

ECONOMIC SURVEY OF NORWAY 2007:
THE PETROLEUM SECTOR AND ITS IMPACT

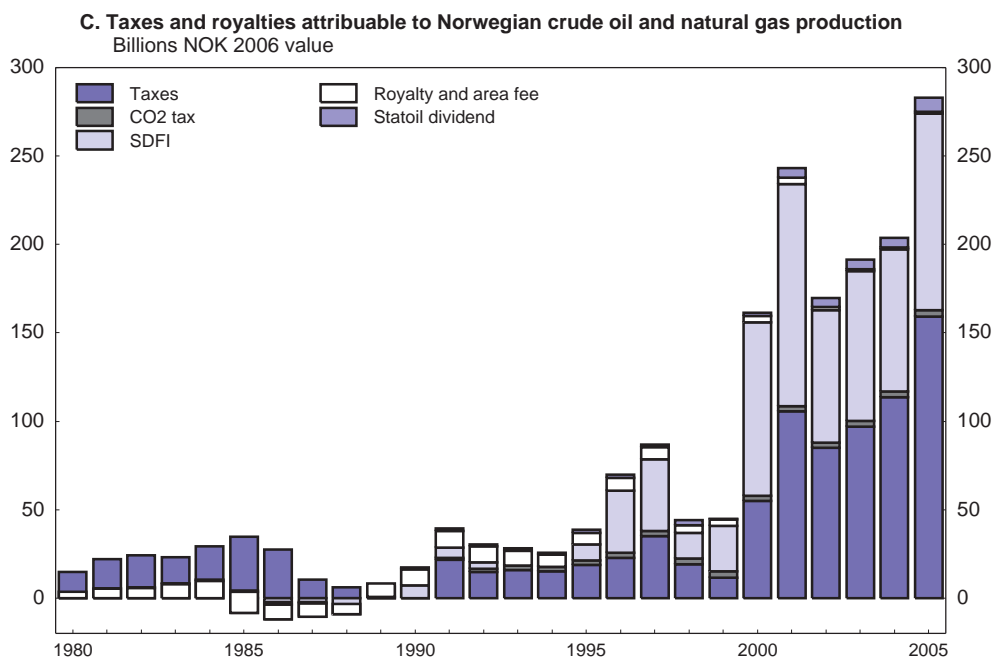
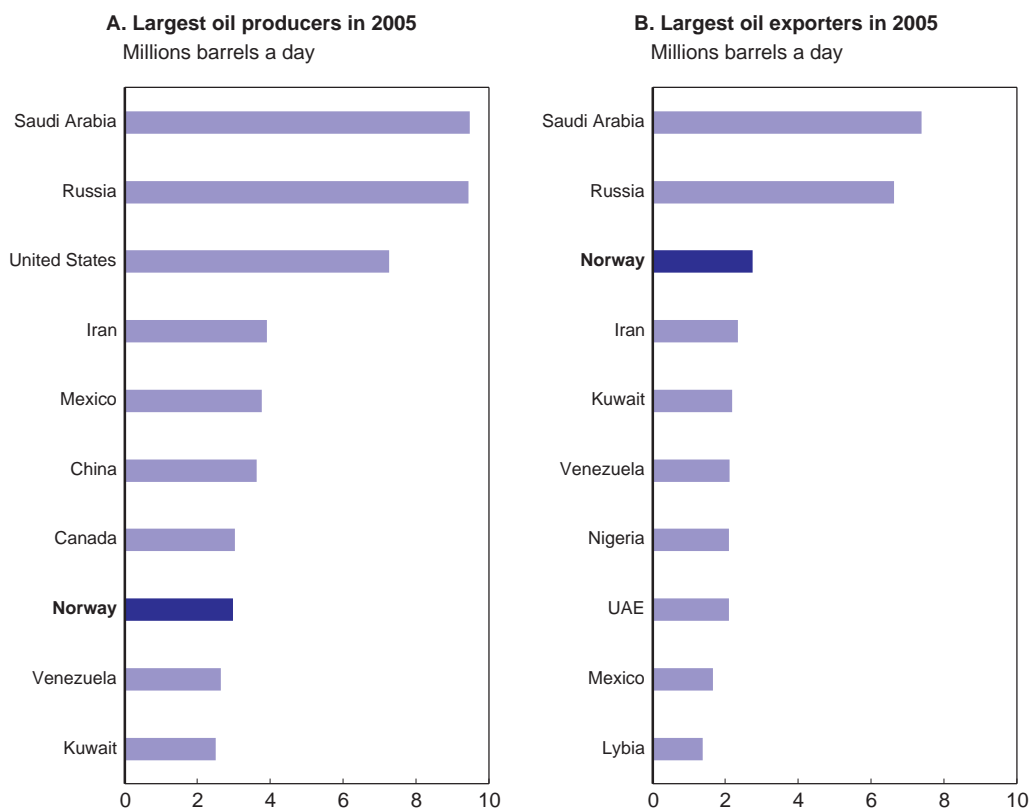
*This is an excerpt of the OECD Economic Survey of Norway, 2007,
from the annex 1.A1 in chapter 1: “Norway’s economic success and the challenge of preserving it”.*

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The petroleum sector

1. Oil exploration started in the late 1960s and production of oil in 1971. Petroleum activities, including exploitation of both oil and gas resources, through nearly 40 years of operation have created values in excess of NOK 5000 billion at 2005 prices, that is close to 350% of total Mainland GDP. Norway is today the third largest exporter in the world, mainly serving European countries,¹ and belongs to the ten biggest oil producers (Figure 1.A1.1, Panel A). In 2005, the sector accounted for 25% of value added, and was the largest industry in Norway. The state is entitled to collect most of the value created from the petroleum activities (Box 1.A1.1). In 2005, the sector generated 33% of government revenues. The net government cash flow from petroleum activities can be divided into corporate taxes, carbon tax and fees, direct ownership revenues (through the State’s Direct Financial Interest SDFI) and dividends from the partly state-owned petroleum company, Statoil (Figure 1.A1.1, Panel C).
2. Since the start of production, only approximately 30% of the expected total resources on Norwegian continental shelf have been extracted. According to national authorities, petroleum production is expected to increase gradually until 2011, and to fall gradually thereafter. Oil production has already reached a peak in 2000 at 181 standard cubic meters. Gas production is expected to further increase to a level of around 130 bcm early next decade. Accounting for 35% of the total Norwegian petroleum production today, gas production is expected to reach a share of about 50% in 2013, increasing gas exports by 49% to reach 130 billion standard cubic meters at this horizon. These estimates could be pushed out with discoveries of new fields or wells. Constraints on new exploitations, such as in the Barents Sea, are both political (international boundaries) and environmental.
3. Although direct revenues from the petroleum sector are channelled out of the mainland economy into a foreign asset fund and employment in the sector is less than 1% of the economy’s total, petroleum investments and other linkages with the mainland economy make Norway to some extent dependent on the petroleum sector. Oil production in the long run will diminish in line with the decrease in non-extracted reserves, but in the medium term it could crowd out other sectors unless policies proactively contain this risk.

Figure 1.A1.1. The net government cash flow , oil producers and exporters



Source: Ministry of Petroleum and Energy (2006), *Facts: The Norwegian Petroleum Sector*.

Box 1.A1.1. Organisation of the Norwegian petroleum sector

The institutional framework

From the start, the national authorities established administration and controls over the petroleum activity, as a fundamental requirement to maximise value for Norwegians. In this model, foreign companies started to carry out all petroleum activities on the Norwegian continental shelf. During the 1970s, Norway launched a state - owned company (Statoil), and Saga and Norsk Hydro joined in petroleum activities, allowing Norway to secure substantial revenues from the sector and develop its own skills and technological know-how.

The current resource management model is built on two principles: predictability and transparency. All oil companies are responsible for the actual operation of petroleum activities on the Norwegian continental shelf, in a competitive and cooperative framework. The approval of the authorities is required in all stages of petroleum activity: exploration drilling, plans for development and decommissioning plans. But agreements and licenses are attributed in a very flexible and innovative way. The authorities award production licences to a group of companies instead of just one company. The most important decision criteria include understanding the geology, technical expertise, financial strength and the experience of oil company. Based on the applications, the Ministry of Petroleum and Energy establishes a licensee group, in which companies must exchange ideas and experience and share the cost and revenues associated with the production license.

Major development projects or matters of great public importance must be discussed and approved by the Storting (the national parliament). The Storting, for instance, has recently enacted decisions to launch large individual investment projects in Snøhvit, Ormen Lange and Langeled, that should be delivered in the course of 2007. The government holds the executive power over petroleum policy. The Ministry of Petroleum and Energy is mainly responsible for resource management and the sector as a whole.

The petroleum tax system and oil revenue management

- Petroleum taxation is based on Norwegian rules for ordinary corporation tax (28%), supplemented by a special tax rate (50%), due to the extraordinary profitability of those resources. Tax deductions are also granted to cover costs associated with exploration, R&D, net financial, operating and decommissioning expenses.
- The CO₂ tax, introduced in 1991 to reduce carbon dioxide emission is the other tax linked to petroleum activities.
- The SDFI, previously managed by Statoil, is the second most important source of state revenues from petroleum activities. This is a special arrangement, decided when production licenses are awarded, in which the state owns interests in a number of oil and gas fields, pipelines and onshore facilities. Since Statoil's partial privatisation, the SDFI has been transferred to a state created trust company, Petoro.
- As owner of Statoil, the state receives dividends (in March 2006, the public shareholding amounted to 70.9%).

Assessing the impact of oil production and revenues on mainland

4. During the last three decades, Norwegian GDP *per capita* has increased from 90% to 150% of the OECD average. Unemployment has been low except for a short period around 1990. The Norwegian government has considerably increased its net financial assets; erasing a net debt of close to 60% of GDP in the 1970s to build a Government Pension Fund that exceeded 100% of mainland GDP at the end of 2006. Compared to other OECD countries, economic growth has on average been half a percentage point higher annually over the past 30 years and real wage growth much higher. What role did petroleum play in Norway's economic development? How much is mainland subject to oil demand and real price swings?

The Petroleum sector and the catch-up process

5. There is today a consensus in the literature that Norway operated its catch-up process towards the frontier (*i.e.*, GDP *per capita* of the USA), thanks to the oil discovery. The actual increase in Norwegian

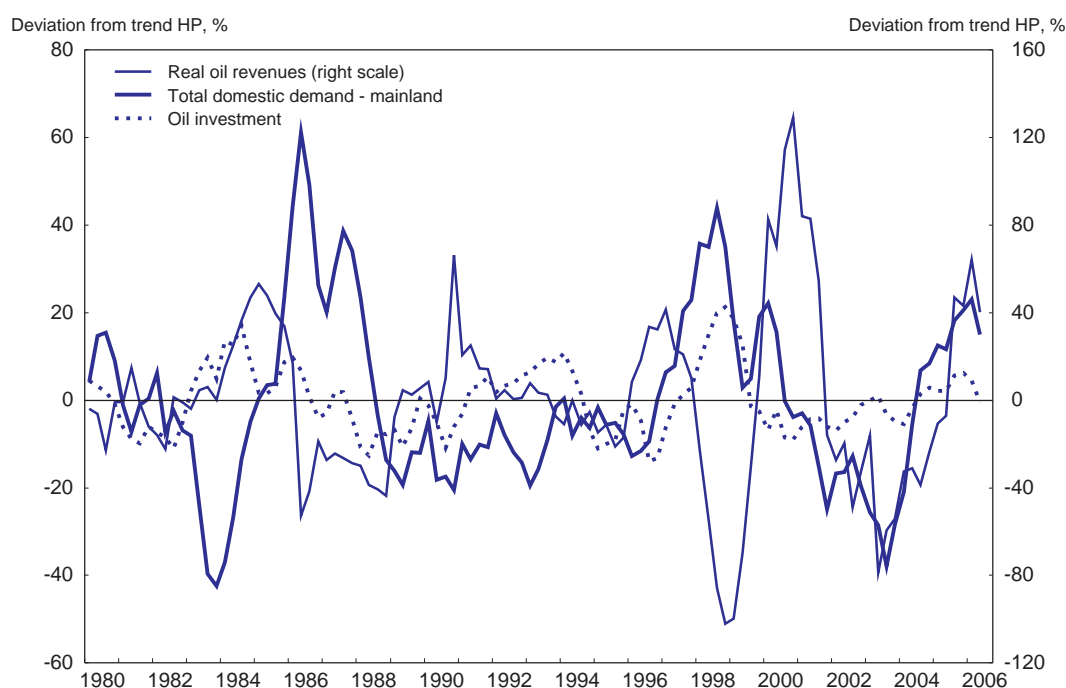
GDP *per capita* relative to the OECD average has been shown to be very oil related (Cappelen *et al.*, 2000). In the same way, Norway had trailed its similar neighbours (Denmark and Sweden)² until the early 1970s, as there existed some underperformance partly linked to historical choices in specialisation (Røed Larsen, 2004). However, in the 1980s, having found oil, the country caught up and passed them briskly, and continued this relative growth advance after oil permeated the economy.

6. This thesis is largely confirmed by Eika and Magnussen (1998), showing through an analysis of the natural experiment of the 1979-1985 oil price shock that Norway received a windfall gain from the increase in oil prices, despite a negative effect through world trade that should have impacted on such a small economy. Under an alternative low oil price scenario, the authors show that the impulse had provided a long term stimulation of close to 25% of GDP to Norway. Because oil production is mature and stable, the petroleum activity might channel into the mainland economy through direct and indirect effects of oil investment, and impacts of real oil revenues mainly due to price swings. How are these factors likely to stimulate the economy?

Is mainland insulated from oil cycles?

7. A small oil-exporting economy as Norway should be stimulated by an adverse oil price shock.³ Surprisingly, cycles in real oil price, real oil revenue cycles or oil investment are little correlated to mainland fluctuations (Figure 1.A1.2). However, this result may be driven unduly by past episodes of supply driven oil price increases, namely the OPEC I and OPEC II shocks, which depressed worldwide demand. When increases are demand driven, like in the current global cycle, oil price increases may exacerbate mainland fluctuations. The Norwegian business cycle may thus be far more influenced by global macroeconomic shocks and cycles. Fiscal expenditure fluctuations also exhibit little correlation with real oil revenue swings. Jafarov and Moriyama (2005) confirms these results, showing through a VAR analysis that government expenditures do not react to an energy boom and that policies have successfully insulated the mainland economy and the budget from real oil revenue fluctuations since the mid 1980s. In a context of an unprecedented current account surplus and inflow of real oil revenues, this may be reassuring.

Figure 1.A1.2. Cycle of mainland output and oil
HP filtering on smoothed series, lambda = 1600



Source: OECD calculations.

8. However, these results do not imply that, in the long run, real oil revenues do not impact total and mainland Norwegian GDP *per capita*. Besides, if oil price and oil investment cycles have not been the major driver of domestic cycles, they may strongly contribute, when synchronised with these cycles, to stimulate the domestic economy. Table 1.A1.1 reports indirect effects of oil investment on mainland GDP. An impulse of one percentage point of mainland GDP in off-shore investment would boost mainland GDP by 0.6%. The impact is strongest on the manufacturing and construction sectors. For instance, indirect effects of oil investment on mainland (such as onshore construction, manufacturing production or business services provision indirectly related to oil) may have explained close to 10% of the cumulated growth over the years 2003-2005,⁴ which clearly supported part of the current boom.

Table 1.A1.1. The effect of an increase in oil investment equivalent to 1 percentage point of mainland GDP

| | GDP | Employment |
|----------------|-----|------------|
| Manufacturing | 0.6 | 0.4 |
| Construction | 1.5 | 0.7 |
| Transport | 0.3 | 0.0 |
| Other services | 1.2 | 0.3 |
| Mainland GDP | 0.6 | 0.2 |

Source: Ministry of Finance.

Norway without oil: a counterfactual scenario

9. Cappelen *et al.* (2000) have estimated the effects of petroleum production on the Norwegian economy using a large-scale macro-econometric model. Conveying a counterfactual analysis, through a multi-sectoral input-output model (MODAG), the authors show two major results. From the early 1980's

to the present, the petroleum sector has demanded resources that have accounted for close to 14% of mainland GDP, of which half has been investment goods. In some years, petroleum investment amounted to one-third of total fixed capital formation in the total economy. In spite of the strong impulse coming from the resource movement effect,⁵ the spending effect operating through the public arm has been as important. Without oil revenues the current account and government budget would have run into severe deficits during the last twenty years or so unless domestic spending had been cut down severely.

10. Table 1.A1.2 confronts the counterfactual scenario to the baseline (observed) growth path. According to these results, oil has brought low unemployment and higher real wages to the economy. It has stimulated, on average, consumer spending, real public consumption and real GDP by almost 1½ percentage point per year. Growth in real wages would have been a third lower in a world without oil.

11. This counterfactual analysis shows that the accumulation of financial assets, mainly in the government sector, would not have taken place and net debt would have been of the same magnitude as in other European countries at the turn of the 21st century. Besides, oil specialisation has crowded out non-oil exports only marginally and increased import shares. According to these simulations, the size of the manufacturing sector has expanded because of oil by close to 25% relative to the baseline scenario. These results converge to the conclusions of Røed Larsen (2004): Norway without oil would have performed in line to its closest neighbour such as Denmark and to a lesser extent Sweden.

Table 1.A1.2. Economic development in Norway (actual, with oil) and counterfactual (without oil)

| | EU15 | Norway, historical | Norway, without oil |
|---|-----------------------------------|-----------------------|------------------------|
| Total growth in real hourly earnings in manufacturing (1974-1998) | 7.4 | 47.1 | 32.5 |
| Standardised rate of unemployment, 1998 | 10 | 3.3 | 6.3 |
| | (Percentage of nominal GDP, 1999) | | |
| General government balance | -1.6 | 4.9 | -3.0 |
| General government net financial assets | -55.6 | 48.5 | -65.8 |
| | (Average growth rates 1974-1999) | | |
| Real GDP | 2.2 | 3.3 | 1.8 |
| Real private consumption | 2.4 | 2.7 | 1.4 |
| Real public consumption | 2 | 3.4 | 2.1 |

Note: EU15, except Greece, Ireland, Luxembourg and Portugal.

Source: Cappelen *et al.*, (2000).

Notes

1. The most important petroleum importing countries from Norway are the United Kingdom, Germany, Netherlands, France, USA, Sweden, Canada, Denmark, Spain and Italy.
2. The author used these two countries as counterfactual because the three Scandinavian countries are similar: they share common history, language and culture, and almost identical institutions. Besides, they constitute a fluid Nordic labour market, allowing rapid factor reallocation and stable equilibriums.
3. Although VAR analysis shows that in the long run the effects should be most likely zero (Bjørnland, 1998).

4. Between 2002 and 2005, mainland GDP in volume terms grew by 9%. Applying elasticities of indirect effects of oil investment leads to a cumulative growth impact of 0.8% of mainland GDP over this period.
5. In the early stage of oil production, a resource movement from old sector to the petroleum sector occurred, due to factor demand (capital and labour). During this period, the import shares related to oil investment was very large, crowding out domestic demand (Cappelen *et al.*, 2000).

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