent growth from previous quarter.
Seasonally adjusted and smoothed. Annual rates.)



1) Excl. oil and ocean transport.
Source: Statistics Norway.

Macroeconomic indicators
Growth from previous period unless otherwise noted. Per cent[1)]

		Seasonally adjusted[2)]				
	1993	93.2	93.3	93.4	94.1	94.2
Demand and output						
Private consumption	1.7	1.4	2.7	-0.1	1.9	0.2
Public consumption	1.8	-0.6	2.9	0.9	2.2	-0.4
Gross fixed investment	8.0	-8.4	27.3	-12.9	-2.5	12.9
- mainland Norway	-4.7	5.0	2.9	2.6	-9.2	8.1
- accrued petroleum investment[3)]	15.9	-4.9	47.7	17.2	18.6	-14.9
Final domestic demand from mainland Norway[4)]	0.7	1.4	2.8	0.5	0.3	1.1
Exports	1.8	7.3	-2.9	5.6	2.2	-1.3
- crude oil and natural gas	5.8	7.3	-4.1	14.0	1.1	-0.0
- traditional goods	3.0	8.2	-2.8	6.7	4.6	-1.2
Imports	3.3	3.9	7.3	-3.5	1.5	1.9
- traditional goods	1.7	1.8	6.4	2.7	4.5	3.8
Gross domestic product	2.3	0.9	2.7	1.2	1.5	1.0
- mainland Norway	2.0	0.8	1.8	0.7	1.2	0.6
Labour market[5)]						
Man-hours worked	0.0	0.3	-0.8	0.6	1.2	0.5
Employed persons	-0.0	0.1	0.4	0.5	0.1	0.3
Unemployment rate, level	6.0	6.2	6.1	5.6	5.4	5.8
Prices						
Cunsumer price index[6)]	2.3	2.5	2.2	1.9	1.2	1.0
Export prices, traditional goods	0.2	-0.5	-0.3	-1.3	1.3	-0.8
Import prices, traditional goods	0.4	-0.1	0.9	-0.3	-1.2	-0.2
Balance of payment (unadjusted, level)						
Current balance, bill. Nkr	17.1	7.6	4.1	0.1	8.1	4.8
Memorandum items (unadjusted, level):						
Eurokrone rate (3 month NIBOR)	7.2	7.4	6.1	5.6	5.1	5.2
Average lending rate[7)]	11.4	12.1	10.7	9.4	8.6	..
Crude oil price, Nkr (Spotprice Brent Blend)	121.9	126.2	121.8	112.2	103.0	113.3
Importsweighted krone exchange rate (1992=100)	102.8	102.1	107.6	103.7	105.3	104.6

1) Figures for 1993 may deviate somewhat from those published in Economic Survey 2/94 due to new information.
2) The method for seasonal adjustment has been changed.
3) Growth from previous year.
4) Private consumption + public consumption + gross fixed capital formation in mainland Norway.
5) Based on monthly figures, seasonally adjusted.
6) Percentage change from previous year.
7) Private financial institutions.
Source: Statistics Norway.

ships and platforms, total imports have shown a far slower growth than traditional merchandise imports the past year.

Mainland GDP expanded by a good 0.5 percentage point from the first to the second quarter of this year after slightly faster growth through the previous three quarters. Production in manufacturing and mining, which generally has been rising since the end of 1991, grew by 3 per cent. Private services showed only negligible growth, while the level of activity in goods-producing sectors excluding manufacturing and mining declined slightly.

Developments in the labour market through 1993 and thus far in 1994 provide further evidence of an upturn in the mainland economy. Employment rose last year, and continued to increase in the first half of 1994. This was also the case for the number of man-hours worked. Unemployed declined, and the positive trend has persisted in 1994. On a seasonally adjusted basis, about 5.5 per cent of the labour force was unemployed in the first half of this year.

The consumer price index rose by 1.1 per cent from January-July 1994 to the same period in 1994. On a year-on-year basis the rise in the consumer price index slowed in the period to May. The increase in some indirect taxes as from 1 July this year, however, contributed to boosting the 12-month rise from 1.1 per cent in June to 1.4 per cent in July.

The current account of the balance of payments showed a surplus of NOK 12.9 billion in the first half of 1994, or the same as one year earlier. Both the surplus on the balance of goods and services and the deficit on the interest and transfers balance were reduced between the first half of 1993 and first half of 1994.

Outlook for 1994 and 1995

The projections for macroeconomic developments in Norway in 1994 and 1995 are derived from Statistics Norway's macroeconomic quarterly model, KVARTS, based

Main economic indicators
Percentage change from previous year unless otherwise noted

	1993	1994			1995	
	Accounts	SN	MoF[1]	NB[2]	SN	NB[2]
Demand and output						
Private consumption	1.7	4.2	3.0	4 1/2	3.3	3
Public consumption	1.8	3.1	3.2	3 1/4	1.4	1 1/4
Gross fixed capital formation	8.0	5.8	..	1 1/2	2.9	2 1/2
- mainland Norway	-4.7	5.0	4.4	4 1/4	8.9	6 1/2
- accrued petroleum investment	15.9	-1.7	-8.0	-7	-5.9	-4 1/4
Demand from mainland Norway[3]	0.7	4.0	3.3	4 1/2	3.6	3
Exports	1.8	6.6	5.9	7	4.3	4
- crude oil and natural gas	5.8	11.8	12.8	12 3/4	3.3	2 3/4
- traditional goods	3.0	9.1	5.0	5 1/2	4.3	7
Imports	3.3	6.9	2.8	6 1/4	5.5	3 1/2
- traditional goods	1.7	13.9	5.0	7 3/4	4.5	4
Gross Domestic Product (GDP)	2.3	4.4	4.0	4	2.5	2 3/4
- mainland Norway	2.0	3.2	2.6	2 3/4	2.2	3
Labour market						
Persons employed	-0.0	1.7	1.0	1	1.7	1 1/2
Unemployment rate (level)	6.0	5.7	5 1/2	5 1/4	5.3	5
Prices and wages						
Wages per man-hour	2.7	2.8	2	2 3/4	3.6	2 1/4
Consumer price index	2.3	1.3	1 1/4	1 1/4	2.1	1 3/4
Export prices, trad. goods	0.2	0.6	3	3 1/4	10.6	2 1/4
Import prices, trad. goods	0.4	0.6	2.5		4.0	
Balance of payments						
Current balance (bill. Nkr)	17.1	19.0	19.9	22	26.4	29
Memorandum items:						
Money market rate (3 month NIBOR, level)	7.2	5.2	..	..	4.6	..
Average borrowing rate (level)[4]	11.4	8.4	..	..	7.8	..
Crude oil price Nkr (level)[5]	122.4	111.1	110	110	116.5	111.4
International market growth	1.0	5.8	..	5	5.9	7
Importsweighted krone exchange rate[6]	1.9	1.4	..	..	-0.6	..
Current balance in per cent of GDP	2.3	2.5	..	2.9	3.3	3.6

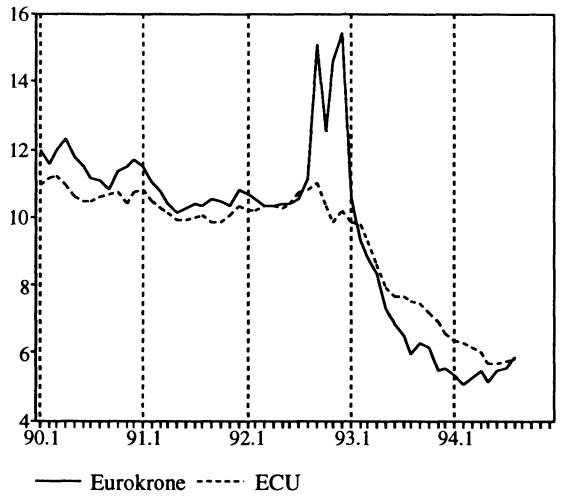
1) MoF: Ministry of Finance's forecasts. Final budget bill 1994.
2) NB: Forecast according to Penger og kreditt 1994/2.
3) Private consumption + public consumption + gross fixed capital formation in mainland Norway.
4) Households' borrowing rate in private institutions.
5) Average Norwegian oil production.
6) Positive entails depreciation.

on preliminary national accounts figures up to and including the second quarter of 1994.

According to the calculations, the expansion in mainland demand in the first half of 1994 will continue through the rest of the year and into 1995. The impetus to growth generated by the household sector is likely to be considerable this year, but will weaken slightly next year. Business fixed investment, however, will probably be stronger in 1995. Demand from the petroleum sector for goods and services produced in Norway will be reduced both years, particularly in 1995. External demand is also expected to be relatively strong in both 1994 and 1995. Mainland GDP growth is projected to pick up somewhat and this will result in relatively strong employment gains. The labour force, however, will also show a pronounced growth, entailing that the decline in unemployment will be moderate through the projection period. Consumer price inflation is expected to pick up marginally later in 1994, with price inflation projected at an average 1.3 per cent in 1994 compared with 2.3 per cent in 1993. In addition to inflationary impulses from abroad, a noticeably slower pace of interest rate reductions will contribute to slightly higher price inflation in 1995 than in 1994. Wage growth will also pick up.

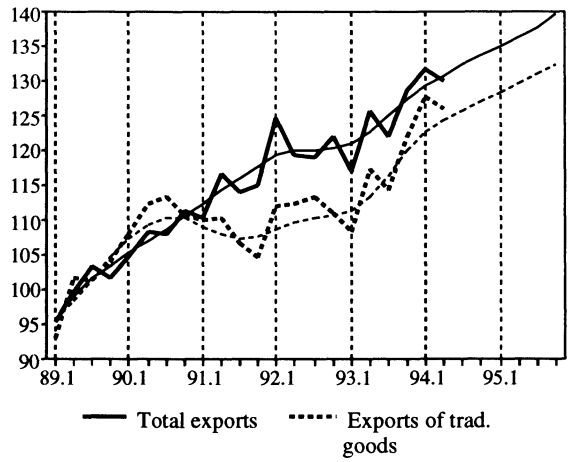
The forecasts for 1994 and 1995 are close to the projections presented in Economic Survey 2/94, but the current projection shows a higher growth in both imports and exports in 1994 and a less negative demand impetus from the reduction of stocks of traditional manufactured goods. Partly as a result of the strong growth in imports and less favourable terms of trade, there has been a substantial downward revision in the projection for the current account for 1994.

Short term interest rates
Per cent



Source: Central Bank of Norway

Exports
1989=100. Seasonally adjusted (QNA)
Seasonally adjusted and smoothed (KVARTS)



Source: Statistics Norway

The interest rate environment, the inflation outlook for 1995, public budget balances and developments in other key macroeconomic variables may depend on whether Norway becomes a member of the European Union (EU). The model-based calculations that have been made do not take account of this directly. As the projections are based on quantitative relationships estimated on the basis of historical data, the estimates are probably closest in line with the situation arising if Norway and its Nordic neighbours do not become members of the EU, provided this does not severely affect capital and foreign exchange markets or the investment outlook. The estimates for exogenously determined variables are also closest in line with the situation arising if Norway and its Nordic neighbours do not become members of the EU.

Exchange rates and interest rates

A further moderate decline in German short-term rates are expected this year, but in the light of improved growth prospects for the German economy, no further reduction is anticipated through 1995. With price inflation in Norway at a lower level than in the ECU area and the prospect of a further improvement in the current balance, conditions are favourable for a continued decline in Norwegian money market rates this year. Developments over the past few months, however, have resulted in greater uncertainty concerning future interest rate movements. Renewals of fixed-rate contracts will however probably result in a further slight decline in financial institutions' average lending and deposit rates through the second half of 1994 and in 1995.

In the projections we have assumed a dollar exchange rate of NOK 6.85 from the second half of this year and continued unchanged exchange rates from the beginning of September until the end of 1995. This entails a depreciation of the trade-weighted exchange rate of about 2 per cent this year compared with a good 3 per cent last year. The krone appreciated during the second quarter of 1994, entailing that our projections are based on a moderate strengthening of the trade-weighted exchange rate - measured as an average from 1994 to 1995.

Economic policy

The estimates concerning the use of resources in the general government sector are based on the Revised National Budget for 1994. Growth in public consumption in 1994 is put at a good 3 per cent while public sector investment is assumed to remain unchanged. Public consumption growth is expected to be highest in the local government sector. Local government investment is projected to rise slightly, but this will be offset by an equivalent decline in central government investment.

In 1995, public consumption and investment are assumed to rise by a good 1 per cent. The projections also embody assumptions of unchanged real tax rates and slightly lower excise duty increases in real terms than in preceding years.

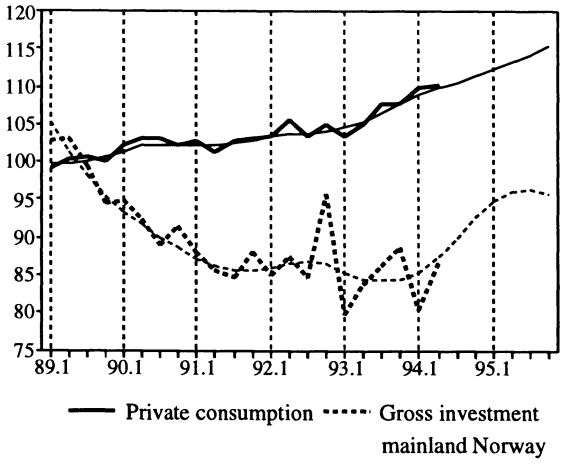
Higher tax revenues will help to improve the public sector's budget balance: In the calculations the deficit before loan transactions as a percentage of GDP is reduced by a good 1 percentage point from 1993 to 1994 and by a further half a percentage point next year. Measured by the definitions of the Maastricht treaty, the overal public deficit is reduced from approximately 2.7 percent of GDP in 1993 to 2 per cent in 1994 and to 1.7 per cent in 1995.

Negative demand impetus from the petroleum sector

Following substantial growth in accrued petroleum investment the last three years, it now appears that investment will edge down both in 1994 and 1995. The fall in investment will primarily affect platform construction. A number of major investment projects will be completed in 1995. Many of these investments in platforms are modules to be

Consumption and investment

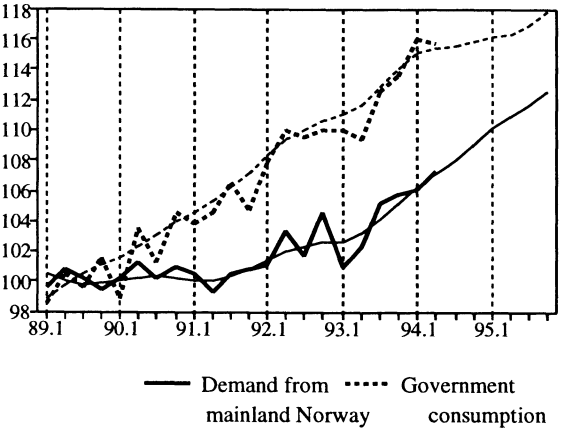
1989=100. Seasonally adjusted (QNA)
Seasonally adjusted and smoothed (KVARTS)



Source: Statistics Norway

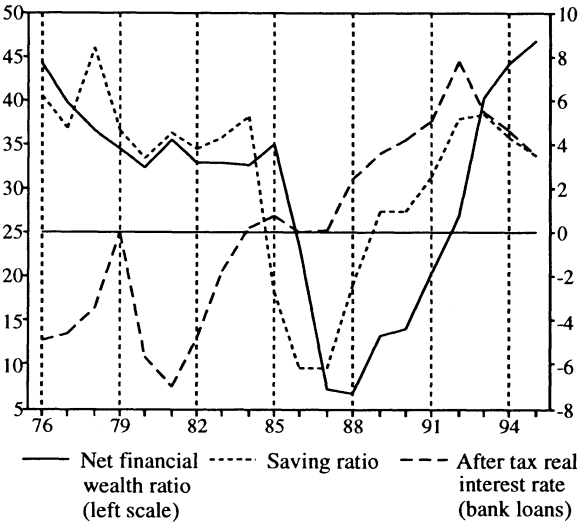
Demand from mainl. Norway and governm. consumption

1989=100. Seasonally adjusted (QNA)
Seasonally adjusted and smoothed (KVARTS)



Source: Statistics Norway

Net wealth ratio, saving ratio and after tax real interest rate 1976 - 1995



Source: Central Bank of Norway and Statistics Norway.

built in other countries, entailing that the fall in the demand for goods and services from Norway's offshore industry will be greater than indicated by the development in accrued investment. Investment in oil and gas pipelines rose sharply from 1992 to 1993, and pipeline investment is expected to increase further this year followed by a slight decline in 1995. The level, however, will remain high in a historical perspective. Investment by the petroleum sector in mainland Norway is expected to pick up sharply in 1994, but decline by the same margin next year.

Turnaround in international markets in 1994

Due to the breakdown of foreign trade statistics in EU countries, developments in demand in Norway's export markets in 1993 have probably been more favourable than indicated by official foreign trade data. Based on other available information, market growth in 1993 has therefore been revised upwards to 1.1 per cent. Despite this upward revision, 1993 represents a clear cyclical trough in demand among our trading partners. It appears that market growth began to pick up towards the end of last year, and in the calculations it is assumed that a strong recovery in 1994 will continue into 1995. Market growth for Norway's main export goods is projected to reach 5.8 per cent this year and slightly more next year. This contributes to boosting traditional merchandise exports in the projection period. Due to considerable growth through 1993, the calculations show a rise of as much as 9.2 per cent between 1993 and 1994 compared with 4.3 per cent next year, in spite of an even underlying rate of growth through the two years. Freight earnings in the shipping sector are also expected to rise in volume in the period ahead as a result of expanded world trade. Oil and gas exports are projected to increase substantially in volume in 1994, while growth in 1995 is expected to be more subdued.

The improved economic situation internationally is also expected to push up commodity prices through 1994 and 1995. The rise in prices of traditional imports is thus expected to pick up through the second half of this year, and is projected at 0.6 per cent from 1993 to 1994. Prices of traditional merchandise imports are estimated to rise by 4.0 per cent in 1995. Prices of industrial raw materials are generally expected to rise more than the prices of finished goods, which helps to explain the sharp rise in prices of Norway's traditional export products in 1995.

Low price and wage inflation in 1994, slightly higher in 1995

The rise in the consumer price index is estimated at 1.3 per cent in 1994, edging up to 2.1 per cent next year. The fall in interest rates through 1993 and in the first half of 1994 is an important factor underlying low price inflation this year. A stabilization of interest rates through the second half of 1994 and in 1995 and a faster rise in import prices will boost the rise in the consumer price index next year.

Improved profitability in the business sector as a result of the cyclical upturn both in Norway and abroad will contribute to higher wage growth next year. The estimated growth in wages per man-hour worked in 1995, however, is also influenced by the fact that there are two fewer working days compared with 1994.

Higher growth in mainland demand

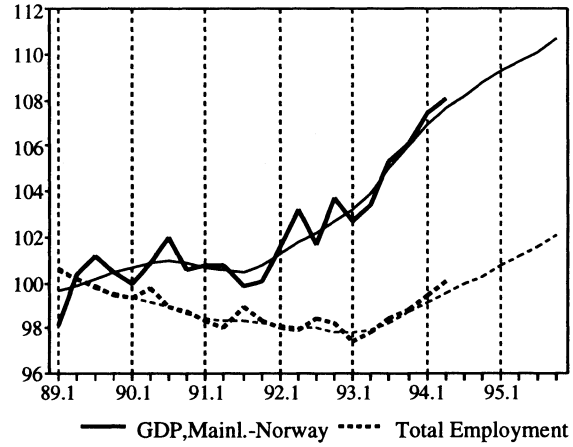
Output growth and the decline in interest rates will, according to the calculations, result in an upswing in mainland fixed investment in 1994, with the rise continuing in 1995. The development of Gardermoen airport and the expansion in housing investment are important factors behind the projected growth, but the calculations also point to a clear investment upturn in some service sectors. According to the calculations, growth in manufacturing investment will be relatively modest in both 1994 and 1995. The growth projections for 1995 differ slightly from Statistics Norway's investment intentions survey from May this year. The survey points to a more pronounced rise in manufacturing investment in 1995, although there is considerable uncertainty attached to these estimates.

Following several years of growth in household income, the pronounced decline in real interest rates last year spurred the demand for dwellings. The turnaround in the housing market started early in 1993 when house prices began to pick up. In the calculations, the fall in interest rates between 1993 and 1994 will contribute to a rise in the prices of resale homes of nearly 12 per cent this year and a little less than 5 per cent in 1995. The increase in prices in 1993 and so far this year stimulated housing starts, and after having touched bottom in 1993 housing investment is estimated to expand by 26 per cent in 1994 and 8 per cent in 1995. In spite of this growth, housing investment in 1995 will probably remain at an historically low level: With the exception of the early part of the 1990s, the volume of housing investment has not been lower since the 1970s.

Household real disposable income is projected to rise by a good 3 per cent in 1994 and about 2 1/2 per cent in 1995. The income growth can largely be ascribed to higher wage income as a result of a growth in real wages and gains in employment. Developments in net interest income also make a positive contribution to the growth in real disposable income this year, but the effect will be slightly reversed next year. The contribution from higher transfers from the public sector is declining, but is still substantial.

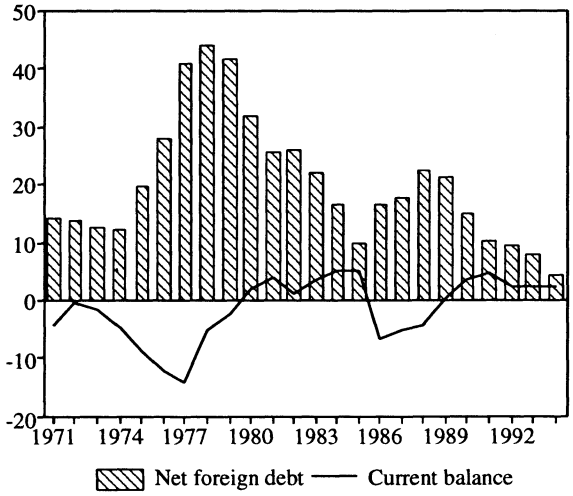
In the last few years net lending has been positive for the household sector. With housing prices also starting to pick up, total household wealth is moving on an upward trend following several years of decline. As a result of the increase in wealth, the fall in interest rates and growth in real income, private consumption is estimated to expand by 4.2 per cent in 1994 and 3.3 per cent next year. An important element in consumption growth in the projection period is

Gross domestic product and employment
1989=100. Seasonally adjusted (QNA)
Seasonally adjusted and smoothed (KVARTS)



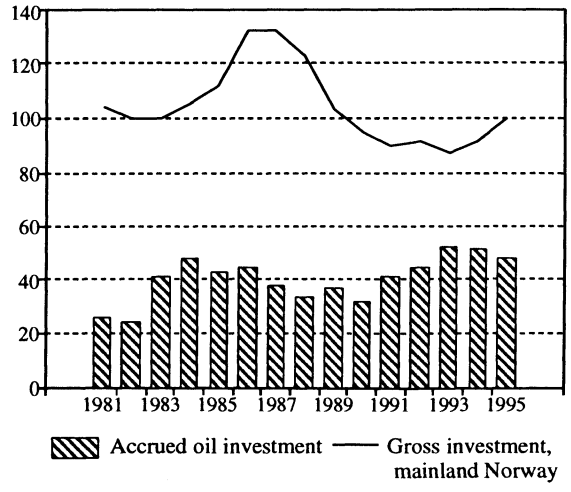
Source: Statistics Norway

Current balance and foreign debt
Per cent of GDP



Source: Statistics Norway.

Accrued oil investment and investment in mainland Norway
Nkr billion 1991



Source: Statistics Norway.

a sharp rise in sales of new cars, partly the result of the low level of new car registrations for many years.

According to the calculations, the household saving ratio will be reduced from 5.3 per cent in 1993 to 4.3 per cent in 1994 and further to 3.4 per cent in 1995. Much of the growth in consumption, however, is related to purchases of consumer durables. When consumption is adjusted for such purchases, the decline in the saving ratio from 1993 is negligible. In spite of the brisk growth in household consumption and fixed investment in both 1994 and 1995, the household sector will continue to improve its net financial asset position.

Strong growth in GDP in 1994

Value added in manufacturing industry is expected to rise by about 2 per cent this year. Lower demand from the petroleum sector will also entail that growth in manufacturing output will be low in 1995 in spite of the cyclical upturn in Norway's main trading partner countries.

A sluggish trend in the construction industry for a number of years came to an end and recovery began at the end of 1993. The sharp rise in housing investment and construction investment in various sectors will result in higher growth in 1994 and 1995.

Production in service industries is generally expected to be slightly higher the next two years than in 1993. As a result, production growth in the mainland economy will pick up in both 1994 and 1995. According to the calculations, mainland GDP growth will be 3.2 per cent in 1994 and 2.2 per cent next year.

Oil and gas production is projected to rise sharply in 1994, with total GDP growth reaching more than 4 per cent. Next year output growth in the offshore sector will be more in line with the increase in mainland activity, with GDP growth estimated at 2.5 per cent.

Lower unemployment in 1994 and 1995

Pronounced growth in the mainland economy in 1994 will result in an improvement in the labour market. Employment is projected to expand by 1.7 per cent in both 1994 and 1995. After falling since the recession began in 1988, the labour force was unchanged from 1992 to 1993. However, the calculations indicate a rise in the supply of labour in 1994 and 1995 which is higher than the growth implied by underlying demographic trends. Unemployment is projected to fall to 5.7 per cent in 1994 and further to 5.3 per cent in 1995.

Rising current-account surplus

Crude oil prices are assumed to remain at USD 16.50 p/b on average from the third quarter of 1994 to the end of the year. A crude oil price of USD 17 p/b has been assumed for 1995. With a projected USD exchange rate of NOK 6.85 from the second quarter of this year, this is equivalent to NOK 111 per barrel in 1994 and about NOK 116 per barrel in 1995.

The sharp growth in imports this year will contribute to reducing the balance of trade surplus between 1993 and 1994. In 1995, there will be a substantial improvement in the terms of trade and the balance of trade will be strengthened even though the volume of imports will rise faster than exports. A reduction in share dividend payments and lower interest payments abroad will lower the deficit on the interest and transfers balance in both 1994 and 1995. The current-account surplus is estimated at NOK 19.0 billion in 1994 and NOK 26.4 billion in 1995.

Norway: Trends in selected macroeconomic variables
Percentage volume changes in 1991 prices*)1)

	Billion 1991-Nkr	Growth from the same period previous year								
	1993	1993	92.3	92.4	93.1	93.2	93.3	93.4	94.1	94.2
Private consumption	361.9	1.7	0.9	2.0	0.2	-0.6	4.2	2.7	6.3	4.8
Goods	222.4	1.6	0.2	2.5	-0.3	-1.1	5.0	2.8	9.4	6.6
Services	127.9	1.7	2.1	1.2	0.7	0.8	3.0	2.1	3.0	2.5
Norwegian consumption abroad	24.7	3.5	9.0	0.9	1.0	1.0	5.0	6.3	5.5	6.7
- non-residents' consumption	-13.1	5.1	13.7	-0.1	-3.2	7.8	6.1	7.9	31.5	16.7
Government consumption	156.7	1.8	2.8	5.0	3.0	-1.2	2.9	2.7	5.6	5.1
Central government	62.3	1.6	2.9	7.6	4.8	-6.6	4.2	4.2	9.4	7.8
Civilian	41.6	7.3	0.7	8.8	9.9	-2.8	8.6	14.3	7.9	3.5
Military	20.7	-8.3	7.2	6.3	-7.6	-13.9	-3.7	-7.7	13.6	16.7
Local government	94.5	2.0	2.7	3.1	1.9	2.6	2.1	1.5	3.3	3.5
Gross fixed capital formation	152.8	15.2	-5.2	-1.6	7.8	-20.6	95.0	3.1	11.4	-18.1
Oil and shipping	65.5	59.4	-19.9	-31.9	98.1	-35.1	405.6	56.3	38.8	-45.7
Mainland Norway	87.4	-4.7	0.4	9.2	-6.3	-4.0	1.4	-8.7	2.3	3.4
Manufacturing and mining	13.3	-1.2	5.3	16.9	-1.9	7.1	4.4	-10.6	-1.1	3.0
Production of other goods	11.9	-2.0	6.2	-5.4	-1.9	5.0	6.1	-16.3	-14.2	-9.9
General government	22.6	-11.6	-7.4	6.5	-9.7	-20.3	1.1	-14.3	-2.9	-6.5
Dwellings	11.7	-5.2	-6.7	-7.8	-12.5	-12.9	-6.7	11.3	23.6	34.7
Other services	27.9	-0.9	6.0	23.4	-4.0	6.6	1.7	-6.2	4.2	5.4
Stocks (contribution to GDP growth)[4]	-15.5	-1.4	2.4	-0.8	1.8	2.6	-10.7	1.0	-2.2	7.7
Other commodities (contribution to GDP growth)[3)4)]	-7.5	0.2	0.5	-0.8	0.4	-1.0	0.9	0.5	-1.9	3.2
Ships and oil platforms in progress (contribution to GDP growth)[4)]	-8.0	-1.5	1.9	0.1	1.4	3.6	-11.6	0.5	-0.3	4.5
Gross investment (incl. stock changes)	137.3	8.0	9.0	-6.3	16.0	-15.4	22.9	10.0	-3.9	26.9
Final domestic use of goods and services	656.0	3.0	2.9	1.1	4.1	-3.8	7.7	4.0	3.8	9.0
-accrued petroleum investment[2)]	52.0	15.9	2.6	6.5	12.6	-4.9	47.7	17.2	18.6	-14.9
-demand from mainland Norway	606.1	0.7	1.3	3.9	-0.0	-1.2	3.5	0.7	5.6	4.7
Exports	332.6	1.8	4.5	5.7	-6.2	5.2	2.7	5.7	12.3	3.5
Traditional goods	120.6	3.0	6.4	5.9	-3.3	4.4	0.7	10.1	17.3	7.5
Crude oil and natural gas	113.4	5.8	15.9	7.6	-0.6	7.6	1.7	14.2	18.4	10.5
Ships and oil platforms	13.0	-12.5	-50.8	0.4	-52.4	45.8	54.7	-35.4	-21.3	-62.2
Services	85.6	-2.2	1.9	4.3	-4.6	-2.2	1.4	-3.8	1.7	1.6
Total use of goods and services	988.6	2.6	3.5	2.6	0.4	-0.8	6.0	4.6	6.6	7.0
Imports	262.3	3.3	4.1	-2.9	0.0	-4.4	11.3	6.7	8.5	7.3
Traditional goods	159.6	1.7	11.0	0.6	-3.0	-1.4	3.0	7.8	14.6	19.7
Crude oil	1.2	18.9	71.3	-47.3	64.7	-25.4	16.5	59.2	-21.4	-58.9
Ships and oil platforms	15.9	44.4	-45.7	-51.4	78.8	-14.8	166.8	40.9	-4.4	-39.6
Services	85.7	0.8	0.6	4.4	-1.1	-7.0	12.0	-0.4	-1.0	-5.0
Gross domestic product (GDP)	726.2	2.3	3.2	4.6	0.6	0.6	4.2	3.8	6.0	6.9
Mainland Norway	586.6	2.0	0.9	3.9	1.0	0.1	4.3	2.4	4.1	5.1
Oil activities and shipping	139.6	3.8	14.5	8.0	-1.1	2.4	3.7	10.0	13.9	14.8
Mainland industry	541.0	1.8	0.7	3.7	0.8	0.3	3.9	2.2	3.4	4.5
Manufacturing and mining	97.6	1.6	2.6	1.2	0.1	0.6	2.8	3.1	1.9	8.1
Production of other goods	73.9	1.9	-2.3	10.0	0.2	-4.0	8.4	1.4	0.3	0.3
General government	119.1	2.8	3.1	3.2	2.7	1.9	2.6	3.8	3.2	2.3
Private services	250.4	1.4	-0.1	3.2	0.5	0.4	3.5	1.4	5.0	5.1
Correction items (contribution to GDP growth)[4)5)]	45.6	0.2	0.3	0.3	0.2	-0.1	0.5	0.3	0.7	0.7

*) Notes, see "Technical comments".

Norway: Trends in selected macroeconomic variables
Percentage volume changes in 1991 prices*)[1)]

	Billion 1991-Nkr	Growth from previous quarter seasonally adjusted[6)]								
	1993	1993	92.3	92.4	93.1	93.2	93.3	93.4	94.1	94.2
Private consumption	361.9	1.6	-1.9	1.4	-1.4	1.4	2.7	-0.1	1.9	0.2
Goods	222.4	1.6	-2.4	2.2	-2.9	2.3	3.4	0.1	3.3	-0.4
Services	127.9	1.6	-0.4	-0.4	0.2	1.4	1.4	-0.7	1.3	0.5
Norwegian consumption abroad	24.7	3.4	1.3	-0.5	2.3	-1.8	4.9	0.7	0.0	3.1
- non-residents' consumption	-13.1	5.0	11.0	-5.5	-4.9	9.5	6.3	-1.4	14.9	-2.3
Government consumption	156.7	1.9	-0.4	0.4	0.1	-0.6	2.9	0.9	2.2	-0.4
Central government	62.3	1.6	-1.8	-1.0	-0.3	-2.1	7.1	1.3	2.5	-1.8
Civilian	41.6	7.2	-3.7	-1.2	6.9	-2.3	5.3	3.7	-0.4	-3.2
Military	20.7	-8.1	1.6	-0.6	-12.3	-1.9	10.9	-3.4	8.7	0.9
Local government	94.5	2.0	0.5	1.3	0.3	0.4	0.3	0.6	1.9	0.6
Gross fixed capital formation	152.8	15.5	-40.2	7.4	-11.6	40.4	46.1	-41.7	-8.3	5.7
Oil and shipping	65.5	59.2	-73.7	-11.3	9.7	154.4	103.5	-71.6	-5.9	-0.1
Mainland Norway	87.4	-4.1	-3.0	13.0	-16.6	5.0	2.9	2.6	-9.2	8.1
Manufacturing and mining	13.3	0.2	7.3	12.4	-17.4	6.8	7.5	-2.5	-11.7	10.5
Production of other goods	11.9	-1.7	5.1	-3.4	0.3	2.9	6.1	-23.3	0.7	9.1
General government	22.6	-10.3	-17.6	12.7	-14.0	1.8	2.6	-3.1	-6.2	2.3
Dwellings	11.7	-5.6	-1.1	-6.3	-4.0	-1.9	5.7	11.7	6.7	7.1
Other services	27.9	-1.0	3.1	30.3	-28.4	11.0	-1.6	19.2	-19.8	12.0
Stocks (contribution to GDP growth)[4)]	-15.5	0.1	9.1	-1.9	3.2	-7.7	-5.0	9.8	1.0	1.4
Other commodities (contribution to GDP growth)[3)4)]	-7.5	0.0	1.6	-1.8	2.3	-3.0	2.8	-2.0	0.9	1.0
Ships and oil platforms in progress (contribution to GDP growth)[4)]	-8.0	0.1	7.4	-0.1	0.9	-4.7	-7.8	11.8	0.1	0.4
Gross investment (incl. stock changes)	137.3	7.5	-8.8	-3.9	6.8	-8.4	27.3	-12.9	-2.5	12.9
Final domestic use of goods and services	656.0	2.9	-3.0	0.1	0.6	-1.1	7.5	-2.8	1.1	2.6
- accrued petroleum investment[2)]	52.0	15.7	-31.6	-4.2	2.5	41.5	6.2	-23.2	3.3	1.1
- demand from mainland Norway	606.1	0.8	-1.7	2.8	-3.5	1.4	2.8	0.5	0.3	1.1
Exports	332.6	1.7	-0.1	2.4	-4.1	7.3	-2.9	5.6	2.2	-1.3
Traditional goods	120.6	2.9	1.0	-2.2	-2.2	8.2	-2.8	6.7	4.6	-1.2
Crude oil and natural gas	113.4	5.6	1.7	1.1	-2.7	7.3	-4.1	14.0	1.1	-0.0
Ships and oil platforms	13.0	-12.5	-25.5	78.6	-30.1	56.9	-20.8	-25.7	-14.8	-24.5
Services	85.6	-2.3	-0.3	2.5	-3.8	-0.2	2.3	-1.6	2.2	-1.0
Total use of goods and services	988.6	2.5	-2.1	0.8	-1.0	1.7	3.9	-0.1	1.5	1.2
Imports	262.3	3.2	-7.2	0.3	-0.9	3.9	7.3	-3.5	1.5	1.9
Traditional goods	159.6	1.6	2.8	-2.3	-3.2	1.8	6.4	2.7	4.5	3.8
Crude oil	1.2	18.9	-18.2	-32.1	54.7	-13.0	27.7	-7.3	-23.6	-54.6
Ships and oil platforms	15.9	44.4	-59.8	39.4	11.2	36.7	25.9	-26.4	-24.5	-13.7
Services	85.7	0.8	-13.2	2.4	1.5	3.2	5.1	-9.7	0.6	0.7
Gross domestic product (GDP)	726.2	2.2	-0.1	1.0	-1.1	0.9	2.7	1.2	1.5	1.0
Mainland Norway	586.6	1.8	-1.4	1.9	-1.0	0.8	1.8	0.7	1.2	0.6
Oil activities and shipping	139.6	3.8	5.7	-2.7	-1.5	1.6	6.3	3.3	2.3	2.5
Mainland industry	541.0	1.7	-1.3	2.2	-1.0	0.6	1.4	1.2	0.7	0.5
Manufacturing and mining	97.6	1.6	-0.1	-0.1	-0.1	0.7	2.2	0.3	0.6	2.9
Production of other goods	73.9	0.7	-2.8	3.5	-4.0	0.9	3.2	1.6	-3.8	-0.8
General government	119.1	2.9	-0.1	0.3	1.5	0.5	0.4	1.3	0.3	0.0
Private services	250.4	1.4	-1.9	3.5	-1.7	0.5	1.1	1.4	2.2	0.2
Correction items (contribution to GDP growth)[4)5)]	45.6	0.1	-0.2	-0.1	-0.0	0.2	0.4	-0.3	0.5	0.1

*) Notes, see "Technical comments".

Norway: Price indices for selected macroeconomic variables

	Percentage change from the same period the previous year					Growth from previous quarter seasonally adjusted. Per cent[6]			
	1993	93.3	93.4	94.1	94.2	93.3	93.4	94.1	94.2
Private consumption	1.9	1.6	1.5	1.0	1.1	0.2	0.4	0.1	0.3
Government consumption	1.0	1.1	1.4	2.4	1.9	0.1	0.5	0.8	0.4
Gross fixed capital formation	3.4	4.1	2.9	1.1	-0.0	0.7	0.0	-0.2	-0.6
- mainland Norway	1.1	1.8	1.8	3.3	2.4	0.8	0.0	1.1	0.3
Final domestic use of goods and services	1.9	1.6	1.7	1.2	0.7	-0.2	0.1	0.1	0.3
- demand from mainland Norway	1.6	1.5	1.6	1.7	1.5	0.3	0.3	0.5	0.3
Exports	2.9	5.6	-2.3	-6.1	-3.3	-0.2	-4.0	-1.3	2.2
- traditional merchandise exports	0.2	1.2	-1.6	-1.0	-0.9	-0.3	-1.3	1.3	-0.8
Total use of goods and services	2.2	2.9	0.4	-1.4	-0.5	0.0	-1.4	-0.4	1.0
Imports	2.8	4.5	2.9	0.8	-0.2	1.7	-0.8	-0.8	-0.7
- traditional merchandise imports	0.4	2.0	1.7	0.3	-0.6	0.9	-0.3	-1.2	-0.2
Gross domestic product (GDP)	2.0	2.4	-0.5	-2.1	-0.6	-0.6	-1.6	-0.2	1.6
- mainland Norway	1.6	1.0	1.1	1.7	1.9	0.1	0.2	0.8	0.7

Technical comments on the quarterly accounts figures

Footnotes:
1) Figures for 1993 may deviate somewhat from those published in Economic Survey 2/94 due to new information.
2) Including ships, oil platforms and platform modules in progress.
3) Excluding ships, oil platforms and platform modules in progress.
4) Contributions to GDP growth are calculated as the difference between corresponding figures calculated as a precentage of GDP.
5) Corrected for free bank services and certain indirect taxes.
6) The method for seasonal adjustment has been changed.

Quarterly calculations: The calculations are made on a less detailed level than the calculations for the annual national accounts, and are based on more simplified procedures. The quarterly national accounts figures for the years up to and including 1991 have been reconciled against the most recently published annual accounts figures.

Gross fixed capital formation: Total gross fixed capital formation is heavily influenced by signigicant fluctuations in investment in oil activities. These fluctuations are inter alia due to the fact that platforms that have been under construction for several years are counted as investment in the quarter and with the capital value they have at the time they are towed out to the field.

Seasonally-adjusted figures: The original quarterly national accounts are not seasonally adjusted, as these accounts are attempts to register the actual transactions that have taken place in each quarter. Many of the statistical series thus show clear seasonal variations. Most series are therefore seasonally adjusted on the detailed accounts level and then aggregated to obtain the figures presented in the tables and charts of this volume.

Underlying trend: The Norwegian economy is so small that random or single important occurences can give wide variations in the figures. The seasonally adjusted figures are therefore smoothed so that it is possible to calculate the underlying trend for each series. Smoothing is an attempt to distinguish between random and systematic variations in the series.

Norway: Revisions of underlying trend
Percentage growth from previous quarter. Seasonally adjusted and smoothed. Annual rates

Publ.		90.3	90.4	91.1	91.2	91.3	91.4	92.1	92.2	92.3	92.4	93.1	93.2	93.3	93.4	94.1	94.2
								GDP mainland Norway									
June	-91	1	0	-1													
Sep.	-91	1	0	0	-1												
Dec.	-91	1	0	0	-1	-1											
Feb.	-92	1	0	0	0	0	1										
June	-92	1	1	0	-1	-1	0	1									
Sep.	-92	1	0	0	-1	-1	0	2	3								
Dec.	-92	1	0	0	-1	0	0	1	1	0							
Feb.	-93	1	0	0	-1	0	1	2	2	1	-1						
June	-93	1	0	-1	-1	-1	1	2	2	2	2	0					
Sep.	-93	1	0	-1	-1	-1	1	2	2	2	2	0	-1				
Dec.	-93	1	0	-1	-1	-1	1	2	2	2	2	1	1	2			
Feb.	-94	1	0	-1	-1	-1	1	2	2	2	2	2	2	4	4		
June	-94	2	0	-2	-2	-1	2	4	3	1	1	1	3	6	7	4	
Sep.	-94	2	0	-2	-2	-1	2	4	2	1	1	1	2	5	5	4	2
								Final demand from mainland Norway									
June	-91	1	0	0	-2												
Sep.	-91	1	0	-1	-2	-3											
Dec.	-91	1	0	-1	-2	-2	0										
Feb.	-92	1	0	-1	-1	0	3	4									
June	-92	1	1	0	0	0	2	2	2								
Sep.	-92	1	1	0	0	0	1	2	2	3							
Dec.	-92	1	1	0	0	0	1	2	2	2	1						
Feb.	-93	1	1	0	0	0	1	2	2	2	1	0					
June	-93	1	1	0	-1	-1	1	2	2	3	2	1	-1				
Sep.	-93	1	1	0	-1	-1	1	2	2	2	2	1	-1	-1			
Dec.	-93	1	1	0	-1	-1	1	2	2	2	1	1	1	2	4		
Feb.	-94	1	1	0	-1	-1	1	2	2	2	2	1	1	3	4	4	
June	-94	2	-1	0	-1	-1	1	3	4	2	2	-1	-1	3	6	4	2
Sep.	-94	0	0	-1	0	1	3	4	2	1	0	-1	2	6	5	3	4

Comments on the revisions

Revisions can either be due to new/revised quarterly figures for the current year, new/revised annual national accounts figures for previous year, or a change to a new base year. Because the growth rates calculated as annual rates are rounded off to the nearest whole per cent, a 1 percentage point change in the growth rate can be due to different rounding.

Published:		Price basis:	New annual accounts:	Other comments:
Dec.	-89	1987	Revised seasjonal adjustment programme	
Feb.	-90	"		
June	-90	1988	1987-88	
Sep.	-90	"		
Dec.	-90	"		
Feb.	-91	"		
June	-91	1989	1988-89	
Sep.	-91	"		
Dec.	-91	"		
Feb.	-92	"		
June	-92	1990	1989-90	
Sep.	-92	"		
Dec.	-92	"		
Feb.	-93	"		
June	-93	1991	1990-91	
Sep.	-93	"		
Dec.	-93	"		
Feb.	-94	"		
June	-94	"		

Economic policy calendar 1994

June

3. The Government presents a White Paper (Report no. 40 to the Storting 1993-94) on Norwegian EU membership.

6. The Storting passes a resolution to convert Norwegian Telecom from a public corporation into a state-owned limited company.

11. The Labour Party and Christian Democratic Party arrive at a compromise in the Storting on the Revised National Budget for 1994, entailing that VAT compensation for some food products will not be reduced as proposed by the Government. The emplied loss in revenue will partly be covered by raising the excise duty on cigarettes and increasing the production tax on electric power. As part of the agreement on the revised budget, the interest rate on loans in the State Educational Loan Fund are also reduced from 8.5 to 7.5 per cent for loans provided during the last seven years.

16. The Norwegian Coast Guard cuts the trawl and fires warning shots at Icelandic fishing vessels fishing in the protected zone around Svalbard.

16. The Ministry of Industry and Energy reaches an agreement with the Phillips Group concerning the further development of the Ekofisk field. The development will require investments of nearly NOK 20 billion.

24. Group Managing Director Harald Norvik in Statoil informs the board of directors that the expansion of the Kalundborg refinery will cost altogether DKK 3.2 billion, entailing cost overruns of about one billion.

24. At an EU meeting on Corfu, the heads of government of the four applicant countries Sweden, Finland, Austria and Norway sign accession treaties with the EU.

27. Helikopterservice (HS) signs an agreement with Bond Helicopters on a gradual takeover of the British company over a three-year period. HS will pay a total of NOK 800 million for the takeover, entailing that 49 per cent of the shares are acquired this autumn and the remainder three years later.

28. The Norwegian Nurses' Union and four other unions affiliated with the Federation of Norwegian Professional Associations select about 1,500 of their members to go on strike following the collapse of negotiations with the Norwegian Association of Local Authorities.

30. The strike in the health sector ends following a decision on compulsory arbitration.

30. Hafslund Nycomed buys the contrast medium division of the US company Sterling Winthrop for USD 450 million. Following the purchase, Hafslund will be one of the world's leading operators in the sale and production of contrast medium.

July

1. Mediation in the wage settlement between the Federation of Offshore Workers' Trade Unions and the Offshore Industry's National Association breaks down. The parties are immediately summoned to Minister of Local Government and Labour Gunnar Berge who informs them that the Government will use compulsory arbitration. The formal statutory resolution on compulsory arbitration is adopted the same day.

1. Excise duties on petrol, diesel and tobacco increase. The production tax on electric power goes up. Excise duties for motor vehicles rise, and changes are made in the indirect tax system by removing specified safety equipment for private cars from the tax base.

1. Skandia's chief executive, Bjørn Wolrath, announces that the company will totally boycott Swedish government bonds until the Government presents a satisfactory plan for reducing the general government debt. This results in some unrest in capital and foreign exchange markets.

8. The Federation of Offshore Workers' Trade Unions summons the Government to appear before the Oslo Town Court to clarify the views of Norwegian courts on the use of compulsory arbitration.

11. Norway's Minister of Finance, Sigbjørn Johnsen, participates for the first time at the EU Finance Ministers' meeting and gives his speech in Norwegian.

11. The bankrupt estate of the Fish Farmers' Marketing Association (FOS) loses its case in the High Court of Appeals in the appeal against Follalaks AS. The issue at hand was to what extent an insolvent FOS had the right to pledge receivables for sold, unpaid salmon. The ruling is important in principle, and may, if it remains in force, entail that the FOS estate must pay nearly NOK 200 million to the fish farmers.

15. The 12 EU leaders appoint Luxembourg's Prime Minister Jacques Santer as the new president of the EU Commission after Jacques Delors.

17. After five years of difficult negotiations, representatives of the Nordic countries, the EU, the US, Japan and South Korea reach an agreement which prohibits state support for shipbuilding as from 1 January 1996. The agreement must be approved by the respective countries' national assemblies before it can come into force.

August

1. Production on the 100% Esso-owned gas field Odin shuts down two months earlier than planned. It is uncertain what will happen to the 40 employees and the installations.

1. Ekofisk closes for two weeks for annual maintenance. The production decline is estimated at about NOK 800 million a day.

3. Golar Nor Offshore AS is awarded the contract for phase one in the development of the Foinaven field in the British sector of the North Sea. The contract with BP has a gross value of NOK 3.7 billion and comprises the entire field development with the exception of the production wells.

5. The Coast Guard fires two cold shells against an Icelandic trawler that is fishing in the protected zone near Svalbard. This is the first time that the Coast Guard has fired at vessels to enforce Norway's fishery legislation, and the episode takes place after the Icelandic crew has fired rifle shots against the Coast Guard.

9. Norsk Hydro makes a new commercial oil and gas discovery in the North Sea, near the Oseberg field.

11. The Swedish central bank raises its lending rate to banks from 7.5 to 8 per cent in order to strengthen the currency and prevent higher price inflation. Short-term and long-term interest rates immediately increase by nearly 1 percentage point, and the turmoil in Sweden spills over to some extent to the Norwegian financial market.

16. Statoil awards ABB Offshore Technology the contract for supplying safety valves and wellhead systems for four of the fields in the North Sea. The contract, including options, is worth around NOK 350 million.

16. DnB presents its half-year report which shows a profit of NOK 1,471 million. The favourable result is partly ascribable to the reversal of previous loan loss provisions.

17. Selmer AS is awarded a construction contract, worth NOK 240 million, for the Ibsen block in Oslo.

19. The new Act on company acquisitions is approved by the Council of State. The new act replaces the rules in the Industrial Concession Act on the rights of non-nationals to purchase Norwegian companies. The draft law advocates a notification requirement for acquisitions of a certain size and will ensure that employees are given an opportunity to express an opinion.

19. Statoil approves investments in a desulphurisation plant amounting to NOK 400-500 million. The investment is necessary as a result of the new rules on sulphur emissions within the EU.

20. The Social Democrats present their election manifesto with proposals to reduce the Swedish budget deficit by SEK 61 billion over a four-year period. Skandia's chief executive, Bjørn Wolrath, then removes his purchase boycott of Swedish government bonds.

22. Bjørn Wolrath changes his mind and decides not to remove the purchase boycott of Swedish government bonds.

31. The oil companies announce that they are shelving nine planned oil field development projects as a protest against the tax level and operating conditions for activities on the Norwegian shelf. At worst this may entail that investments of nearly NOK 80 billion will not materialize.

September

1. AS Betonmast secures the contract for building an 80-kilometre long power line in central Thailand. The contract is worth NOK 110 million and is the company's second major contract in Thailand.

2. The Norwegian State Railways (NSB) awards ABB Strømmen the contract for 22 electric locomotives. NSB will pay NOK 735 million for the locomotives, to be delivered in 1996 and 1997, and ABB Strømmen will handle about 30 per cent of the work.

Macroeconomic impacts of reducing NO_x emissions in Norway

Bodil M. Larsen[1]

Using the Statistics Norway's MSG-EE model, a general equilibrium model for the Norwegian economy, we analyze some of the macroeconomic impacts of reducing NO_x emissions in Norway. We find that the costs, in terms of reductions in gross domestic product and private consumption, incurred from the introduction of additional NO_x emissions-control measures are small.

Introduction

Emissions of nitrogen oxides (NO_x) have harmful effects on both human health and the environment (e.g., NO_x emissions increase the risk of respiratory diseases, and contribute to soil and water acidification). Today, the two largest sources of NO_x emissions in Norway are road transport (36 percent) and domestic sea transport (35 percent) (Statistics Norway 1994a). NO_x emissions increased rapidly from 1980 to 1987. This growth was primarily due to the increased use of automobiles for personal transport.

Under the Sofia Protocol, Norway has agreed to stabilize her NO_x emissions at the 1987 level by 1994. It is very likely that Norway will achieve this goal, since there was a 5 percent reduction in NO_x emissions from 1987 to 1993. The main reasons for this reduction are the following: flaring in the North Sea declined; gasoline consumption decreased; the number of vehicles equipped with three-way catalytic converters increased; fuel consumption for fishing and sea transport activities declined; and emissions from industrial processes decreased.

Norway has also set a more stringent domestic NO_x emissions target. The aim is to reduce NO_x emissions to 70 percent of the 1986 level by 1998. This goal may be more difficult to achieve; from 1986 to 1993, NO_x emissions only declined by 3 percent. Even if Norway's entire vehicle stock could to be replaced by vehicles which meet today's emissions standards, NO_x emissions would only be reduced by 18 percent (Statistics Norway 1994b). Therefore, in order for Norway to meet her more stringent target, she must not only enact additional measures to reduce NO_x emissions from vehicles, but she must also establish measures to reduce emissions from other energy-using technologies. Two areas in which there exist NO_x emissions-reduction potentials are in sea transport and petroleum activities.

In this article, we will focus on some changes in the macro economy that may occur when introducing NO_x emissions reduction controls. The direct, technical emissions reductions, that for example follow from the cleaning effect of a catalytic converter, will not be discussed to a great extent.

The MSG-EE model

The MSG-EE model is a Multi-Sectoral-Growth model which describes equilibrium situations in the Norwegian economy when the resources are fully utilized. For a given primary input and technology, the model yields key macro economic indicators, including aggregate and sectoral output. Energy use and transport activities are specified in the model. In the MSG-EE model, transportation is disaggregated into five sub-sectors (road, air, rail, sea and post/telecommunications). An emissions sub-model is attached to the MSG-EE model. In this sub-model, emissions of nine various emissions components are estimated. A description of the emission sub-model is provided in Brendemoen, et al. (1994). The MSG-EE model is an adapted version of Statistics Norway's MSG-5 model. The latter model is used for long-term governmental planning (Ministry of Finance 1993). Detailed descriptions of the MSG-5 and MSG-EE models are provided in Holmøy, et al. (1994) and Alfsen, et al. (1994), respectively.

The measures analyzed

Although MSG-EE is a rather disaggregated macroeconomic model with 33 sectors and 48 commodities, there are some emissions-reduction measures that are neither possible nor appropriate to analyze within the context of the model. Nonetheless, if an estimate of the incurred cost of the technical implementation of the measure exists, then these costs may be incorporated into the model.

We have selected eight emissions-reduction measures which cover transportation activities (measures 1 to 5 in the following) and industrial processes (measures 6 to 8). We have used the State Pollution Control Authority's (Statens forurensningstilsyn, SFT) estimates of the incurred costs of the technical implementation of these measures in our analysis. The following eight measures to reduce NO_x emissions in Norway are analyzed using the MSG-EE model:

1 The author is grateful to Sarita Bartlett for helpful comments.

1. 1995 emissions requirements for passenger automobiles in California

Emissions requirements set upper emissions limits for different components following the use of energy (for transportation). These limits are introduced with that in mind to use specific technical solutions. The current Norwegian emissions requirements for gasoline-driven automobiles, which were introduced in 1989, are based on the 1983 U.S. federal emission control requirements. The requirements for diesel-driven automobiles, which were introduced in 1990, are based on the 1987 U.S. federal emission control requirements. Currently, only a small fraction of the passenger automobiles meets these emissions requirements set for new vehicles. However, NO_x emissions will be significantly reduced in the future as the existing vehicle stock is retired, and as an increasing number of vehicles which meet these standards enters the stock. The 1995 California limit implies, for Norwegian vehicles that fulfill the current (new) emissions limits, a reduction of NO_x emissions of approximately 60 percent from each vehicle unit.

2. Installation of electrically heated catalytic converters on passenger automobiles

This type of catalytic converter (pre-heating before ignition) will reduce emissions that occur because of cold-startings, and driving with cold catalytic converters. Compared to the 1995 California emissions limit, this will yield an additional 50 percent reduction in the NO_x emissions from passenger automobiles.

3. 1994 emissions standards for light trucks in the U.S.

On October 1, 1992, the 1990 U.S. federal emissions control requirements for light trucks was mandated in Norway. If the U.S.'s 1994 emissions standards were introduced, NO_x emissions would be approximately 23 percent lower per vehicle that met the standard than the vehicle that only met the 1990 U.S. federal standard.

4. 1998 emissions standards for heavy-duty trucks in the U.S.

The European Economic Community's phase 1 emissions limit for heavy-duty trucks was introduced in Norway on October 1, 1993. Phase 1 restricts NO_x emissions to 9 grams per kWh. The community's phase 2 emissions limit, which restrict NO_x emissions to 7 grams per kWh, will be introduced in the EEC and Norway on October 1, 1996. The 1998 U.S. federal emissions control requirements means modifications to the engines, in order to reduce NO_x emissions from heavy-duty trucks to maximum 5.6 grams per kWh, i.e., an additional 20 percent reduction compared to the EEC's phase 2.

5. Measures for reducing emissions from coastal traffic and the fishing fleet

Measures directed towards coastal traffic and fishing entail the implementation of technical changes to the engines, such as delayed fuel-injection. These measures are directed towards all new engines. About 50 percent of old engines in the marine crafts can also be converted to the new technology. If the entire marine craft were converted to new technology, NO_x emissions would be reduced by approximately 8 percent. This will also lead to approximately a 2.5 percent reduction in total NO_x emissions in Norway.

6. Measures for reducing NO_x emissions in the petro-chemical industry

This measure entails an installation of catalytic converters at Hydro Rafnes, a large petro-chemical plant in Norway. A reduction in NO_x emissions at Hydro Rafnes between 70 and 90 percent is possible. This means a 0.2 percent reduction in total NO_x emissions in Norway.

7. Measures for reducing NO_x emissions in petroleum refining

Catalytic converters at Statoil Mongstad, which account for approximately 65 percent of the NO_x emissions from Norwegian refineries, can reduce Statoil Mongstads NO_x emissions by 50 percent. The total Norwegian NO_x emissions will then be reduced by approximately 0.5 percent.

8. Measures for reducing NO_x emissions in petroleum production

This measure is based on a new turbine combustion technology, which lowers the NO_x emissions. There are approximately 200 turbines in use on the Norwegian continental shelf. About 80 of these turbines may be converted to the new technology. If these turbines were converted, NO_x emissions from each of the converted turbines would be reduced by between 25 and 80 percent. Total NO_x emissions in Norway can be reduced by between 1 and 5 percent.

Implementation of the costs in the macro model

The costs listed in table 1, which we have used in our analysis, have been estimated by the State Pollution Control Authority (SFT). We have assumed that the measures to reduce NO_x emissions from motor vehicles pertain to all *new* vehicles in Norway. The costs listed in the second column of the table are the additional costs the consumer would have faced if they had bought a vehicle that fulfills the new requirement, compared to the costs of buying a vehicle that fulfills today's emissions requirements.

In the context of the MSG-EE model, the first and second measures pertain to the residential sector and each of the production sectors with own passenger automobiles. The third and forth measures mainly pertain to the sector that

Table 1. Estimated costs of measures

Measures to reduce NO_x emissions in Norway	Additional purchase costs (NOK/unit)	Registration of new cars (units,1988)	Total additional costs (mill.NOK)
1. California standards, passenger automobiles	500	67 822	34
2. El. heated catalyzers, passenger automobiles	4 000	67 822	271
3. US-94 emission standards, light trucks	2 400	16 404	39
4. US-98 emissions standards, heavy-duty trucks	40 000	6 113	245
5. Coastal traffic and the fishing fleet			88
6. Petro-chemical industry			30
7. Petroleum refining			65
8. Petroleum production			2 500

produces road transport services, but they also pertain to other sectors with own light trucks and heavy-duty trucks. The fifth measure pertains to the sector that produces sea transport services, sectors with own sea transport, and the fishing sector. The sixth, seventh, and eight measures pertain to the following sectors in the model: production of industrial chemicals, petroleum refining, and production of crude petroleum and natural gas.

The implementations of the sectoral costs in the MSG-EE model are made in the following ways:

- To implement additional emissions requirements for new passenger automobiles (the measures 1 and 2), the user cost of passenger automobiles in the residential sector is increased in the model. This means that we do not take account of any additional costs in the production sectors.

- The measures directed towards new light and heavy-duty trucks (i.e., measures 3 and 4) are technically more complicated to implement in the MSG-EE model. We have taken a short-cut; we illustrate the effects of new emissions requirements for these vehicles by only studying the sector that produces road transport services. The own transport in the manufacturing and services sectors are not contained in the analysis (i.e., approximately 50 percent of the road transport in the production sectors are not taken account of). The implementation is made by an increase in the user cost of motor vehicles in the road transport sector. This is done in order to reflect that the measures lead to an increase in the price of capital which is used for productive activities. We assume that the road transport sector bears the whole cost (also the cost that ideally should be on own transport). To reflect the costs to society, we have increased total vehicle investments by an amount equal to the costs of introducing the new requirements.

- The measure pertaining to coastal traffic and fishing (measure 5) is implemented as an increase in the import price of new and second-hand boats and ships. In addition, we have assumed that old engines which may be modified, will be. This is implemented as an increase in the import price of ship-repairings abroad.

- The measures pertaining to petro-chemical industry and petroleum refining (i.e., measures 6 and 7, cleaning installations) are implemented as increased investment costs in the two sectors, respectively. To implement the costs to society, we have increased total investment in machinery equipment in society with an amount equal to the costs of the measure.

- As regarding the petroleum production sector (measure 8), the measure is installation of low-NO_x turbines. We have increased the investment costs in the sector that is necessary to produce an exogenous and fixed volume of crude oil and natural gas.

We have used the MSG-EE model to simulate one base-year or business-as-usual path, and 7 alternative simulations in which the different measures are implemented. We have made one simulation for each measure, except that the measures pertaining to light trucks and heavy-duty trucks are handled in one simulation. The model is simulated for the base year 1988, and the trade balance and capital stock are endogenous. The analysis is a static and hypothetical analysis of how the equilibrium situation in the Norwegian economy would have been if the respective measures were introduced in the base year, ceteris paribus (i.e., other exogenous variables unchanged).

Results

Table 2 and figure 1 show changes in GDP, private consumption and trade balance relative to the costs of introducing the measure. Some main conclusions may be drawn:

- Gross domestic product and private consumption are reduced after an introduction of more stringent NO_x emissions requirements. However, for the measures pertaining to light trucks and heavy-duty trucks (the measures 3 and 4), GDP increases. The reason for this is increased investments and imports of vehicles, which lead to an increase in the collection of import taxes.

- Cleaning technology in petro-chemical industry, petroleum refining, petroleum production, and boats and ships (the measures 5 to 8) have small effects on the macro economy. The trade balance worsens with a nominally amount of approximately half of the costs of the industry measures, while the measure pertaining to ships and boats has a somewhat stronger effect on the trade balance.

- The measures pertaining to light trucks and heavy-duty trucks (the measures 3 and 4) have a somewhat stronger, but still small, effect on the macro economy. One should

Figure 1. Relative effects of each measure, NOK per NOK of measure cost

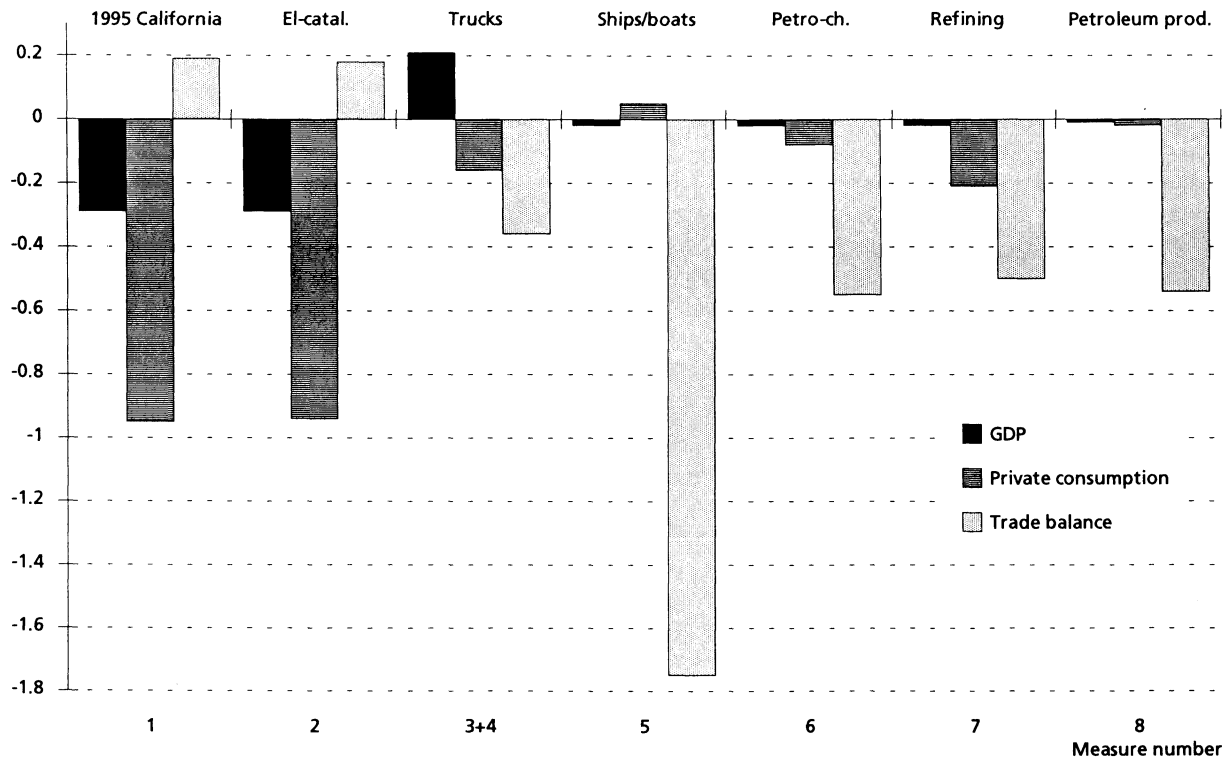


Table 2. Effects of the measures compared to the costs, NOK per NOK of measure cost

Measures to reduce NO_x emissions in Norway	Costs (mill.NOK)	Changes in GDP	Changes in Private consumption	Changes in Trade balance
1. California standards, passenger automobiles	34	-0,29	-0,95	0,19
2. El. heated catalyzers, passenger automobiles	271	-0,29	-0,94	0,18
3./4. Measures pertaining to light and heavy-duty trucks	284	0,21	-0,16	-0,36
5. Coastal traffic and the fishing fleet	88	-0,02	0,05	-1,75
6. Petro-chemical industry	30	-0,02	-0,08	-0,55
7. Petroleum refining	65	-0,02	-0,21	-0,50
8. Petroleum production	2 500	-0,01	-0,02	-0,54

remember that these measures are only partially implemented in the model. This situation is, however, not likely to halter the conclusion that these measures have small effects on the whole economy.

- The results are somewhat different for the measures pertaining to passenger automobiles (the measures 1 and 2). The repercussions on the economy are stronger, if one looks at changes in GDP and in particular private consumption as share of the costs of introducing the measure.

Table 3 shows the deviations in some main variables between the base run and the alternative simulations. The figures are in fixed prices, except for the trade balance. Table 4 shows changes in the emissions of CO_2 and NO_x from the base run to the respective alternative simulation. The direct, technical reductions in emissions, as a result of catalytic converters and other measures, are not included in the table. By *direct effects* we mean reductions in total emissions that follows lower emissions per vehicle unit (i.e., the cleaning effect). The *secondary effects* shown in the table are caused by changes in the pattern of the economic growth path. Table 4 contains secondary effects only, for example the emissions reductions that follows an increase in automobile prices. Emissions of other polluting components may change as well, but we have chosen CO_2 in addition to NO_x to illustrate the size of the emissions reductions. The percentage numbers in table 4 are given as the emissions changes share of total emissions of the component in the base year.

The following sections describe the mechanisms in the MSG-EE model that cause the results in table 3. We will concentrate on the 1995 California emissions standard for passenger automobiles. Main results from the other model simulations will also be given.

Emissions requirements for passenger automobiles (the 1995 California emissions standard)

The GDP is reduced with 10 million Norwegian kroner, or 1 - 2 thousands of a percent. It is especially a reduction in

Table 3. Deviations from the base year (1988) in some main macroeconomic variables. Million NOK. All figures in fixed prices, except for the trade balance

Analysis, measure number	Costs	GDP	Import	Private consumption	Export	Invest-lments	Trade balance
1. California emission limits, passenger automobiles	34	-10	-6	-32	0	17	6
2. El. heated catalyzer, passenger automobiles	271	-78	-49	-253	0	128	50
3./4. US-94+US-98, light and heavy-duty trucks	284	59	101	-45	0	200 (-84*)	-101
5. Measures pertaining to coastal traffic/ fishing	88	-3	-7	4	-4	-8	-153
6. Measures pertaining to petro-chemical industry	30	-1	14	-2	-4	20 (-10*)	-17
7. Measures pertaining to petroleum refining	65	-1	35	-14	0	46 (-19*)	-33
8. Measures pertaining to petroleum production	2 500	-18	1 356	-508	-1	1 809	-1 357

* Productive investments, i.e., total investments minus the investments attached to the measures.

the gross product in wholesale and retail trade. In addition, the income from import taxes and value added tax are reduced by approximately 1 million kroner, as a result of less import and sale of automobiles. Despite the reduction in GDP, total gross production shows a small increase in the alternative simulation compared to the base year. This is a result of increased demand for domestically produced consumption goods from the residential sector. The production of these goods needs more input of materials compared to import of automobiles. There are, however, a production reduction in the following sectors: wholesale and retail trade (less automobile sale); petroleum refining (less gasoline sale); banking and insurance (fewer services for automobile insurance); and other private services. The households purchase of automobiles is reduced by 35 million kroner, or approximately 0.3 percent. When automobiles become more expensive, more of the households demand will be directed towards other commodities, for example dwelling services. The production in the construction sector increases, and the same regards the sectors producing intermediate inputs and capital goods (increased demand for wood, wood products, and furniture), and metal products, machinery and equipment (increased demand for durable consumer goods). Increased demand for domestically produced goods leads to some increase in the demand for capital goods, and therefore to an increase in the investments. In the MSG-EE model, private consumption is residually determined as the difference between total production, investments and net exports. A reduction in GDP, increased investments, and reduced imports imply that there will be less for private consumption. The increase in automobile prices leads to a change in the composition of private consumption. Purchase of automobiles, gasoline and other expenses attached to car ownership will be reduced, while the consumption of other goods and services will increase. Some of the reduction in private automobile transport is replaced with an increase in the demand for all types of public and commercial transportation. Among the consumption goods, the consumption of post and telecommunications services increases the most, as a consequence of high estimated cross price elasticities for these services in the model (Aasness and Holtsmark 1993). Other consumption goods increase less, but among these the consumption of dwelling services, tourism abroad, and furniture increases the most. In total, private consumption is reduced by 32 million kroner, or about 1 hundred of a percent.

Table 4. Deviations in emissions of CO_2 and NO_x as a result of secondary effects. Tonnes (percentage in parenthesis)

Analysis, measure number	CO_2 emissions	NO_x emissions
1. California emission standards, passenger automobiles	-51 (-0.0001)	-5 (-0.0020)
2. El. heated catalyzer, passenger automobiles	-389 (-0.0011)	-39 (-0.0155)
3./4. US-94 + US-98, light and heavy-duty trucks	-1 408 (-0.0041)	-8 (-0.0032)
5. Measures pertaining to coastal traffic and the fishing fleet	-512 (-0.0015)	-7 (-0.0028)
6. Measures pertaining to production of industrial chemicals	-944 (-0.0027)	-3 (-0.0012)
7. Measures pertaining to petroleum refining	-621 (-0.0018)	-3 (-0.0012)
8. Measures pertaining to petroleum production	-10 336 (-0.0298)	-75 (-0.0298)

In the context of the MSG-EE model's exogenous stock of employees, the employment is reduced in the sectors that reduces its production; petroleum refining, wholesale and retail trade, banking/ insurance and other private services. The employment increases in other sectors. A reduction in the use of privately owned automobiles, and a reduction in gasoline consumption, leads to a reduction of the emissions that come on top of the direct reductions that follows the use of catalytic converters. However, these secondary effects of the introduction of more stringent emissions limits for passenger automobiles, imply only small reductions in emissions compared to the direct cleaning effect of the catalytic converters. The California standard for passenger automobiles leads to a strong reduction in the emissions from the households' car-use. As mentioned, each vehicle is to reduce NO_x emissions by 60 percent compared to the US83/US87-limit. This means a reduction in NO_x emissions from the households' car-use of about 820 tonnes the first year after the introduction (when approximately 5 percent of the automobile stock, i.e., the sale of new automobiles in 1988, fulfills the limit). When a greater share of the passenger automobile stock fulfills the limit, the reduction in emissions will be much greater. The hypothetical reduction in total NO_x emissions if the whole automobile sale in 1988 was to fulfill the California requirement, compared to today's requirements (US83/ US87) is about 0.4 percent.

A reduction in the emissions of nitrogen oxides means fewer health problems, and less acidification of the environment. Such benefits are estimated in Brendemoen, et al. (1992). Using their results, the 1995 California emissions standard for passenger automobiles (with an estimated NO_x emissions reduction of 825 tonnes) will imply a cost saving of approximately 75 million 1988-kroner. This means that the reduction in health damages and acidifications will more than compensate for the reduction in GDP. We have to point out, however, that the uncertainties attached to this analysis are quite considerable, both with respect to the additional costs for the consumer in Norway when introducing the 1995 California standard, and the estimated benefits attached to the emissions reductions.

A pre-heating of the catalytic converters (measure number 2) costs a lot more than the 1995 California emissions standard (measure number 1). However, the mechanisms in the model are just the same as described above, but higher costs give stronger effects: GDP is reduced by 78 million kroner (0.01 percent); private consumption is reduced by 253 million kroner (0.08 percent); and the trade balance is worsened by about 50 million kroner. The households purchase of automobiles is reduced by 273 million kroner, or approximately 2 percent.

Emissions standards for light and heavy-duty trucks (the measures 3 and 4)

An increase in the user cost of motor vehicles in the road transport sector, and an increase in investments in motor vehicles in the society, will reduce the total *productive* investments (as shown in table 3), but total investments (costs of the measures included) will increase by 200 million kroner. Imports are increasing, especially imports of passenger automobiles, and metal products, machinery and equipment, and then the import taxes increases. The income from collection of import taxes, value added tax, investment levy on fixed capital formation, and customs duty increase by approximately 65 million kroner. Therefore, GDP increases. The gross production in the road transport sector decreases by 0.004 percent.

Measures pertaining to coastal traffic and the fishing fleet (measure number 5)

GDP is reduced by 3 million kroner. Private consumption increases by 4 million kroner. The production in the fishing sector is exogenous, while the gross production in the sea transport sector is reduced by 1.2 million kroner (0.02 percent) because of the measures. The trade balance worsens by 153 million kroner (import in current prices increases by 169 million, while export in current prices increases by 16 million).

Measures pertaining to the processing industries (Hydro Rafnes and Statoil Mongstad, the measures 6 and 7)

Installations of catalytic converters at Hydro Rafnes and Statoil Mongstad have quite low costs, and the effects on the macro economy are small. Gross production and employment in the sector producing industrial chemicals are reduced by 0.05 percent, while the petroleum refining sector reduces its activity by 0.002 percent.

Measures pertaining to off-shore petroleum activities (the measure number 8)

GDP is reduced by 18 million kroner (0.003 percent), private consumption is reduced by 508 million (0.17 percent), export is reduced some, while import increases by 1.4 billion kroner. The necessary machinery investments in the sector producing crude petroleum are exogenously increased by around 300 percent. The productive investments increase by 1.8 billion kroner. Gross production in the petroleum sector is exogenous. The trade balance worsens by 1.4 billion kroner.

Summary

Our analysis predicts that the social costs attached to an introduction of more stringent emissions limits for motor vehicles and industry processes are small, measured as reductions in GDP or private consumption. In addition, there will be savings because of reduced health damages and less acidification of nature and materials.

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New research publications in English

Social and Economic Studies

Klaus Mohn:
Modelling Regional Producer Behaviour - A Survey
SES no. 86, 1994. pp. 71.
ISBN 82-537-4042-5

Departing from theoretical principles of duality between production technology and costs, this study provides some suggestions on how to address regional aspects in empirical analyses of producer behaviour. Having established some general properties of the translog cost function, it is illustrated how dummy variable techniques may be applied to incorporate various regional technological characteristics into an integrated empirical model. The model is then used to illustrate and discuss different specifications of producer behaviour.

The first elements to be integrated in the regional framework are technological change, productivity growth, and spatial features. Different sources of regional productivity growth are discussed, and their measurement in the regional econometric cost function is then considered.

Second, the attention is drawn towards problems concerning measurement and modelling of regional labour demand. Regional labour markets have some special characteristics that require special attention. These include labour heterogeneity, different forms of rigidity, and adjustment costs. The significance of these aspects is discussed within the dual approach to regional producer behaviour.

Third, regional investments and capital formation is introduced, largely motivated by the need for a framework to analyse regional producer behaviour in the long run. This provides a tool for empirical analysis of the links between public policy, investment incentives and the process of industrial localization.

Finally, the implications of sluggishly adjusting input demands are addressed within the regional cost function approach. As both labour and capital may be viewed as quasi-fixed, a dynamic approach is required for analyses of the different adjustment mechanism. However, the technology of adjustment may also vary systematically from region to region. Two approaches are presented and compared in the treatment of dynamic factor demands.

Knut A. Magnussen:
Old-Age Pensions, Retirement Behaviour and Personal Saving. A Discussion of the Literature
SES no. 87, 1994. pp. 69.
ISBN 82-537-4050-6

Since the early 1970s, a large literature has studied the effects of social security, in particular old-age pensions, on the economic behaviour of households. In order to survey this literature, we start by introducing a simple overlapping generations model where the main theoretical effects are discussed. In a traditional life-cycle setting, it is shown that personal saving is likely to decline when public pensions are introduced. This result is modified by allowing for liquidity constraints and endogenous labour supply, but could be strengthened by income uncertainty. Many direct empirical tests, based on different types of data for different countries and periods, of the effects on saving are surveyed. Since results show that this literature fails to find unambiguous effects on saving, we also review studies that have been concerned with modifying factors. Empirical evidence suggests that pension schemes to some extent affect labour supply and that consumer behaviour is affected by both liquidity constraints and uncertainty.

Reports

Erling Holmøy, Gunnar Nordén and Birger Strøm:
MSG-5. A Complete Description of the System of Equations
Reports 94/19, 1994. pp. 209.
ISBN 82-537-4039-5

The Multi Sectoral Growth (MSG) model is an applied equilibrium model of the Norwegian economy which has been regularly used in long-term planning by the Norwegian Ministry of Finance since 1968. However, the model structure and its empirical characteristics change more or less continuously. The current version of the model, MSG-5, differs significantly from its predecessor MSG-4 in that domestic products are imperfect substitutes for foreign products, import shares and exports of manufactured products have been endogenised by adopting the Armington approach, the impact of capital income taxation on the user cost of capital has been taken into account, the system of indirect taxation and the special characteristics of the Norwegian electricity market have been given more detailed descriptions, the sub-model of private consumption utilizes micro-econometric estimates and determines consumer demand as the outcome of utility maximising behaviour in 14 specified household groups.

This report contains a complete and accurate description of the system of equations, including a thorough explanation of all the model variables and of how the model aggregation level corresponds to the classification system in the Norwegian National Accounts. In addition, the report offers both an informal overview of the model structure and an analytical discussion of an aggregated stylized version which is intended to facilitate the interpretation of model simulations.

Ragnhild Balsvik and Anne Brendemoen:
A Computable General Equilibrium Model for Tanzania. Documentation of the Model, the 1990 - Social Accounting Matrix and Calibration
Reports 94/20, 1994. pp. 50.
ISBN 82-537-4041-7

This report documents a Computable General Equilibrium model for the economy of Tanzania, the Social Accounting Matrix underlying the model, and the calibration of model parameters. The model is developed to account for effects of land degradation processes; this report does, however, only deal with the pure economic part of the model, treating land degradation as an exogenous variable in the agricultural production functions. The model describing the land degradation processes is developed at the Agricultural University of Norway.

The CGE model presented here is quite standard; producers maximize profits subject to Codd-Douglas production functions, households maximize utility and distribute expenditure according to a linear expenditure system. The model exhibits two way trade assuming imperfect substitution between domestically produced and imported varieties of each good, and between production for the domestic market and export. Prices are endogenous and adjust to obtain market equilibria. Economic growth occurs through growth in the stock of capital, which is determined by savings, exogenous technological progress, and declines in the land degradation processes.

The model is calibrated to produce the Social Accounting Matrix with all prices equal to unity. The Tanzanian Bureau of Statistics provides a number of publications on economic data. Tanzania is how-

ever still in the process of developing National Accounting procedures, and the data available are often somewhat inconsistent as different sources often give different figures for what should be the same issue. Much of the official data are based on information from an input-output study from 1976. Furthermore, apart from the agricultural sectors, we have found no gross production figures. The construction of the Social Accounting Matrix has accordingly been a stepwise procedure, based on several somewhat arbitrary and rough assumptions.

Discussion Papers

Yngve Willassen:
A Generalization of Hall's Specification of the Consumption Function
DP no. 121, 1994. pp. 32.

This paper deals with optimal consumption over time. The starting point is a dynamic utility function which is exponential where the exponent is quadratic in the observable consumption outlays. The approach is shown to be a generalization of Hall's formulation of the consumption relation. While Hall's structural form of consumption is independent of the income process, we show that this no longer holds. On the contrary, parameters of the income process are shown to affect the parameters of the consumption process in an essential way. The paper also argues for a stochastic maximum principle. In addition to generating the optimal current decisions, this principle produces simultaneously optimal estimates of the future values of the decision variables. This interplay of optimization and prediction is interesting. The paper terminates with statistical testing procedures which compare the testing of hypotheses deduced by Hall with testing of those derived in the present paper.

Erling Holmøy, Torbjørn Hægeland and Øystein Olsen:
Effective Rates of Assistance for Norwegian Industries
DP no. 122, 1994. pp. 26.

We measure the effective assistance to 18 Norwegian private industries in 1989 caused by government budgetary subsidies, indirect commodity taxes, import protection through nominal tariffs and non-tariff-barriers, price discrimination of electricity and capital income taxation. The assistance effects are measured by the change in the net-of-tax value added price. Most industries were effectively assisted, but the effective assistance differs widely between industries indicating the overall distortive effect on the industry structure. Agriculture, Fishery and Building of Ships and Oil Platforms stand out as the most assisted industries. Budgetary subsidies and non-tariff barriers had the strongest effective assistance effect.

Klaus Mohn:
On Equity and Public Pricing in Developing Countries
DP no. 123, 1994. pp. 22.

With address to developing countries, this paper derives some formulae for the optimal price structure for publicly provided private goods. A general equilibrium model is examined, which makes it possible to incorporate features like distributional social objectives and public profit constraints in the analysis. The model identifies different sources which may cause the optimal public price structure to deviate from marginal cost pricing in a second-best optimum. The main result is that the optimal public price structure includes an implicit subsidy on commodities which are consumed relatively intensely by transfer-deserving households, whereas the same price structure involves an implicit tax on publicly provided luxuries.

Jørgen Aasness, Erling Eide and Terje Skjerpen:
Criminometrics, Latent Variables, Panel Data, and Different Types of Crime
DP no. 124, 1994. pp. 72.

A behavioural model of crime is developed and applied to panel data on the number of crimes and clear-ups for the 53 police districts in Norway for the period 1970-78. Data on both total crime and on 12 different types of crime is employed. The model consists of behavioural relations of the offenders and the police, and of measurement relations allowing that the model is identified under certain conditions, and our empirical analysis supports the hypothesis that these conditions are satisfied. Detailed empirical results on deterrence elasticities and other structural parameters are presented.

Erik Biørn and Tor Jakob Klette:
Errors in Variables and Panel Data: The Labour Demand Response to Permanent Changes in Output
DP no. 125, 1994. pp 55.

This paper examines panel data modelling with latent variables in analysing log-linear relations between inputs and output of firms. Our particular focus in on (i) the "increasing returns to scale puzzle" for labour input and (ii) the GMM estimation in the context of errors-in-variables and panel data. The IV's used for the observed log-differenced output are log output (in level form) for other years than those to which the difference(s) refer. Flexible assumptions are made about the second order moments of the errors, the random coefficients, and other latent variables, allowing, inter alia, for arbitrary heteroskedasticity and autocorrelation up to the first order of the errors-in-variables. We compare OLS, 2SLS, and GMM estimates of the average input response elasticity (which in some cases can be interpreted as an average inverse scale elasticity), and investigate whether year specific estimates differ substantially from those obtained when data for all years are combined. The results confirm the "increasing returns to scale puzzle" for labour input (measured in three different ways), but indicate approximately constant returns to scale when we consider the material input response. This indicates non-homotheticity of the production technology.

Ingvild Svendsen:
Do Norwegian Firms Form Extrapolative Expectations?
DP no. 126, 1994. pp. 43.

The hypothesis of extrapolative expectations is tested directly using Norwegian microeconomic data on firms' expectations of the prices of own products in domestic and export markets and expectations of demand for own products in domestic and export markets. The data, which are categorical, are taken from a survey of firms in manufacturing and mining. Different versions of extrapolative models are discussed, i.e. the general extrapolative model, the pure adaptive scheme and the error-learning model. The data are analysed by means of different measures of association in cross-tables and loglinear probability models. Because of the sample size and the distribution of observations through out the table, statistical conclusions cannot be drawn for the hypothesis of adaptive expectations. For this version of extrapolative expectations, only descriptive measures are provided. Our empirical results support a general version of extrapolative expectations. The restrictions on the lag structure which takes us from the general version to the model of adaptive expectations do, when confronted with our data, seem to be too restictive.

Reprints

Knut H. Alfsen and Hans Viggo Sæbø:
Environmental Quality Indicators: Background, Principles and Examples from Norway
Reprints no. 69, 1994. pp. 20.
ISSN 0800-7500

Reprint from Environmental and Resource Economics, Vol. 3, 1993, 415-435.

Documents

Haakon Vennemo:
Welfare and the Environment. Implications of a recent tax reform in Norway
Documents 94/1, 1994. pp. 22.

Many countries have recently enacted tax reforms with the aim to increase efficiency and welfare. These reforms have side effects on the environment. If the effects on the environment are negative, a tax reform which increases efficiency is maybe not worth doing after all.

This paper evaluates the economic and environmental consequences of a recent Norwegian tax reform. Our dynamic CGE framework accounts for important links between the environment and the Norwegian economy as well as welfare from environmental quality.

As it happens, the tax reform in Norway seems to affect the environment very little, and delivers a total welfare gain of 0.9 per cent of welfare (wealth). The small environmental effect has to do with the size of environmental vs. economic parameters, and with the environmental component of tax reform package in Norway.

Knut H. Alfsen:
Natural Resource Accounting and Analysis in Norway
Documents 94/2, 1994. pp. 26.

The paper briefly outlines the content and structure of the Norwegian natural resource accounts as these have been developed over the years. Initially, work on the natural resource accounts was motivated by a desire to improve the management of natural resources within a national context. Over time, it was gradually recognised that lack of systematically organised data is not the main obstacle to a satisfactory resource management in Norway. Therefore, more emphasis is now put on trying to integrate environmental and resource issues within the traditional economic planning tools, highlighting the linkages between economic development, natural resource use and environmental concerns. The integration secures consistency between economic analysis and analysis of important environmental and resource issues such as air pollution and energy use. In our view this provides better support for decision makers than the often suggested proposal of "correcting" GDP or other aggregates of the national accounts.

Examples of integrated environment-energy-economy models will be presented together with some empirical applications of these models. It will be shown that environmental control policies directed at one economic sector can have important repercussions for the rest of the economy. Thus, in order to capture the total economic effect of a change in policy, a general economy wide model should be used. Tentative calculations of secondary benefits associated with climate policies are also presented.

Overall, the aim of the paper is to illustrate the importance of organizing the natural resource accounts in a manner that facilitates its usefulness for analytical purposes. This will enchance the probability that the linkages between economic, natural resource, and environmental issues are brought to the attention of the decision makers. Quite often it turns out that one can show, even with a limited set of data, that proper management of natural resources and the environment makes economic sense.

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