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USING THE OIL AND GAS REVENUES: THE NORWEGIAN CASE

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Olav Bjerkholt, Lorents Lorentsen
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VIRKNINGER AV BRUK AV OLJE- OG GASSINNTEKTER I NORGE

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PREFACE

The production of crude oil and gas has become of increasing importance in the Norwegian economy. In recent economic debate in Norway a central issue has been the impact of the use of revenues on the economic development in the next decades.

The present article discusses theoretical aspects of depletion policy and attempts to calculate the consequences of two alternative strategies with regard to the use of oil and gas revenues. The calculations are performed by means of the MSG model which recently has been updated and revised.

The authors are solely responsible for the assumptions and conclusions in the article. The Central Bureau of Statistics gratefully acknowledges the permission of the Academic Press to reprint the article.

Central Bureau of Statistics, Oslo, 24 December 1981

Arne Øien

FORORD

Petroleumsvirksomheten i Norge har fått et omfang som innebærer en stor og stigende betydning for den økonomiske utvikling i årene framover. Virkningene er petroleumsvirksomheten og særlig av bruken av olje- og gassinntektene har vært et sentralt tema i politisk sammenheng i de siste årene.

I denne artikkelen drøftes noen teoretiske sider ved de valg som skal treffes i oljepolitikken, og den inneholder også beregningsresultater for virkningene av to alternative strategier når det gjelder bruken av oljeinntektene. Beregningene er utført ved hjelp av modellen MSG som nylig har blitt oppdatert og revidert.

Byrået har villet utgi artikkelen som et interessant eksempel på anvendelse av MSG-modellen i en aktuell problemstilling. Forutsetningene og konklusjonene i artikkelen står helt ut for forfatternes regning. Statistisk Sentralbyrå vil takke Academic Press for samtykke til opptrykk av artikkelen.

Statistisk Sentralbyrå, Oslo, 24. desember 1981

Arne Øien

7 Using the Oil and Gas Revenues: The Norwegian Case

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1 Introduction

The use of oil and gas revenues is an important issue in each of the five countries considered in this book. It is interesting to observe how the common analytic problem looks very different in the context of each individual economy. This is not surprising, however, in view of the differences between the countries in their oil reserves and depletion and more generally in their social and economic structure, as shown earlier in Chapter 2.

Some important factors of the Norwegian economy are that it is a small and very open economy with a high level of consumption and social development, a high investment ratio, virtually full employment and a good record of economic growth. The oil and gas reserves are large relative to the size of the economy and with a moderate level of production they will last far into the next century. As a considerable part of the Norwegian continental shelf has not yet been explored, no one would be very surprised if the reserves turned out to be so large as to last into the twenty-second century with the assumed level of annual production.

Obviously then, the Norwegian situation is different *both* from the Mexican case of needing to use oil and gas revenues to promote economic and social development *and* from the Dutch and British case of using oil and gas incomes in a transitional period of rather limited duration. The challenge facing the Norwegian economy is to adjust to quite considerable oil and gas revenues over a long period of time.

The oil and gas venture is of very recent origin in Norwegian

economic development. The first – very modest – assessments of the extent of the resource base were made about ten years ago but oil and gas incomes did not become substantial until the late 1970s. The expectancy of considerable oil and gas revenues was a major factor, however, behind the anti-recession policy pursued by the Norwegian government from 1975. Domestic demand and employment were kept high. In the mid-1970s the traditional exports stagnated as in all other western countries, but in Norway some of the struggling industries were given substantial financial support in various forms. In the course of a few years an external debt of about 20 billion dollars was incurred. The manufacturing sector has hardly grown since 1974 in spite of the powerful stimulus to Norwegian industry provided by the exploration and production of crude oil and gas. Government policy has been to enlarge this stimulus by trading oil concessions for industrial development, providing the Norwegian petrochemical industry with low-priced raw materials, and to some extent giving preferential treatment to the domestic suppliers of the North Sea installations. The loss of competitive edge in these years could be seen as a natural and necessary adjustment in a transition to an economy relying on oil and gas revenues as a major source of income. The fear of losing competitive position too rapidly and stretching foreign credit too far in view of the uncertainty of the future oil price caused a reversal of policy in 1978 with restrictions of domestic demand and a comprehensive prices and incomes freeze through 1979.

The net revenue from oil production will be large in proportion to the Norwegian economy. Official forecasts estimate oil and gas production in 1980 as 50 million tonnes oil equivalents (mtoe). At this level oil and gas will constitute almost one third of the value of Norwegian exports in 1980, while the gross product of the petroleum sector is of the same magnitude as that of the whole of manufacturing industry. This is also the case for fixed capital formation with each sector counting for about 12 per cent of the national total. As a contrast employment in oil production is less than 0.5 per cent of total employment, while employment in manufacturing industry constitutes well above 20 per cent of total employment.

Tax revenues from oil constitute 75 per cent of the gross domestic product in the oil sector (after an allowance for gross investments). This is somewhat more than 50 per cent of all other direct taxes on persons and companies and somewhat less than 20 per cent of all general government revenues.

In the years to come a moderate increase in oil and gas production up to a relatively stable level of some 60 mtoe per year is foreseen.

In a parliamentary report in 1974 the government introduced 90 mtoe per year as 'an illustration of a moderate production level'. In a report to the parliament in 1980 the same target quantity was maintained. In the analysis which follows we shall assume that by 1990 a production level of 75 mtoe has been attained.

A major issue in economic policy in Norway at present is how to use the oil income. Even at a low level of domestic spending of the income, Norwegian industry may contract. For manufacturing in particular, the positive stimulating effects of extra domestic incomes on demand may be more than counteracted by a deterioration in international competitiveness.

The dilemma facing the government is as follows. Can the domestic use of the oil and gas revenues be partially suspended in view of the political and popular pressures to reap the benefits? Can the oil and gas revenues be used without disruptive effects on industrial structure? Norwegian political attitudes are perhaps less prone to accept changes in industrial structure than those of some other countries because of the close connection between the regional population pattern and the industrial structure. The question in the longer term is, however, not whether changes in industrial structure should be avoided but rather in what way they should be promoted.

II Optimal Depletion Policies

How should a country in Norway's situation administer its depletion policy? There is by now a growing literature on resource management in open economies, for instance Aarrestad (1978), Dasgupta, Eastwood and Heal (1978), Kemp and Long (1980) and Hoel (1980). The main issue in these theoretical contributions has been the discussion of what characterises the optimal path of resource extraction. In (Dasgupta *et al.*, 1978) the depletion policy is derived from a maximisation of discounted future utility of consumption given the opportunities of saving by domestic investment in real capital, by foreign investment or by withholding oil and gas in the fields. In Hoel (1980) the same problem is discussed with the exception that the optimal depletion policy is derived from an efficiency criterion (maximising wealth at a future point in time, given the consumption path).

Provided that the rate of return on foreign investment is exogenously given on the world market, i.e. independent of the wealth of the considered economy, a major conclusion reached is that 'choosing an optimal depletion policy' becomes a very simple asset management problem (Dasgupta *et al.*, 1978). The necessary condition for dynamic efficiency means in this case that the rate of return on the

three assets involved should be equated. Thus, domestic investment, foreign investment and resource depletion are such that the marginal productivity of domestic capital is equal to the rate of return of foreign investment and the net marginal revenue from the resource depletion has to grow at a rate equal to this world market rate of return. Hence, the well known Hotelling rule is obtained. If the economy in question is a price-taker in the world market for the resource, the net marginal revenue will be equal to the net price (world market price minus extraction costs). As in traditional theory of trade, domestic production, including the production of oil and gas, will be determined by world market prices and hence be independent of the preferences of the economy. The decision on the optimal depletion profile can therefore be separated from that on the optimal consumption path. This conclusion has to be changed if one assumes that there are imperfections, for instance in the foreign financial markets, such as when the rate of return on foreign investment depends on the amount which is invested abroad (Dasgupta *et al.*, 1978; Hoel, 1980). If the rate of return decreases when the wealth invested abroad increases, no separation is possible. Moreover, the standard Hotelling result on an increasing net price of the resource product might change. Since the net price should now grow at a rate equal to that of the marginal revenue from foreign investments, the net price will decline over time when foreign investments are pushed so far that the marginal revenue is negative (Hoel, 1980).

A small open economy such as that of Norway has probably no such influence on the world market interest rates. According to the theory reviewed previously, the Norwegian production and depletion policies can therefore be separated from the question of preferences, and depletion can be treated as a simple asset management problem. It seems to be the case, however, that the net price of oil and gas is increasing at a higher rate than the average yield on foreign investment. Hence, it could be optimal to save more of the resource for a future gain. Furthermore, the average of the marginal productivity of real domestic capital is obviously not in line with foreign rates of return. While the international, real rate on loans is less than the marginal productivity of capital in Norway, the rate of return from investing in some countries other than Norway is higher, (see Kartevoll, Lorentsen and Strøm, 1980; Hill, 1979). It is therefore tempting to conclude that the management of the Norwegian assets could be improved by reducing the rate of depletion, and by investing in real capital abroad rather than in Norway. But one ought to be careful. There are lots of imperfections, uncertainties and political considerations that change the assumptions underlying the neat Dasgupta–

Eastwood–Heal world. Judging, for instance, from the Norwegian discussion on oil policy, the Norwegian depetion policy is certainly not separated from the system of preferences and the consumption path. At first sight this policy seems to be non-optimal. On the other hand one can think of imperfections and uncertainties that make even the Norwegian depletion policy optimal!

In what follows we shall not undertake to try to determine optimal depletion policies. We take as given the official Norwegian depletion policy that aims at producing 70–90 mtoe per year. However, by comparing rates of return and real interest rates we shall try to shed some light on the optimality of current oil policy.

III Alternative Ways of Using the Oil and Gas Revenues

The revenues from the extraction of oil and gas can be split up in two parts; one part is the remuneration to labour and capital employed in North Sea activities, the other part is the scarcity rent which the Norwegian government attempt to expropriate through royalties and special taxes. A considerable, but hopefully a diminishing, part of the scarcity rent is kept by the companies.

The revenues over and above the remuneration to labour and capital have no counterpart in the use of Norwegian resources. This scarcity rent can be considered as an extra income rather similar to massive unilateral transfers, e.g. those of the Marshall aid programme. The fact that the transfers are embedded in the price is just a formal aspect of the situation.

North Sea oil and gas production is at present mostly undertaken by multinational companies although an increasing share will be undertaken by the government's own company, Statoil, and to some extent also by Norwegian private companies. The main control over the development of the volume of production is through the issuance of concessions. In the short and medium term the actual production can be considered as predetermined, reaching 75 mtoe in 1990, although economic policy should, of course, allow for unexpected deviations from planned production.

The projected level of production with moderate assumptions of relative oil price increases implies a huge surplus on current account with a 'normal' development of the rest of the Norwegian economy. The question is how the accumulated surplus should be managed as an asset and when it should be used and for what purpose.

The current account of the balance of payments can be stated as:

$$A_{OG} + A - B + \underline{R} + \underline{V} = \underline{I} \qquad (1)$$

where A_{OG} is the export of oil and gas,
A is other exports of goods and services,
B is total imports of goods and services,
$\underline{R}$ is net interests and dividends from abroad,
$\underline{V}$ is net transfers from abroad, and
$\underline{I}$ is financial investments (net increases in wealth accumulated abroad).

There are the following ways – in current account terms – of using the surplus:

a) other exports can be reduced
b) imports can be increased
c) transfers from Norway to other countries can be increased
d) net foreign investment can be increased
  d1) by reduction of foreign debts or increased lending,
  d2) by increased currency reserves, and
  d3) by investments abroad.

Any combination of these possibilities is feasible. The implications in current account terms of using the surplus do not express the policy choices but are rather the end result of a policy. A policy alternative would be for instance to boost consumption by cutting taxes. The economic effects will work through the following steps.

Demand for consumer goods and services will increase. Some part of this increase will be covered by imports, but prices and costs will increase in Norway. Norwegian firms competing with foreign firms in Norwegian markets will lose market shares. A further increase in imports will therefore take place. The 'traditional' export sectors will get reduced profitability. The least effective firms have to decrease activities or close down, thereby making resources available for the production of consumer goods and services. The result of using oil and gas revenues to increase consumption will therefore be a reallocation of labour, raw materials, energy and other inputs.

The Norwegian government can at present be described as being in search of a policy strategy for the 1980s. The lack of a firm policy is due partly to the uncertainty of the international situation caused inter alia by oil market shocks and partly to bewilderment with regard to handling the fruits of the oil bonanza.

IV The Rate of Depletion and the Return on Capital

A fortune has been found below the North Sea. Some will surely find it natural that an unexpected increase in wealth such as this should

be used for investment rather than consumption. If we assume, however, that the previous accumulation of wealth was consistent with national preferences with regard to present and future consumption, some of the newly discovered wealth must be used for consumption. It is not necessary to start depleting the oil reserves in a physical sense in order to increase consumption. If the expected rate of increase of the price of oil and gas is higher than the rate of interest on foreign loans, it will be better to borrow abroad to cover a balance of payments deficit due to increased consumption. Future oil and gas incomes can be used to service the debts. If such credit is available, decisions on depletion policy can be separated from decisions on the development of consumption. In fact Norway has such credit-worthiness given its political stability and large oil and gas reserves. In our view this possibility deserves closer consideration.

When the development of consumption has been decided, the consequences for total savings are determined implicitly. If extensive foreign borrowing is a realistic alternative the question of the rate of depletion becomes simply a question of the optimal portfolio of total savings. Norway as a nation can save through (i) accumulation of physical capital, (ii) accumulation of human capital, (iii) further accumulation of natural capital, i.e. through lower depletion, and (iv) accumulation of foreign assets both real and financial.

An optimal composition of accumulation is characterised by the same marginal return on all assets assuming the same risk on each asset. The information on the return on these types of assets is however rather limited. Assessments made in 1980 on the return on physical capital in Norway converge on 6–7 per cent per annum with somewhat lower figures for the later years of the 1970s. Reliable assessments on the return on education are not available but it seems reasonable to assume that the returns are not less than for physical capital. The return on foreign bonds is around 3 per cent in 1980 in real terms. The returns on foreign industrial investments are presumably higher but also with higher risks.

The price gain in oil and gas was extremely high in the 1970s. From 1973 the price of oil increased in real terms by 20 per cent annually. We have assumed an average increase of 3 per cent per year in real terms from 1980 to 1990.

There is no particular reason to assume that decisions on depletion policy in Norway are based on the type of considerations discussed above. On the basis of our assumptions we find, however, that in 1990 the actual depletion may imply that rates of returns on different assets are considerably equalised compared with the rates of 1980.

The empirical results in this chapter allow us to compare two alternative ways of using the oil and gas revenues in the decade ahead. In the first alternative ('Reference scenario') we assume that all oil and gas revenues are accumulated in foreign assets. Industrial interests in Norway seem to favour this alternative. In the other alternative ('Using revenues') the oil and gas revenues are used domestically for consumption and investment. The balance of payments surplus is kept at a more modest level, such that all foreign government debt is repaid by 1985 and net foreign assets in 1990 amount to 20 billion US dollars. In this alternative we distribute savings over the four different ways of accumulation in such a way that differences in rates of returns are reduced.

V The Choice of Model Tool

The model chosen to study the problem outlined above is a multisectoral growth model of the Norwegian economy called MSG-4E. The model is a development from an earlier model which originated in an empirical study of the growth potential of the Norwegian economy (Johansen, 1960, 1974; Longva, Lorentsen and Olsen, 1980).

MSG-4E traces out the long-term growth paths of the economy, especially the distribution of labour, capital and production over about 30 industries, the changes in household consumption patterns, and the development in the corresponding equilibrium prices.

For each industry the input coefficients of labour, capital, energy and other materials are determined by cost minimisation. The mix of oil and electricity as energy inputs is also determined endogenously from relative prices. For each industry there is assumed to be a trend of technical change. The equilibrium commodity prices are then determined by unit costs taking into account the full input–output relationships.

On the quantity side the allocation of production by industry is determined by the final demand as in the traditional input–output model. Industry demand for capital and labour services is also derived. Imports are calculated from import shares differentiated by commodity and purchasing industry. Final demand is exogenous, in the case of exports and government expenditures, and endogenous, in the case of household consumption and private gross investment.

Private gross investment is determined in a closed loop with the scale of production by industry. The scale of production determines capital services and capital stock both by industry and by type of asset. This then determines private gross investment by commodity.

For given prices the commodity composition of household con-

sumption depends only on its total which is determined so that total capacity use is ensured.

The model thus depicts an economy at full capacity utilisation. The main variables given exogenously are the total labour force, the rate of return on capital, the parameters of technical change, and the exogenous components of final demand.

The description given above outlines the main features of the model and does not refer to the smaller features, found in the formulation of the model. Among these are submodels of capital depreciation, indirect taxes and changes in commodity stocks. Some industries are specialy treated; for example they may have decreasing returns to scale or exogenous prices.

On the whole the model has been found to be quite well suited for an exercise where overall consistency in a general equilibrium sense would appear to outweigh the need to pay attention to the details of individual industries. However, the model does project considerable changes in industrial structure over a period of ten years and this raises some questions as to the interrelation of the firm structure and the age structure of capital within the individual industries. Work is going on to improve the model in this aspect.

The model does not include a calculation of results for the balance of payments in current and capital account. A supplementary model to calculate these variables has been hooked onto MSG which uses the results from MSG together with exogenous information about interest rates, transfers and some capital transactions. The model specifies five institutional sectors – government, financial institutions, oil and gas companies, shipping and 'others' – and determines the items of current and capital account using exogenous information, econometric relations and definitional balances.

VI The Economic Impact of Domestic Use of Oil and Gas Revenues

The main result of our model computations is a breakdown, by industry, of production, labour and capital which is consistent with the input–output structure, the production functions and the behavioural relationships of the model. The focus of this empirical exercise is the transition from the industrial structure of 1980 to one that is compatible with a substantial use of oil and gas revenues. We compare two scenarios for the target year 1980. In Table 1, the main assumptions and results are summarised.

In the 'Reference scenario' GNP, private and government consumption and investment develop at very slow rates. The labour market is assumed to be in balance at full employment level and

Table 1 Assumptions and results for macroeconomic aggregates, Norway 1980–90.

	Billion Norwegian krone			Annual growth rates per cent	
		Reference scenario	Using revenues	Reference scenario	Using revenues
	1980	1990	1990	1980–90	1980–90
Constant 1978 prices					
GNP	232.4	271.4	282.7	1.6	2.0
Imports	100.3	120.0	142.5	1.8	3.6
Exports	102.7	131.9	119.1	2.5	1.5
Private consumption	120.0	140.2	166.6	1.6	3.3
Government consumption	46.3	53.0	58.7	1.4	2.4
Investment	63.7	66.3	80.8	0.2	2.2
Current prices					
Balance of trade	18.3	123.8	35.2	—	—
Current account	5.7	186.4	34.7	—	—
Foreign assets, net	−96.7	711.2	84.5	—	—

there are no substantial changes in the economic structure, measured by the industrial composition of gross product and employment. Although incomes from oil exports show a strong increase in the 1980s, the domestic use of oil incomes peaks in 1980. From then on the increase in net cash flow in the petroleum sector is used for amortisation of loans, financial investments abroad, development aid and increases in foreign exchange reserves. Only a very minor part of the oil and gas revenues is allowed to influence the domestic economy. The growth potential which oil income creates is hardly used, but at the same time a cutback of oil income would not leave the economy in an adverse situation, it would only affect the growth in foreign financial assets and development aid.

In the alternative scenario the domestic use of resources is increased by reducing traditional exports and increasing import shares. Labour and investment are transferred from exposed industries to industries producing for domestic markets. Production in industries exposed to foreign competition is cut down by reducing exports and increasing import shares proportionately except for 'Crude oil and gas', 'Petroleum refineries' and 'Shipping'. The effects of increased domestic costs on exports and imports have been calculated outside the model. Exports of 'Metals' and 'Basic chemicals' are maintained however, at 1980 levels, but increased import shares make even these industries diminish in gross production. These energy-intensive and capital-intensive industries are hit to a lesser degree by increased domestic costs. If oil revenues were ploughed back into the economy by allowing high wage increases one would

expect labour-intensive industries to have the most deterioration in competitiveness. Calculations on the unit cost function in the model reveal that a uniform increase in wages gives a rise in unit costs which is surprisingly similar in all industries. This is because of the cost-price interrelationships between industries (also affecting capital costs) which diffuses the increase in labour costs and the material-labour-capital substitution which offsets most of the remaining effects of changes in relative prices.

The increase in the domestic use of resources as compared with what happens in the 'Reference scenario' benefits capital formation in private and government sectors as well as private and government consumption. The increase in investment which starts in 1981 enlarges the productive capacity so much that by 1990 the economy catches up with a pure consumption expansion scenario (not shown in the table). This level of investment is consistent with the rate of return on domestic investment being reduced to around 3 per cent in 1990.

Table 2 Industry shares of gross national product, Norway 1980–90 (per cent).

Industry	1980	1990	
		Reference scenario	Using revenues
Primary industries	4.5	3.2	3.0
Mining and quarrying	0.4	0.3	0.3
Manufacturing	16.0	14.2	11.0
Electricity production	4.4	7.7	7.7
Construction	7.2	5.1	6.9
Oil and gas	15.9	24.8	23.1
Shipping	3.6	5.2	4.9
Other transport	6.1	5.4	5.5
Other private services	28.1	21.3	23.5
Government services	13.8	12.8	14.1
Total	100.0	100.0	100.0

The structural changes over the decade are considerable as revealed in Tables 2 and 3. Table 2 displays the industry shares of GNP, calculated in current prices. Because of the compensatory effect of the equilibrium prices, the shares of Table 2 tend to underestimate the reshuffling of productive resources.

Table 3 shows the employment by industry in rather greater detail. Total manufacturing is reduced from 21.6 per cent in 1980 to 15.8 per cent in 1990 when oil and gas revenues are used domestically, while there is only a very slight decrease in the reference scenario. The increase in employment in 'Trade' and 'Construction' as a consequence of using revenues is quite notable.

Table 3 Employment by industry, Norway 1980–90.

	Millions man hours			Per cent of total		
	1980	Reference scenario 1990	Using revenues 1990	1980	Reference scenario 1990	Using revenues 1990
Agriculture	191.1	179.0	157.1	6.5	5.6	4.9
Forestry	20.0	17.4	14.7	0.7	0.6	0.5
Fishing	40.1	46.7	43.8	1.4	1.5	1.4
Mining and quarrying	15.2	16.2	14.8	0.5	0.5	0.5
Food manufacturing	86.7	77.4	70.4	2.9	2.5	2.2
Beverages and tobacco	10.7	11.4	11.4	0.4	0.4	0.4
Textile and clothing	38.8	39.2	17.0	1.3	1.2	0.5
Wood products	57.8	45.4	46.2	1.8	1.4	1.5
Pulp and paper	32.9	35.1	25.6	1.1	1.1	0.8
Basic chemicals	17.0	21.9	16.5	0.6	0.7	0.5
Petroleum refineries	1.3	1.7	1.9	0.0	0.1	0.1
Chemicals and mineral products	70.2	75.6	47.9	2.4	2.4	1.5
Metals	58.5	69.3	53.8	2.0	2.2	1.7
Machineries	124.1	125.6	85.8	4.2	4.0	2.7
Shipbuilding, platforms	97.1	99.6	64.2	3.3	3.1	2.0
Printing and publishing	47.5	59.7	60.7	1.6	1.9	1.9
Total manufacturing	638.7	661.9	500.7	21.6	20.8	15.8
Electricity distribution	38.1	46.1	53.8	1.3	1.5	1.7
Construction	265.3	212.9	273.0	9.0	6.7	8.6
Trade	394.3	445.9	478.0	13.3	14.0	15.0
Crude oil and gas	13.0	19.7	19.7	0.4	0.6	0.6
Shipping	67.0	67.0	67.0	2.3	2.1	2.1
Transportation	264.1	313.9	312.7	8.9	9.8	9.8
Other private services	428.8	514.3	546.6	14.4	16.1	17.2
Government	587.7	637.1	695.9	19.2	20.0	21.9
Total	2,963.8	3,178.0	3,178.0	100.0	100.0	100.0

In order to benefit from the oil and gas revenues there must be substantial industrial changes. For this gain to materialise it is necessary that there be an active industrial policy and labour market policy. Direct and indirect subsidies to exposed industries introduced in the 1970s must be abolished. The overall reduction of employment in manufacturing will make strong demands on labour market policy. Special consideration should be given to possibilities for further imports of services, e.g. in health and education. Such possibilities may ease the necessary reallocation of labour by reducing the demand for service employment in Norway. A greater use of labour-saving techniques in the sheltered sectors together with further investment in these sectors might also help to ease the reallocation of labour.

VII Conclusions

If the people of Norway are to benefit from the oil and gas revenues, they must be used domestically. Accumulation of foreign assets would only postpone the domestic use of the revenues. If the revenues are to be used in a beneficial way, industrial changes must be accepted. It is necessary for long-range planning to accommodate these changes. For some individuals and local communities these may nevertheless imply considerable discomfort.

Oil revenues were used in the 1970s. The results are clearly visible in the structure of industry and employment. Further use of oil and gas revenues will continue this development. Some have fears that this will make the Norwegian economy dependent upon oil and that it implies a development towards a Kuwait economy. Norway is already dependent upon oil but the stage of development of the Norwegian economy makes it very different from the economies of Kuwait and all Third World oil countries. For Norway the use of oil and gas revenues means that some industries will expand faster and others slower than otherwise. A few industries will probably have to contract as a consequence. But it is important to keep in mind that the cause of these changes is not the oil and gas in itself, but the fact that Norway is becoming richer as a nation. Similar changes would have been caused by intensified growth from other sources.

There is a common belief that the manufacturing sector plays a crucial role in the progress and growth of an economy. However, attempts to protect this sector from a decline cannot achieve anything but *less* progress and growth. Another belief is that Norwegian raw materials should be processed at home rather than being exported in a crude state. An industrial policy based on such recommendations could also imply *less* growth in income and welfare. Norwegians should confine themselves to the rather comforting thought that their comparative advantages are in the production of raw materials such as crude oil and gas and hydroelectric power, goods that the surrounding world values more and more highly.

Finally, oil and gas production will last a long time. It is too early to make specific preparations for export industries to take over when the wells are dry. It would be wise to preserve productive power by investments in education, infrastructure and sheltered industries.

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