Mineral Rents and Social Development in Norway

Halvor Mehlum
Department of Economics, University of Oslo
Halvor.mehlum@econ.uio.no

Karl Moene
Department of Economics, University of Oslo
k.o.moene@econ.uio.no

Ragnar Torvik
Department of Economics, Norwegian University of Science and Technology
ragnar.torvik@svt.ntnu.no

Abstract

Norway is often referred to as the prime example of a country that has achieved high growth and low income inequality despite its vast natural resources. This contrasts sharply with many other resource abundant countries, which raises the questions why Norway has succeeded while many other resource abundant countries have not. That is the topic of this paper. To make progress we first need to find out along which dimensions Norway differs from resource abundant countries with a less favorable development. Thereafter we turn to a more detailed description and investigation of the policies adopted in Norway, and discuss if there are lessons to be learned for other resource abundant countries.

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SUMMARY

Norway is often referred to as the prime example of a country that has achieved high growth and low income inequality despite its vast natural resources. This contrasts sharply with many other resource abundant countries, which raises the questions why Norway has succeeded while many other resource abundant countries have not. That is the topic of this paper. We want to find out along which dimensions Norway differs from resource abundant countries with a less favorable development.

On average the economic performance of resource rich countries has been hampered by their natural resource wealth. Natural resources have in many cases been a curse rather than a blessing. The discovery of oil in the North Sea, however, stimulated productive forces rather than grabber activities partly because of the high quality of institutions and partly because of the technological challenges of oil extraction offshore.

There is evidence that countries with a high quality of institutions turn natural resources to an asset rather than a problem. In countries with good institutions, such as good protection of property rights and little corruption, natural resources seem to contribute to growth. More natural resources provide private agents with productive investment opportunities, in turn creating positive externalities for other agents. With poor protection of property rights and much corruption, however, more natural resources may hamper growth. In such countries with dysfunctional institutions, more natural resources may stimulate predation, rent-seeking and other destructive or non-productive activities, in turn creating negative externalities for the rest of the economy. Hence, we call this theory *the curse of institutions*. While the growth effect is negative in countries with bad institutions, we show that the growth effect of resource abundance is positive in countries with good institutions. In countries with good institutions there is no resource curse. For Norway, in particular, resource abundance has stimulated growth rather than retarded it.

In addition to the institutional aspects related to rule of law and property rights, a likely reason for Norway's positive development is the early industrialization and late oil discovery. Moreover, when Norway became oil rich, it already had a long and stable tradition of democratic rule. It also had a well functioning state bureaucracy. All this contrasts with many of the other resource abundant countries in the world today, countries which are neither democratic nor

bureaucratically efficient. Wasteful activities were thus held in check by democratic governance, based on broad political representation with checks and balances in civil society.

In the era from 1900 onwards, more and more of the Norway's natural resources were utilized. This was also an era of increased political participation. The extension of the franchise, and broad geographical and class representation in the political system, created many veto players resisting any attempt of resource grabbing by narrow interest groups. In turn, the industrialization which the resources generated implied a growth in the labor movement, and it was in the interest of this labor movement to promote a political system ensuring that the resource wealth benefited broader groups of the population. Thus, when the oil era came, the institutions of Norway were already well prepared to ensure that also this resource wealth would be to the best of the population. In addition, new institutions and arrangements were created to ensure a sustainable use of the resource wealth.

Social welfare and public social spending have also been important for Norway's development. Oil rents constitute extra income to all citizens where the majority of citizens have reasons to favor an expansion of public social spending rather than tax cuts. This is because tax cuts redistribute in favor of the rich, while welfare state expansion redistribute in favor of the poor. The richer voter whose income lies above the mean would clearly prefer tax cuts, but such voters are in minority. In many less democratic oil exporting countries, politicians "bribe" the influential groups of citizens with visibly low gasoline prices, but fail to provide adequate health care to the majority. Norway spends its oil rents differently and has both high domestic gasoline prices and a high level of public health provision.

Another aspect of social welfare considerations is equity between generations. Countries, like Norway, that have escaped the resource curse, have had a more sustainable use of resource rents than countries that have not escaped the resource curse. There is a tendency for these countries to have higher resource adjusted savings rates. It appears that compared to many other countries, Norway has been able to get the economy on the right path, a path more sustainable in the use of proceeds stemming from natural resources.

Introduction

In 1900 Norway was among the poorer countries in Europe. According to the UNDP Human Development Index, Norway is today among the countries creating the highest welfare to its population. This remarkable transition is a product both of economic opportunities and of political choices. The economic opportunities followed the the vast natural resources. Norway initially exported timber and fish, then developed industry based on hydro electrical power, before finally from 1973 onwards, becoming a producer of oil and then natural gas.

In Figure 1 we have plotted the development of GDP per capita in Norway, Sweden, and Denmark. From the Figure you see that Norway had the lowest income of the three in 1900. This remained the situation until the early 1980s. Since then Norway has had the highest GDP per capita.[1] While Norway in 1900 had an income per capita 40 percent below that of Denmark, the position in 2006 was reversed to 12 percent above Denmark. Today, following Saudi-Arabia and Russia, Norway ranks as the third largest petroleum exporter in the world. It seems clear that the natural resource abundance of Norway has been a main contributor to the economic development giving room for and, as we will argue, being fueled by equitable social policies.

As the literature on the resource curse shows[2], economic opportunities in the form of natural resources are not sufficient for growth and welfare. Although there may be several reasons for this, in the case of Norway we show that some of the dangers of resource abundance have been irrelevant, while others have been turned into advantages. The main reason why Norway's natural resources have been a blessing rather than a curse finds its explanation within the political system and in the policy decisions it generates. In the era from 1900 onwards, more and more of the Norway's natural resources were utilized. This was an era of increased political participation. The extension of the franchise, and broad geographical and class representation in the political system, created many veto players resisting any attempt of resource grabbing by narrow interest groups. In turn, the industrialization which the resources generated implied a growth in the labor movement, and it was in the interest of this labor movement to promote a political system ensuring that the resource wealth benefited broader groups of the population. Thus, when the oil era came, the institutions of Norway were already well prepared to ensure that also this resource wealth would be to the best of the population. In addition, new institutions

1 The data is taken from Maddison (2008)
2 See for example the overview of van der Ploeg (2008)

were created to ensure a sustainable use of the resource wealth.

In order to find the relation between oil rents and social development our approach is twofold. First, we point to the reasons why oil rents have contributed to social and economic development in the country benefiting the great majority of its citizens. With respect to this, our most important line of arguments concerns how the oil rents, contrary to the experiences of other oil producing countries, were not wasted unproductively or extracted by the elite or by other special interest groups. We emphasize how the wealth itself was distinguished from income or rents on the wealth, i.e. how the oil rents were equitably distributed and efficiently used without wasteful rent seeking and why the rents to a large extent were used on social welfare spending. Second, we point to reasons why the social and economic development prior to the discovery of oil facilitated an efficient implementation of the oil rent to the benefit of the majority

Section 2 sketches some important dimensions of social development in Norway. Section 3 discusses the connection between resource abundance and growth. We start out by studying the average effect of resources in a large group of countries in order to create the basis for an analysis of the dimensions along which Norway differs, of which we identify seven. In Section 4 we discuss growth and equity supporting institutions. Section 5 then concludes and we discuss what social and economic policy lessons can be derived from Norwegian experiences.

2. Oil and the economic and social development in Norway

Oil was discovered on the Norwegian shelf in the 1960s and oil production started in 1973. In the first years of the oil era Norway ran had to run a rather large current account deficit in order to allow for the necessary investments in the petroleum sector. The first explorations and investments were paid for by international companies. During the 1970s Norwegian involvement, in part through the state owned oil company Statoil, increased steadily.

In Figure 2 we have plotted the time series for the external balance and investment together with manufacturing and industry value added, all as percentages of GDP. The first striking pattern is the upward trend and the erratic movements in the export surplus. In the 1960s, before the start of the oil era, trade was more or less in balance. In the mid 1970s there was a deficit followed by a surplus of close to 10 percent from the 1980s and onwards, rising to 15 percent plus in the last years. The deficit in the 1970s finds its counterpart in the expansion of capital formation related

to establishing the oil industry. The drop in 1986 and 1998 are both linked to dramatic declines in the oil prices in those periods. The end of the war between Iran and Iraq caused the drop in 1986 and the Asian crisis combined with expanded OPEC production explains the drop in 1998. Hence, in terms of disposable income, the Norwegian economy has become very dependent on the oil sector. When building up the oil industry, Norway benefited from international credit. Norway became an international creditor in 1995 and has been so ever since.

Claim 1:

The expanding oil sector has been an integral part of the economic transformation in Norway. It has generated potentially disturbing shocks that largely have been absorbed and leveled out. International capital markets have leveled out the cash flow variations while a flexible labor supply has mitigated stress in the labor market.

The impact of the oil income has led to a decline in the share of manufacturing production over the period. The answer to why we have seen this decline is twofold. First, as in all rich countries globalization has led to a division of labor in the world, with Asian countries delivering manufacturing goods that previously were domestically produced. Second, the oil income allowed a reduction in traditional exports such as metals, fish, and timber.

Manufacturing production has declined from 20 percent of GDP in the early 1970s to 12-13 percent in the early 1990s. Since then manufacturing production has been stabilized. Textiles, for example, are all but gone, while several of the remaining main contributors to manufacturing are oil related, such as oil refineries and ship and petroleum exploration equipment.

While manufacturing production declined, the oil revenue opened up for expanded production of services, particularly in the public sector. Figure 3 illustrates the development in the labor force composition from 1956 and onwards. The figure shows a marked growth in employment in services over the entire period. This expansion in services production did not, however, lead to a dramatic decline in other employment, the reason being female labor market participation doubling, from less than 40 percent to close to 80 percent over the same period. Even though the male labor force participation declined somewhat, the fraction of adults in the labor force increased from about 65 percent to 80 percent from 1970 to 2006. This increase in labor force participation was in part made possible by the boom in subsidized higher education, particularly among women in the 1960s. Another contributing factor was the increased provision of day care

for children in the 1970s, explaining the sharp increase in female labor force participation in the mid 1970s.

Summing up, social policy made room for a high labor participation rate. Contrary to popular perceptions, the growth of the welfare state increased employment rather than reducing it. The increased income led to an increased demand for services and to increased female labor participation. Public participation in child care and also in the caring for elderly opened up opportunities for women to participate in the formal labor market. Spending on education made it possible to expand the provision of public services without bringing about a too dramatic side effect on industrial production. Hence, the potential harm of rapid reallocations between sectors was to some extent mitigated. In this perspective social spending was in part a prerequisite for the transformation that followed with petroleum, where higher income in part led to higher demand for social spending. Hence, there was a consistent co-movement of forces, or complementarity between arrangements, that led to a quite frictionless transformation. In the following we will look at the institutional arrangements in more detail and we do so in a comparative perspective. We will point out other complementarities in the Norwegian oil economy.

3. Petroleum and growth

Our first concern is to compare the Norwegian experience at the macro level with that of other resource rich countries.

Claim 2

On average the economic performance of resource rich countries has been hampered by their natural resource wealth. Natural resources, such as oil, have in many cases been a curse rather than a blessing.

There is a large literature supporting this claim. Most of it investiging the effects of resource abundance on growth. A typical example is reproduced in Table 1, which reports results from a cross country growth regression with annual growth rate as the dependent variable. Regression 1 shows that, controlling for the initial income level and the openness of trade policy, resource abundance is negatively correlated with growth.

One possible explanation of the negative relation between resources and growth could be that exporters of natural resources have a weak protection of property rights, much corruption, and bad quality of the public bureaucracy. If this is the case and if we do not control for the quality of institutions we could misleadingly blame resources for a low growth that is caused by the quality of institutions. In regression 2 we controlled for part of this by using an index for the quality of institutions. This index runs from zero to one, with one being the best possible institutional quality. We see that the effect of resource abundance still is about the same.

Another problem may be that in resource abundant countries the investment climate is worse than in other countries. In Regression 3 we control for this by including the share of investments in GDP. The effect of the resource abundance term still basically is the same. Indeed, we could go on controlling for more factors, and this is precisely what the empirical literature on the resource curse has done. We may conclude from this literature that in the last 40 years there is a negative correlation between the share of primary exports in GDP and the growth rate of GDP, also when many other factors are controlled for. It is important to realize, however, that this correlation does not necessarily imply causality. It may be that the correlation is due to omitted variables, or that the chain of causality runs from low growth to resource dependence and not the opposite way. It is probably fair to say that there is no agreement in the literature at the present as to what extent mineral wealth *causes* low growth.

There is also another serious concern. For policy purposes the first wave of cross country results are not very helpful. If there is a negative average effect of resources on economic growth in bad performing Nigeria and better performing Norway, one ought to study what causes this *variation* rather than studying the average effect. Thus, recently we have seen a shift in the resource curse literature – researchers have turned to the more important question of why some resource abundant countries succeed while others do not. Resource abundant countries constitute some of the richest and some of the poorest countries in the world. The most interesting aspect of resource abundant countries is not their average performance, but their huge variation.

Claim 3:

The type of natural resources that Norway has is particularly harmful to the economic performance in some countries.

To see the relevance of this claim observe first that it is unlikely that all types of resources have

the same effect on growth. The mechanisms that help explain why resource abundance may lower growth are often linked to the profitability of extracting these resources compared to the profitability of other economic activities. A considerable difference in profitability leads to diversion. It stimulates rent seeking and alters political and economic incentives that all in all strongly influence the allocation of talent and capital across sectors and activities. In many empirical investigations, however, all natural resources are lumped together to create one measure for resource abundance as if agricultural resources were as profitable as oil and minerals. We need to investigate whether different resources have different effects on growth and, more importantly, which resources have the strongest growth effects.

The study by Boschini et al (2007) is probably the most detailed exploration of how different types of natural resources affect growth and how this is linked to the quality of institutions. These authors use four different measures of resources and find that what is crucial for the growth implications is the 'lootability' of resources. Rents from oil resources are found to be particularly easy to grab since they are geographically concentrated and feasible to transact. This is also shown by our data. As we demonstrate below oil and minerals are more strongly associated with low growth than other natural resources. Thus Norway is rich in a resource that has a particular potential for hampering economic growth, meaning that political and social institutions in Norway are put to a more severe test in order to prevent harmful effects on growth and development.

The same type of natural resources may initiate different economic and political dynamics depending on where they are located. One example documented in the literature is that of primary versus secondary diamonds, where secondary diamonds are found to fuel civil conflict while primary diamonds are not (Lujala et al 2005). The hypothesis is that property rights are more easily defended when diamonds require mining than when they do not require advanced mining, leaving less room for rebels to loot and extort.

Similarly, Lujala (2007) finds that onshore oil increases the risk of violent conflict in a country, but that offshore oil has no effect on the risk of conflict onset. Again, this finding may reflect that onshore oil represents different incentives and opportunities for rebel groups than offshore oil. Offshore oil installations are easier to protect and the operations of an oil field can be more or less independent from activities onshore. Onshore oil makes different actors more inclined to use violence and predation to grab part of the oil resources, which in turn may be socially

destabilizing

All in all, much was at stake when oil was discovered on the Norwegian shelf in the 1960s and when oil production started in 1973.

4. Petroleum and institutions.

Our second concern is how Norway's experience can be explained as a result of the high quality of institutions.

Claim 3: *The discovery of oil in the North Sea stimulated productive forces rather than grabber activities partly because of the high quality of institutions and partly because of the technological challenges of oil extraction offshore.*

Again the empirical support for this claim is partly based on cross country comparisons. Across countries there is a link between early industrialization and the quality of institutions. The rather well performing institutions in Norway are to some extent a result of the late discovery of the oil resources and the rather early industrialization of the economy.

Firstly, countries that were industrialized early are generally not victims of the recourse curse to the same extent as those industrializing relatively late are. On the contrary, economic historians, in particular Gavin Wright (see e.g. David and Wright, 1997), have pointed out that looking back in time, resource abundance has in many countries been a main driver of growth. In for instance Finland, Sweden, Norway, Australia, Canada, and the US resources have historically promoted growth and industrialization. Contrasting the literature in economic history with the literature on the resource curse, one has to ask whether the effect of resource abundance has changed over time – and if so why? One indication that the effects of resource abundance may have changed over time is the independence between income *levels* and resource abundance, despite the close correlation between income *growth* and resource abundance over the last decades.

Secondly, one explanation why early industrialization made countries escape the resource curse may be that the countries that industrialized first were those with the best quality of institutions (Acemoglu et al., 2001, 2002). Therefore the countries that industrialized early – such as Norway compared to most of today's oil producing countries – had an institutional apparatus in place that

prevented the negative growth effects of resources. Countries that utilized their resources at a later stage did not have such institutions in place. The following passage from The Economist [3] illustrates some possible mechanisms:

> Most countries with national firms used their oil wealth to develop the authority of the state, rather than the other way around. So NOCs (National Oil Companies) sprang up before their countries had institutions strong enough to regulate them, or to manage the money they generate – a recipe for inefficiency and corruption.
>
> These feeble governments, in turn, look to NOCs to perform tasks that would normally fall to the bureaucracy. Many oil-rich states rely on them to bankroll their budgets, rather than bothering to collect any tax. They also depend on them to do a lot of the spending: hence the tendency to draft state oil firms into distributing subsidies and providing social services. In the worst cases interference becomes a surrogate for economic growth, as governments demand they build uneconomic facilities and hire unneeded workers.
>
> No wonder then that Statoil, Norway's NOC, is generally thought to be the best of the lot. Norway, after all, was a rich, efficiently administered country long before Statoil produced its first drop of oil. It had plenty of educated citizens to help staff and regulate the company, a free press, well-funded police and impartial courts to guard against corruption. Norway also had demanding voters to limit waste and inefficiency.

Thirdly, there is also direct evidence that high quality institutions help countries turn natural resources to an asset rather than a problem. In earlier work we have argued that resource wealth provides different incentives for major agents in countries where institutions are 'grabber friendly' compared to countries where they are 'producer friendly' (Mehlum et al, 2006). In countries with good protection of property rights and little corruption, natural resources may contribute to growth. More natural resources provide private agents with productive investment opportunities, in turn creating positive externalities for other agents. With poor protection of property rights and much corruption, however, more natural resources may hamper growth. In such countries with dysfunctional institutions, more natural resources may stimulate predation, rent-seeking and other destructive or non-productive activities which in turn create negative externalities for the rest of the economy. Hence, we call our theory *the curse of institutions*.

In order to place the Norwegian experience in perspective we now provide a more general assessments of the curse of institutions. One prediction of the theory is that resource abundance should affect growth differently in countries with good compared to countries with bad institutions – irrespective of when they industrialized. The regressions reported in Table 1 are not

3 The Economist, 12 August 2006, pp. 58-60

helpful to investigate this, as only the average effect of natural resources is derived. To investigate if resources work differently in countries with good and bad institutions we include an interaction term of the form:

(Resource Abundance × Institutional Quality)

In Regression 4 in Table 2 the regression from Table 1 is extended with such a term. The interaction term is highly significant and the effect of resource abundance on growth is now given by the expression -14.34+15.40 × Institutional Quality, implying that improvements in institutions (Institutional Quality towards one) dampen the negative effect of resources.

This result supports the theory that resource abundance has different growth implications depending on the quality of institutions. In countries with the worst possible quality of institutions the index for institutional quality takes the value of zero. Thus in such a country the effect through the interaction term disappears and the growth implications of resource abundance is given by -14.34, implying that resource abundance is very harmful to growth. In countries with the best possible quality of institutions the index for institutional quality takes the value of unity – thus the effect of resource abundance in such countries is given by -14.34 + 15.40 = 1.06. If anything, in such a country resource abundance stimulates growth. Thus the growth effect of resource abundance seems to be the opposite in countries with good and bad institutions. In countries with good institutions there is no resource curse.

From Table 2 we may also find how good the institutions must be for the resource curse to vanish. The positive and negative growth implications of resource abundance cancel out when:

–14.34 + 15.40 × Institutional Quality = 0

Thus in countries where the institutional quality exceeds 14.34/15.40 = 0.93 resources do not contribute negatively to growth. Out of the 87 countries that are included in the regressions, 15 countries reach this threshold. For the top 20 percent of countries with regard to institutional quality, resource abundance does not seem to push growth down. For Norway in particular it is more likely that resource abundance over the last decades has stimulated growth rather than retarded it.

One potential problem with this analysis is that of missing variables – there may be many other differences between Nigeria and Norway than institutional quality that we have not controlled for. Maybe the resource curse is only valid for Africa as the poorest and least developed continent? To shed light on this, all African countries are excluded from the analysis in Regression 5 in Table 2. The main message is that basically the same results emerge – the resource curse does not seem to be a phenomenon limited to Africa.

In Regression 6 in Table 2 we try out an alternative measure of resource abundance – only including oil and minerals. This alternative measure is particularly relevant for the case of Norway. Two important lessons emerge from regression 6. First, the direct term of resources on growth is still negative, and the effect is stronger than in the case with the all inclusive measure of resource abundance. Second, the interaction term is still positive, and it is stronger than what we found when using the all inclusive resource measure. These two results are economically important for interpreting the variation across countries and for assessing why Norway has performed better than most other resource rich countries. Compared with natural resources in general, oil and minerals have a stronger negative growth impact when institutions are bad and a stronger positive growth impact when institutions are good. Again this partly explains why Norway has had such a favorable development – not only has the quality of institutions been sufficiently high, but given the high quality of institutions the type of resources has been one that favors growth to a great extent.

Another factor possibly explaining Norway's performance is offshore oil being more growth promoting than onshore oil. Offshore oil demands more complicated technical solutions. While Norway had no high tech industry when oil drilling began in 1973, the challenging climate and deep sea drilling has necessitated the development of a such a new industry that today is a world leader. These circumstances are often claimed to explain why the experience of Norway stands in sharp contrast to the phenomenon of the Dutch disease. The oil sector has generated new human capital and positive knowledge externalities domestically, rising rather than slowing productivity growth. The value of the new human capital by far exceeds its use on the Norwegian shelf.

The new knowledge is exportable. Norwegian oil companies are for example heavily involved in Angola, with sea depths of around 2000 meters. The Norwegian company StatoilHydro was recently selected as one out of two main foreign companies to participate in Russia’s Shtokman

field.[4] Rough climate and demanding conditions for drilling, which was initially a main challenge, has thus turned into effects of resource abundance different from what standard Dutch disease theory would predict.

Already in 1970 the Norwegian government, after political dialogue in the parliament, laid down the so called "Ten Commandments" for the management of the emerging oil sector. The most important of the ten commandments were: 1. National control with all offshore activities. 2. The reserves must be developed so that Norway becomes independent in the provision of oil. 3. The oil sector should contribute to new industrial activities. 6. Petroleum from the Norwegian continental shelf should as a rule, and if national interests does not demand otherwise, be processed in Norway. 7. The state should be involved at all relevant levels and should contribute to the coordination of Norwegian interests and to the creation of an encompassing integrated oil industry with national and international ambitions. 8. A state owned oil company should be established in order to look after Norwegian commercial interests and in order to cooperate with Norwegian and foreign private companies.

These commandments illustrate the role of politics in Norwegian oil extraction. That the political process led to such explicit commandments demonstrates how politicians at the time realized that they were making crucial decisions at a crucial moment. Their seriousness has contributed to the consensus building around the development of the oil economy. Their insistence of state involvement and state control are also worth noting. The policy of governmental involvement contrasts the policy advice that many countries are given today. In Norway government involvement has assured national participation and the building of technical competence in all aspects of offshore exploration, drilling, and production in addition to most aspects of onshore supporting technology and services. In retrospect it must be said that most of the ambitions in the commandments have been realized. Again, the success should not be ascribed to the commandments themselves, but rather to having proper institutions to implement the commandments' ambitions.

One example of the risky policies that the commandments inspired, is the insistence on Norwegian participation in the explorations. To drill in the North Sea international oil companies had to let Norwegian companies take part in their projects. This was a risky regulation that needed a careful implementation to avoid permanent favoritism and persistent low productivity.

4 One of the worlds largest gas fields, located offshore in the Barents Sea.

Over time, however, the regulation led to a strong domestic oil industry that moved up to the international technology frontier in about ten years. In addition Norwegian communities and industrialists could benefit greatly from the oil activities without too much wasteful influence activities.

Claim 4 *Wasteful activities were held in check by democratic governance, based on broad political representation with checks and balances in civil society.*

Norway already had a long and stable tradition of democratic rule when it became oil rich, another potential benefit of early industrialization and the late discovery of oil. Norway also had a well functioning state bureaucracy. All this contrasts with many of the other resource abundant countries in the world today, countries which are neither democratic nor bureaucratically efficient. Moreover there may be a tendency that resource wealth itself undermines democracy and bureaucratic efficiency in developing countries, see for example Ross (2001b).

In highly autocratic regimes, resource abundance is particularly harmful to economic performance. Resource abundance has a larger -- more negative and clearly significant -- effect on economic growth than in other regimes (Bulte and Damaina, 2008). Within democratic regimes the picture is more optimistic as it is difficult to find any robust links empirically between resource abundance and low economic growth in democratic countries. This is documented and further discussed in Bulte and Damaina (2008) and in Andersen and Aslaksen (2008). The stable democratic system of Norway has obviously been of great importance as a guarantee that the proceeds from the petroleum sector did not derail growth and that the money was used in part to fund social spending. There is reason to think that democratic rule has contributed to raising growth and improving economic performance.

Within democratic regimes the type of democratic rule also seems to matter. First of all, constitutional differences affect how different interests in society are represented in parliament and in government. Like most European countries, Norway has a parliamentary political system. The government is made strong by having the political support of the national assembly. With a strong government it is important that all the major interests are represented in parliament in order to minimize favoritism and other types of misuse of power. The elections in Norway are based on proportional representation close to the ideal where each elected representative has the

same number of votes in his support.

In general, election systems with proportional representation tend to achieve a broader representation of the interests of society than majoritarian systems where each district chooses one representative. On the one hand, with proportional representation the number of political parties tends to be large with a broad geographical and class representation in the parliament. Majoritarian systems, on the other hand, tend to have two (or three) parties only with a more narrow representation. The size of the minimum winning coalition differs in the two systems. While it is one quarter of the electorate within a majoritarian system (half of the votes in half of the districts), it is half of the electorate in systems with proportional representation.

As we have already pointed out, parliamentary systems have a broader representation within government. The executive body has its basis in parliament, the possibility of a vote of no confidence in parliamentary regimes puts veto players in a strong position to abort policy should it head in the wrong direction. Presidential regimes in contrast, may have a more narrow representation, and a president cannot be removed from office by parliament. Thus presidential regimes may become more of a "one man show" that can be captured by special interests. If all this is right one should perhaps expect the benefits from oil rents to be distributed more equitably in parliamentary regimes with proportional representation, than in other regimes.

The broad representation in parliamentary systems tends to favor public spending on universal programs that potentially benefit all citizens. This tendency is stronger the closer the election system is to the pure proportional ideal. For the same reasons, parliamentary systems also tend to be more redistributive. In contrast, the empirical research that supports these assertions also demonstrates that countries with majoritarian systems tend to favor public spending that can be geographically targeted and which is less redistributive (Milesi-Ferretti, Perotti and Rostagno, 2002; Persson and Tabellini, 2004; and Alesina and Glaeser, 2004 ch. 4). It is also particularly interesting to note that based on cross country regressions the resource curse seems to be relevant in democratic countries with presidentialism, but not in democratic countries with parliamentarism (Andersen and Aslaksen, 2008).

Another important feature of the Norwegian political system is the strong degree of consensus also in the management of the oil sector and the oil revenue. Norway has a tradition of consensus building over policy choices of long lasting national interest. Since the second world war it has

been true for policies concerning foreign affairs and security, and for social spending and the welfare state. Consensus has secured a management of the oil economy that has followed a consistent path and that has been remarkably free of partisan politics.

Since 1970 there has been 15 changes of cabinet, 13 of these have implied a change from social democratic to center/right or vice versa. One should expect that such political instability would lead to highly variable economic policies as parties would like to maximize their impact once in office. This has, however, not been the case. Part of the reason is probably that politicians acknowledge that they will soon be out of office and that if they provoke the opposition too much, they risk having a reform overturned. It is then better to build consensus and thus to commit the opposition to continue the policy. Management of the oil revenue and the regulatory regimes are obviously policy dimensions where it would be very damaging to have the policy change from one extreme to the other over time.

All governments have for example managed to stabilize the economy in spite of large fluctuations in the oil economy. Figure 4 illustrates the volatility in Norway's oil production. The drop in prices that was evident in Figure 2 is also seen here as a decline in the value of exports in proportion to GDP both in the mid 80s and in the late 90s. These periods also coincide with reduced investment levels in the oil sector. Hence, the impact of the oil price on the Norwegian economy is potentially very high. The negative effect of a price drop is twofold: First, income is hit. Second, the demand for investment is hit. The potential for boom and bust trajectories is therefore large. It could even be magnified if government spending followed government income. But, as the figure shows, unemployment has been largely unaffected by these changes. The policy has generally been to cool the economy down in good times and to run expansionary policies in bad times.

Finally, but not less important, Norway has a comprehensive encompassing union movement and similarly a strong employer association. These organized interests constitute an important part of the civic society. They work as checks and balances on state power and vis-a-vis each other. In addition union locals are present in all large companies, including the oil companies, where they to some extent supervise how the companies are managed. No doubt, unions have inside information on how their companies are run and can use a strong voice against mismanagement of resources and against corruption. Thus managerial discretion is performed in the shadow of this informal supervision.

5. Oil and equity supporting institutions

There are two main distributional dimensions in the exploitation of national natural resources. First there is the issue of distribution of the rents throughout society and then there is the issue of rent distribution between generations. Although the moral reasoning is similar, equity in one dimension does not imply equity in the other. We first consider how current rents are distributed within generations before moving to the distribution between generations.

5.1 Equity within a generation

Within generations the basic question is how to distribute the given oil rents over the population:

Claim 5

In Norway oil rents constitute extra income to all citizens where the majority of citizens have reason to favor an expansion of public social spending rather than tax cuts.

The support for this claim is theoretical. We consider a case where all citizens receive an extra windfall gain in the form of oil rents at the disposal of a democratic state. One way to distribute the rents is of course to give each citizen "his" amount in cash. This is seldom done and was not even considered in Norway. The alternative is then to distribute the oil rents in kind in one way or another, or through tax cuts.

Consider first a rise in public spending, say in welfare state programs, versus a cut in taxes. Clearly, the extra income implies that the same welfare state programs are now feasible with lower taxes, or alternatively, an expansion of welfare programs can be obtained with the same level of taxes. Should one vote for tax cuts or welfare state expansion?

One way to understand how this kind of public spending and taxation are determined is to focus on how political parties compete over the support of voters for tax financed welfare state programs. Policies may then converge towards, or at least be located around, the ideal policy favored by decisive voters who in most cases would be the group of voters with income close to the median. In all countries median incomes are below the mean as the income distribution has a thin tail of very high incomes. In other words, the majority of voters have less than average incomes.

Most welfare state programs provide benefits and services that constitute normal goods. Hence, demand increases with income. Think of social insurance against income loss. Each citizen would like to have insurance arrangements that smoothen individual income streams, and they would like the insurance to be in line with their normal income. Such insurance is difficult, if not impossible, to get in the private market and the demand for social insurance increases with income.

With a balanced budget and a constant tax rate, the size of public spending is proportional to the tax on average incomes (corrected for deadweight losses of taxation that we abstract from in the following). Clearly, all voters with income less than the mean pay less in nominal taxes to finance welfare spending than the average income earner. In other words, tax financing means that even in cases where the welfare state basically provides services to all citizens it normally does so on terms that are better for the poor.

A windfall gain could yield an average tax cut equal to the per capita windfall gain. Voters with income below the mean, however, would obtain a lower reduction in tax payments than this amount, while voters above the mean would obtain a higher tax cut. This is true for any tax scheme that is non-regressive, including a constant tax rate. In other words, distributing oil rents through tax cuts (within a given tax system) would normally give more revenues to the rich than to the poor. Similarly, distributing the windfall gain through welfare state expansion would yield higher implicit benefits to the poor than to the rich. Thus the median voter would favor an expansion of the welfare state rather than tax cuts. An expansion of the welfare state provides higher gains in monetary terms than what the median voter would receive if taxes instead were cut. Tax cuts redistribute in favor of the rich, while welfare state expansion redistributes in favor of the poor. The richer voter whose income lies above the mean would clearly prefer tax cuts, but such voters are in minority.

To test this theory requires much work on how to identify the different effects. It would be to go beyond the scope of this work. It is reassuring, however, that the welfare state in Norway at a first glance actually appears to have been growing as a share of GDP since oil was discovered in the North Sea. Figure 6 shows the developments in transfers to households and government consumption since 1970. Both items have increased considerably. The transfers to households include pensions, unemployment benefits, disability pensions, and sickness compensation. The two largest items in consumption are education and health (the third largest is general public

administration). Hence, a large fraction of the oil income is channeled back to the people through social spending and social security.

One example that is related to the general trade-off between welfare state expansion and tax cuts are the observed correlations between domestic gasoline prices and welfare state provisions such as health care. Distributing part of the oil rents as reduced prices of gasoline has similarities to cutting taxes for the few. The benefits of low gasoline prices go to car users, no matter what their incomes are. In addition, gasoline prices are highly visible and this may imply a high psychological cost (the pain of paying), even when knowing that the government budget gets the revenue. In a recent Norwegian opinion survey only 40 percent of the supporters of the government parties were in favor of further increases. Among the opposition parties' voters only 10 percent were in favor of further increases. One third of the voters said that the gasoline prices would determine how they were going to cast their votes in the upcoming election. Such political pressure could easily lead politicians to lower the tax on fuel, and particularly so in a country that is a net oil exporter. So far this has not happened as the established political parties for the time being withstand the political pressure to lower them.

In spite of being a major oil exporter Norway has among the world's highest gasoline prices. Figure 5 shows gasoline prices for all net oil exporters.[5] Many oil exporters choose to use part of the oil revenue to subsidize fuel – that is to distribute part of the resource rent through a cut in one domestic commodity price. In the figure a benchmark price is the US price of 63 cents per liter. In 2006 this covered world market price, industry costs (plus profits), regular sales tax and a tax of ten cents. Hence, any price below 40-50 cents implies that gasoline is being subsidized. A price above 63 implies that gasoline is moderately to heavily taxed.

Among all the net oil exporters Norway has both the highest price of gasoline *and* the highest share of public health provision to GDP. The two other countries that come close, as captured in the upper right ellipses, are Denmark and Great Britain. In the other end of the spectrum, in the

5 The data are taken from the authors' own datasets. Fuel prices are from www.iza.org and are given in US cents pr litre. Public health to GDP is found in the 2007/2008 Human development report. The price data were all collected within the period 15-17 November 2006. The only exception is the price in Iraq that was collected in 2004. The country codes are as follows Algeria (DZ), Angola (AO), Argentina (AR), Azerbaijan (AZ), Bahrain (BH), Bolivia (BO), Brunei (BN), Cameroon (CM), Canada (CA), Chad (TD), Colombia (CO), Congo (CG), The Democratic Republic of The Congo (CD), Cote d'Ivoire (CI), Denmark (DK), Ecuador (EC), Egypt (EG), Gabon (GA), Iran (IR), Iraq (IQ), Kazakhstan (KZ), Kuwait (KW), Libya (LY), Malaysia (MY), Mexico (MX), Nigeria (NG), Norway (NO), Oman (OM), Papua New Guinea (PG), Qatar (QA), Russia (RU), Saudi Arabia (SA), Sudan (SD), Syria (SY), Trinidad and Tobago (TT), Turkmenistan (TM), United Arab Emirates (AE), United Kingdom (UK), Vietnam (VN), Yemen (YE).

lower left ellipses, we find the Arabic Emirates, Egypt, Kuwait, Oman, Qatar, and Yemen that have subsidized gasoline and that have little public health care. The overall picture seems to be that there is a positive association between price of gasoline and the level of public health. There are, however, interesting exceptions. Most Sub-Saharan oil exporters deviate by having low public health despite high prices. These countries are Cameroon, Chad, Congo, The Democratic Republic of Congo, and Cote d'Ivoire, all contained in the lower right ellipses. The other deviating countries are the countries Iraq, Turkmenistan, Iran and Libya, contained in the upper left ellipses, that all have relatively high public health in spite of extremely low gasoline prices. All these countries are authoritarian with large oil income. The Sub-Saharan case is probably related to poverty and fiscal problems, causing both high fuel taxes and the lack of health funding.

Claim 6

While many oil exporting countries bribe their citizens with low gasoline prices, but fail to provide adequate health care to their citizens, Norway has both high domestic gasoline prices and a high level of public health provision.

This example illustrates the huge differences in the priorities in oil rich countries. It illustrates how oil rich Norway is more similar to its less oil rich European neighbors than to other oil rich countries further away.

5.2 Equity between generations

Claim 7

Measured by the resource adjusted savings rates, countries like Norway that have escaped the resource curse, have had a more sustainable use of resource rents than countries that have not managed to escape the resource curse.

Equity between generations is related to the sustainability of the resource income. Oil production does not represent an ordinary income stream. The oil wealth is limited and oil in the Norwegian continental shelf is part of the wealth. Production of oil therefore to a great extent implies accessing the wealth rather than generating value added. Based on this perspective, the use of the oil rents may be guided by the same principles that guide the use of other assets. A sustainable use that benefits all generations implies that only a fraction of the assets are spent such that the

total stock of assets, including financial, human and physical capital, is not reduced.

Thus it is important to clarify whether Norway differs from other resource abundant countries in this dimension. A main obstacle of such an analysis, however, is that income from non-renewable resources in the national accounts misleadingly is classified as income. For this reason it does not make sense to simply compare the savings rates of different countries.

The (resource adjusted) definition of income is the maximum amount that society can consume without reducing the value of societies' wealth. Should a country consume all the proceeds from the sale of oil the correct understanding is that its savings rate is negative – but the savings rate in the national accounts is calculated as zero: the country had an 'income' which it used for consumption hence the savings rate equals zero (of that 'income').

Thus in national accounts a fundamental problem with sales of non-renewable resources is that such sales are recorded as income, in turn overestimating the true savings rates. Thus savings rates as defined in the national accounts cannot be used to assess whether there is 'overspending of resource income'. We therefore need savings rates that take changes in countries' resource wealth into account. In constructing the adjusted savings rate we start out from the traditional savings rates from national accounts, and then subtract net extraction of oil, gas, minerals, and timber. We term these savings rates *resource adjusted savings rates*.

The question is now whether there are systematic differences in the resource adjusted savings rates between those countries that have escaped the resource curse and those that have not. In Table 3 we sort countries into those that according to Abidin (2001) and Mehlum et al (2006a) have escaped the resource curse in the left column, and those that have been claimed not to escape the curse in the right column.

From Table 3 we note the tendency that those countries that have escaped the resource curse have higher resource adjusted savings rates than those who have not. Among the countries listed as escapers, 10 out of 11 have positive resource adjusted savings rates.[6] In contrast, among the countries that have not escaped the curse 7 out of the 9 countries we have data for have negative resource adjusted savings rates over the period. Thus it seems that compared to many other

6 See Matsen and Torvik (2005) for a discussion of whether it is reasonable, as Abidin (2001) claims, to categorize Oman as a country that has escaped the resource curse.

countries, Norway has been able to put the economy on a path that is more sustainable in the use of the proceeds from natural resources.

Table 3 is thus an indication that saving is one dimension in which Norway differs from many other countries. Note, however, that the table does not say anything about causality – we do not know if overspending of resource income in other countries has resulted in bad economic development – or if bad economic development has resulted in overspending of resource income. Thus all we are left with from this is a correlation, albeit an interesting one.

Of particular interest with respect to savings is the construction of the Norwegian Petroleum Fund in 1990. The aim of the fund was to ensure a sustainable use of the income from the petroleum sector. The rationale for establishing the fund was that the return on financial assets was expected to be higher and less variable than the return on oil in the ground. The first payments into the fund were made in 1996, and from then on the fund has accumulated rapidly. At the present moment the fund is among the biggest sovereign wealth funds in the world. The total value of the fund is about 400 billion USD, which is a little less than the annual GDP.

All the proceeds from the petroleum sector to the state enter into the fund. This makes it transparent how much the petroleum sector contributes to public finances. The parliament each year then decides on how much should be transferred from the fund to the running government budget. In 2001 parliament decided on guidelines saying that the transfers out of the petroleum fund should normally equal the long run rate of return from the fund, stipulated at 4 percent. Thus the guidelines domestically referred to as the "decision rule", implies a sustainable use where one does not tap into the wealth in the fund. In fact, the use of the rents increases as the size of the fund increases. Not only is the use sustainable, it implies a scaling up of the use of oil money with time (as oil in the ground does not count in the wealth). The use will follow a path such that the use of oil rents reaches its highest level when the oil era is over and no more oil cash flow enters the fund. From then on the entire oil wealth is transformed to financial wealth while the 4 percent rule is expected to provide a stable predictable flow for all future period.

In the initial years the transfer from the fund exceeded 4% of the fund, but in recent years this gap has narrowed and the transfers from the petroleum fund is now in accordance with the guidelines.

The day to day management of the fund is delegated from the Ministry of Finance to The Central Bank of Norway. The Ministry of Finance specifies how and where the fund is allowed to invest, and designs ethical guidelines while the Central Bank manages the fund.

The Norwegian petroleum fund ensures that (i) transparency in how much income the petroleum sector contributes, (ii) transparency in how much of the fund is used each year, (iii) the fund is integrated in the budget process (unlike for example in Alaska, where the fund operated independently from other government budgets), (iv) the management of the fund is based on professional economic decisions at the same time as satisfying ethical guidelines, but (v) still the fund is under democratic public control.

Interestingly, at the same day as the "decision rule" was announced, the monetary policy was shifted to an inflation targeting regime. One implication of the inflation targeting mandate of the Central Bank was that the interest rate had to be increased as soon as the Central Bank perceived that there was about to be pressure in the economy. Vocal voters, among them families with mortgages, would be very unhappy with interest hikes. As a result the policy makers soon learned that they would lose voters if there were reasons to blame them for generating excess pressure in the economy. In the public debate breaking the "decision rule" has been *the* yardstick when evaluating the soundness of fiscal policy.

6. Concluding remarks

Norway differs from other oil exporters along several dimensions and characteristics which again explains why the Norwegian resource wealth, and in particular oil, has become a blessing rather than a curse. Some of the good outcomes are associated with characteristics that basically are due to Norway's early industrialization and late discovery of the oil wealth. Better institutions, more democracy, higher initial income levels, and a more diverse civic society are all features of being highly developed and civilized, relative to other petrol states, when the oil resources were discovered. There is no doubt that these features have been very effective in avoiding bad policies and in preventing abuse of power.

Other characteristics such as parliamentary governance and elections based on proportional representation are more constitutional. They have given rise to many political parties and a broad social and geographical representation in the national parliament and in central and local

governments. A broad representation opens up for many veto players that can prevent scrupulous favoritism in public procurement and in the distribution of the oil income. It also makes the political consensus building that seems to have dominated Norwegian oil politics possible.

A third group of characteristics is the growing tradition of rather egalitarian income distribution and a high level of worker security in the country associated with strong unions and a comprehensive welfare state. In short, the oil wealth has worked as a test of the robustness of the Nordic societal model. The model has passed the test so far and has been robust to the new riches. More importantly it has helped in distributing the new riches in a manner that benefits the majority without distorting too much of the productive incentives – explaining much of the oil success. The universal programs of the comprehensive cradle to grave welfare state have given some benefits to all. The strong union movement and its wage restraint through centralized solidarity negotiations have constrained the possibilities of boosting wage differentials with oil money.

More generally, the long tradition of class collaboration, trust and consensus building that the Nordic model entails, has been extended to new areas – to oil from the North sea. Trust and collaboration have helped establish the Norwegian pension fund (funded by oil revenues). The large pension fund is a sign of trusting future politicians, voters and organized interests. Trust and collaboration have also helped the Norwegian society to distinguish between wealth and income, in the form of returns on the wealth, and thus in establishing a sustainable use of the oil money implemented as the “decision rule". Again, this is a remarkable sign of trust. The "decision rule" could easily have been eroded by political competition. Parties could have tried to buy popularity by free-riding on the moderation of the other parties. So far such activities have more or less been limited to one party only.

The Nordic model in itself can be viewed as a set of institutions and policies that fit together. For instance a comprehensive welfare state fits well with a coordinated union movement and a well organized employer association as well as with a high degree of openness towards international commodity and capital markets. One may talk about an institutional equilibrium with complementarities between institutions and policies. Complementarities imply that how well one arrangement or policy works depends on how well another arrangement or policy works.
Each of them strengthens the impact of the other such that the total impact is larger than the sum.

Dietsche (2008) rightly points out that the institutions themselves are endogenous and that it is difficult to derive policy implications from the fact that high growth and good institutions go together. This is also a concern when considering the case of Norway. For example, even though the institutional arrangement related to the Petroleum Fund appears to have worked in Norway, it is an open question whether it is a good idea to introduce it in other oil rich countries. There are a number of conditions behind positive functioning of the fund. Most importantly it is in accordance with what the majority wants.

First, the majority wants public services rather than tax breaks. Second, the majority is concerned with fairness towards future generations. Thirdly, the majority trusts the government in managing the wealth. Without this trust the petroleum fund would not be a good idea. In many poor countries all three conditions are violated. Trust in government is rare, people are too poor to be concerned with welfare of future generation, and many would rather have tax breaks or cheap gasoline than social services.

The general lesson is that there is a need for consistency. Institutions ought to fit together. It is difficult to successfully change some part of an institution if the change is not compatible with the design of other institutions. This often implies that the only alternative for institutional reform involves changing several institutions at the same time. Returning once more to the Pension Fund it is important that it is backed up by the inflation targeting regime. The point is not whether inflation targeting in itself is the best choice of monetary policy. What is important is that it is a prerequisite for sustainable use of the oil fund. Thus, it is part of a productive institutional package, even though inflation targeting may be a disaster in other countries.

We have discussed a number of reasons why the discovery of oil has been a blessing for Norway as compared with most other resource rich countries that on average have performed rather poorly. Critics may say that in this comparison it is easy to stand out as the winner. They may be right. We neither claim that the oil has been optimally managed in all respects nor that every aspect of the policy has been a success. There is no reason to think that Norway has found the only road leading to prosperity and equity for resource rich countries.

Many critics seem to forget, however, that there are more roads that lead to bad performance than to good, and that among these many roads there are some that look politically and economically tempting in the short run. So far Norway has resisted the temptations and the oil

has on balance been a clear positive contribution to the Norwegian society. As Figure 1 illustrates Norway has outperformed its two closest neighbors in the last 40 years. The country avoided the recession of Sweden in the early 90s and the stagnation of Denmark in the late 90s, even though Norway was exposed to many of the same shocks. The oil has provided a steady flow of income and employment opportunities that has been largely unaffected by the economic crises in the world.

If the management of the Petroleum Funds remains at sustainable levels, oil will continue to provide a steady flow of income to the Norwegian government that will give the government flexibility in its fiscal priorities. As the petroleum sector is closing down over the next 50 years, however, the private sector has to be transformed back to a sector that produces goods with smaller margins and with more intense competition than what has been the case for the oil sector. This transformation may provide serious challenges both to politicians and to organized interest as international business cycles may have a much stronger the future. It remains to be seen whether Norwegian entrepreneurs, employers and unions that have gotten used to the oil sector as a profitable and secure business are able to adjust when they again must produce ordinary goods and services in ordinary markets under ordinary circumstances.

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Table 1: Resource abundance and growth

Dependent variable: yearly average GDP growth

	Regression 1	Regression 2	Regression 3
Initial income	-0,79*	-1,02*	-1,28*
Trade openness	3,06*	2,49*	1,45*
Resource abundance	-6,16*	-5,74*	-6,69*
Institutional quality		2,20*	0,60
Investments			0,15*
Number of countries	87	87	87
Adjusted R^2	0,50	0,52	0,69

Source: Mehlum et. al (2006) * indicates that estimate is significant at 5% level

Table 2: Institutions, resource abundance and growth

Dependent variable: average yearly GDP growth

	Regression 4	Regression 5	Regression 6
Initial income	-1,26*	-1,88*	-1,33*
Trade openness	1,66*	1,34*	1,87*
Resource abundance	-14,34*	-10,92*	
Institutional quality	-1,30	1,83	-0,20
Investments	0,16*	0,11*	0,15*
Resource abundance × Institutional quality	15,40*	11,01	
Oil and mineral abundance			-17,71*
Oil and min. abundance × Inst. quality			29,43*
Africa excluded	No	Yes	No
Number of countries	87	59	87
Adjusted R^2	0.71	0.79	0.63

Source: Mehlum et. al (2006), * indicates that estimate is significant at 5% level

Table 3. Resource adjusted savings rates as percentage of gross national income, average 1972-2000

Countries claimed to have escaped the resource curse		Countries claimed not to have escaped The resource curse	
Australia	18,0%	Algeria	6,11%
Botswana	33,0%	Congo	-11,9%
Canada	15,7%	Mexico	10,8%
Chile	7,4%	Nigeria	-22,0%
Ireland	22,0%	Saudi Arabia	-21,5%
Malaysia	19,9%	Sierra Leone	-1,8%
New Zealand	18,4%	Trinidad and Tobago	-3,9%
Norway	17,0%	Venezuela	-1,8%
Oman	-26,6%	Zambia	-5,8%
Thailand	20,0%	Ecuador (n.a)	
USA	15,1%		

Source: Matsen and Torvik (2005)

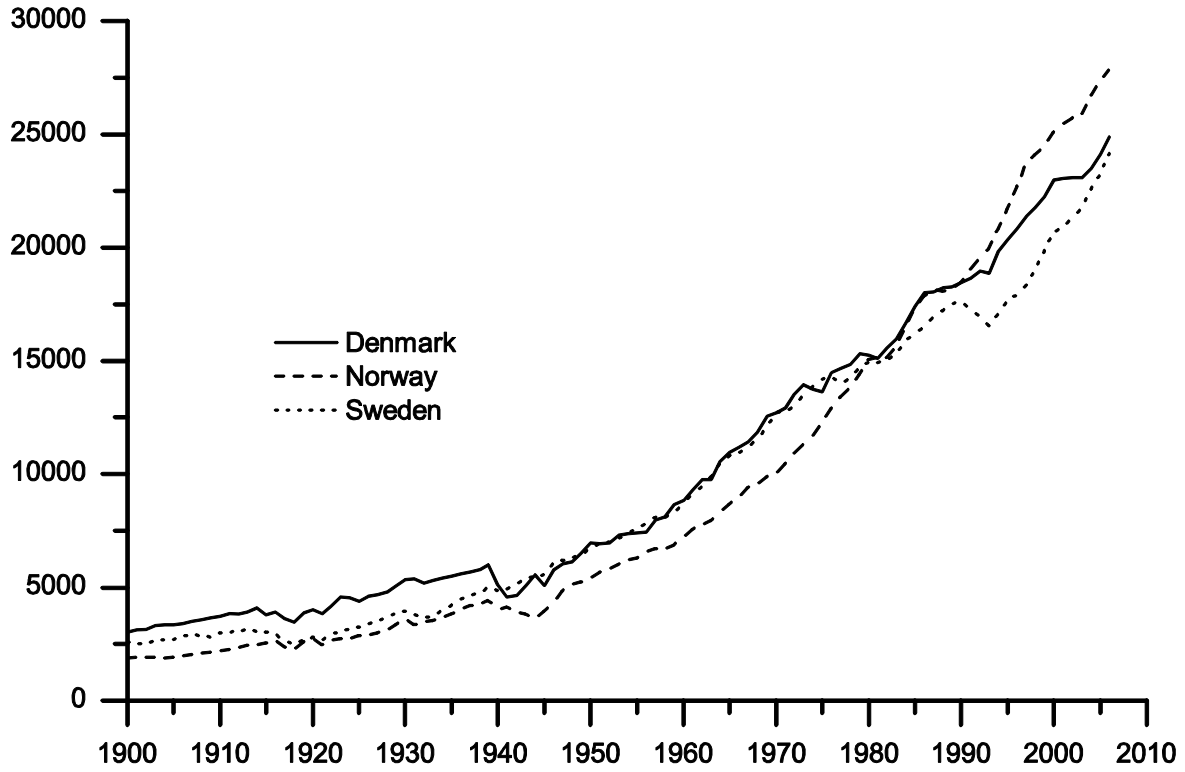

Figure 1: GDP per capita in the Nordic countries, (1990 PPP International Geary-Khamis dollars)

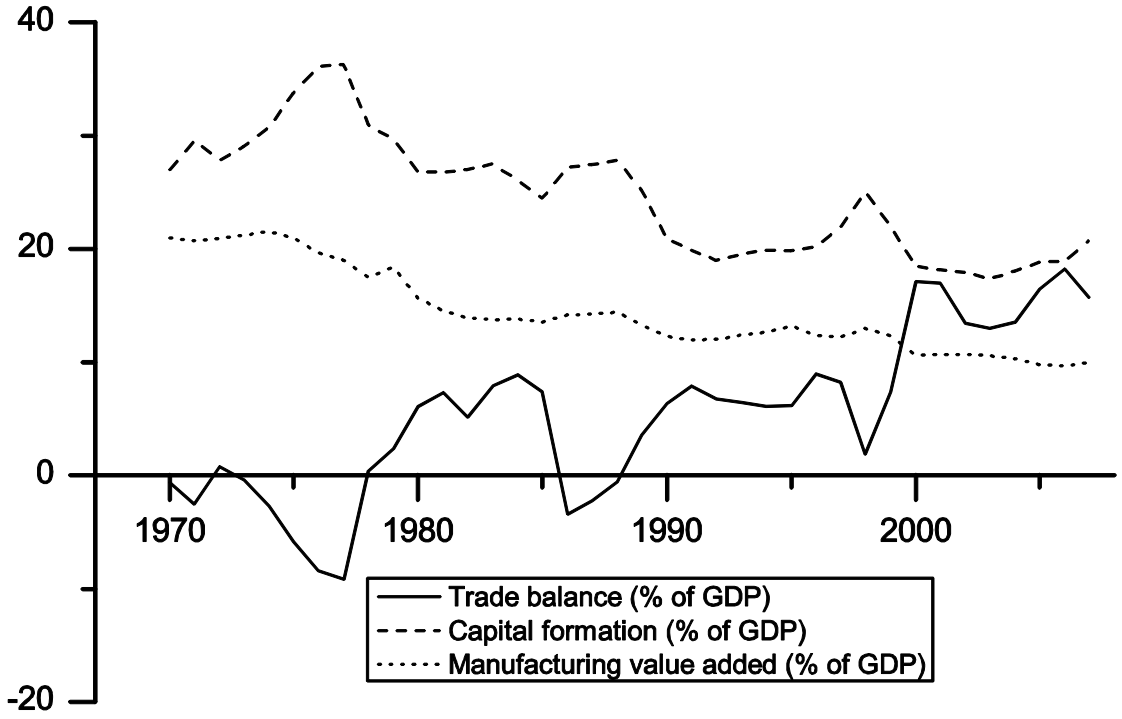

Figure 2: Patterns of investment and production

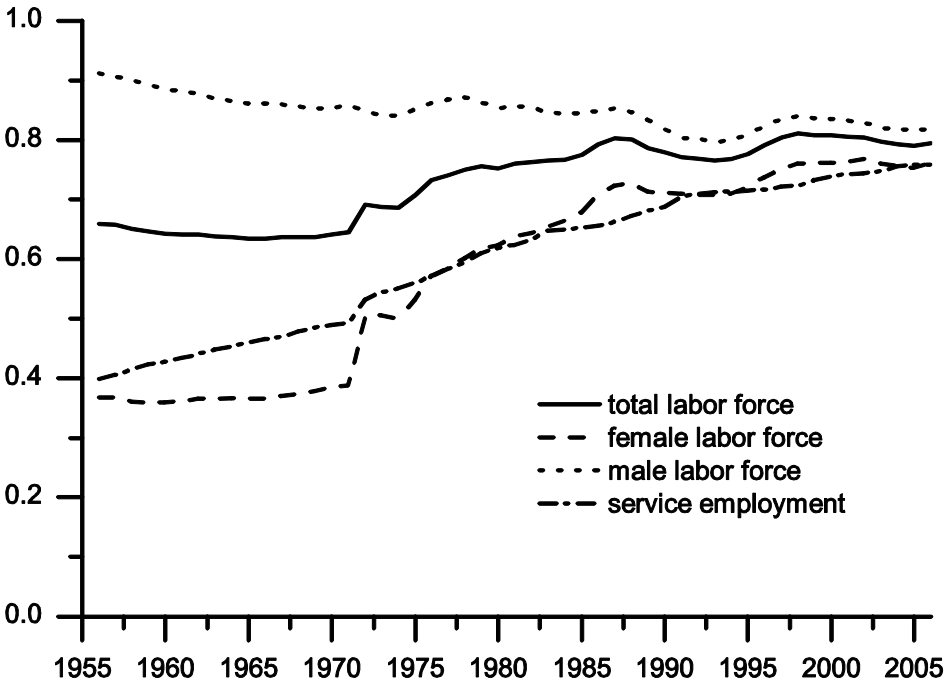

Figure 3: Labor force and service production

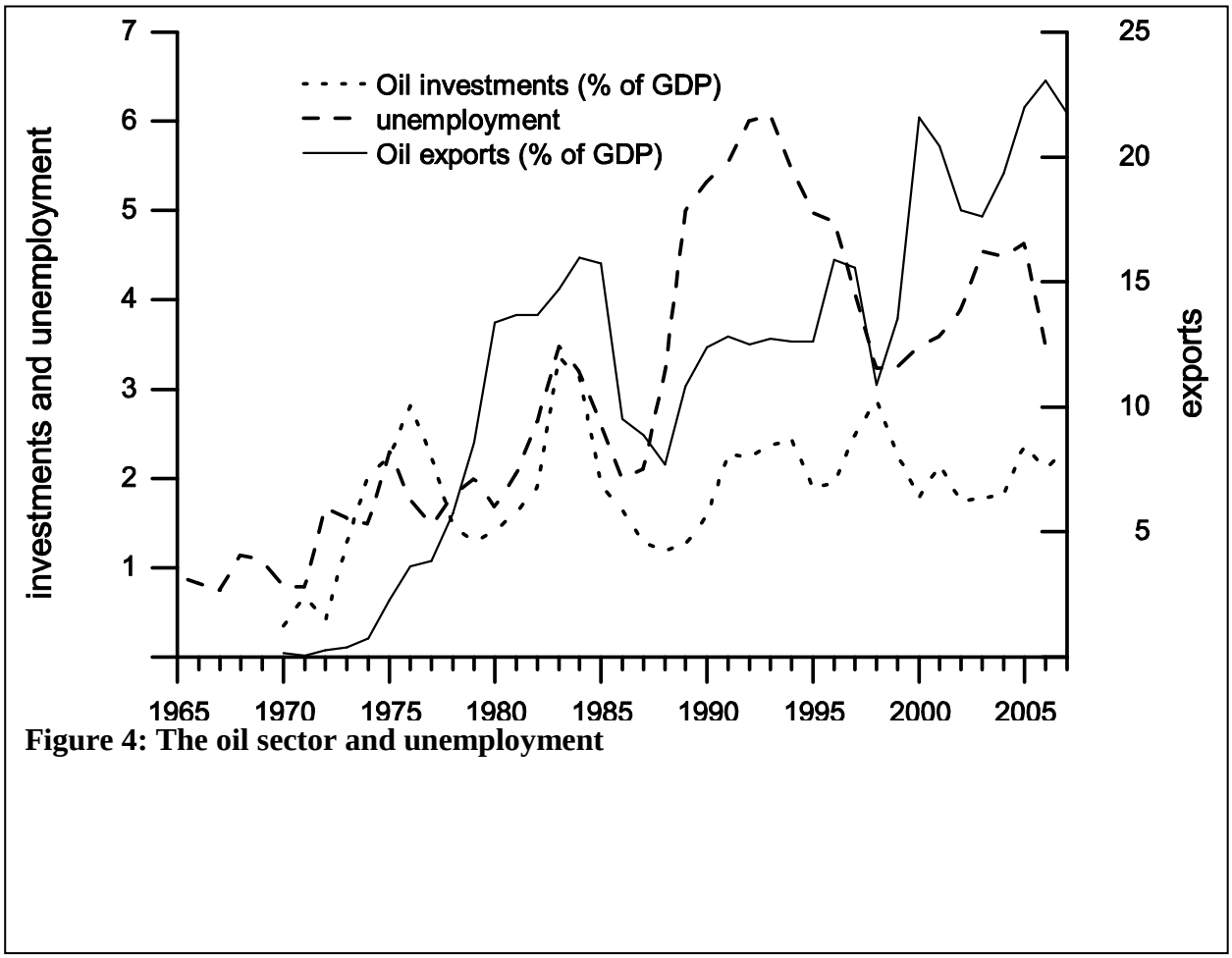

Figure 4: The oil sector and unemployment

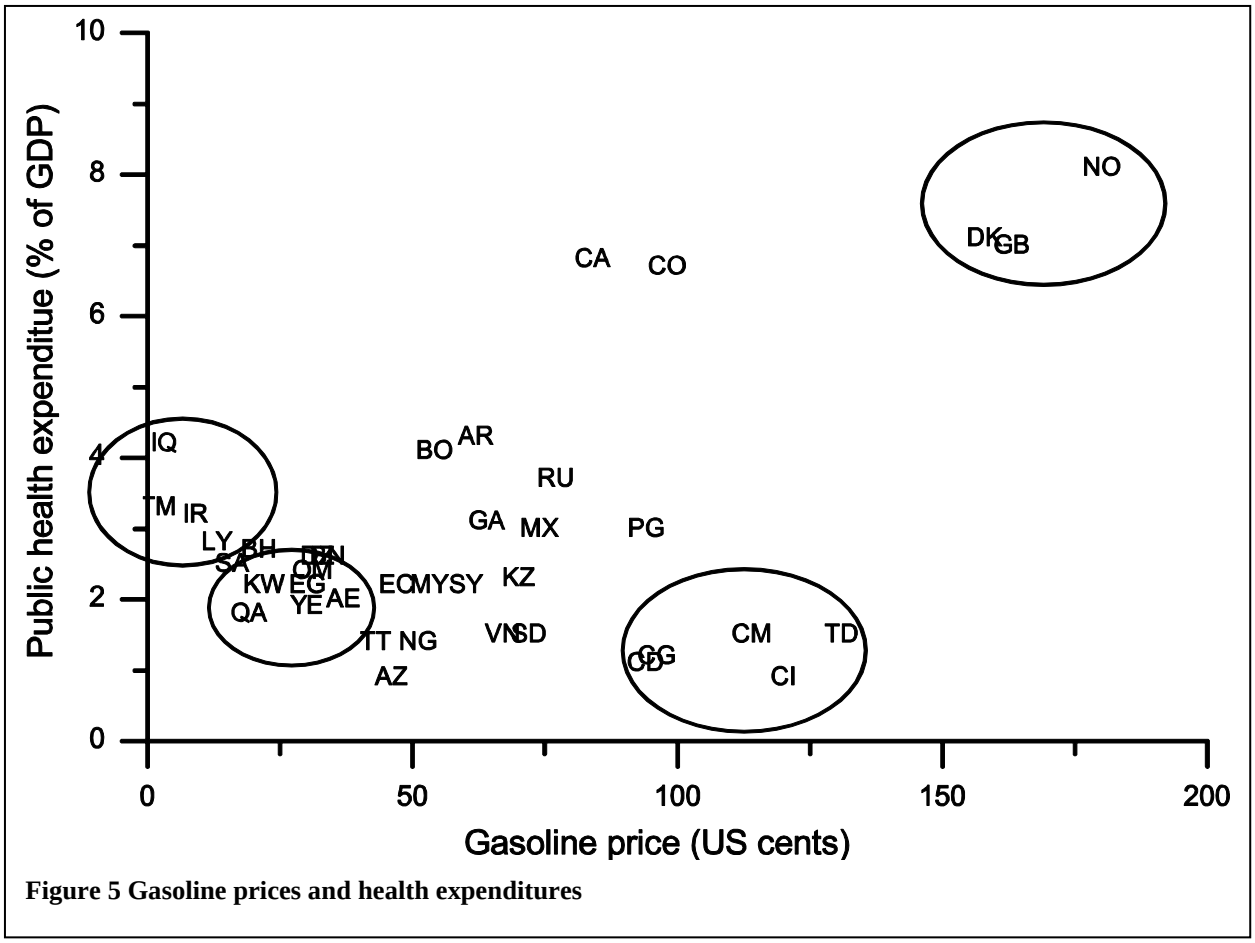

Figure 5 Gasoline prices and health expenditures

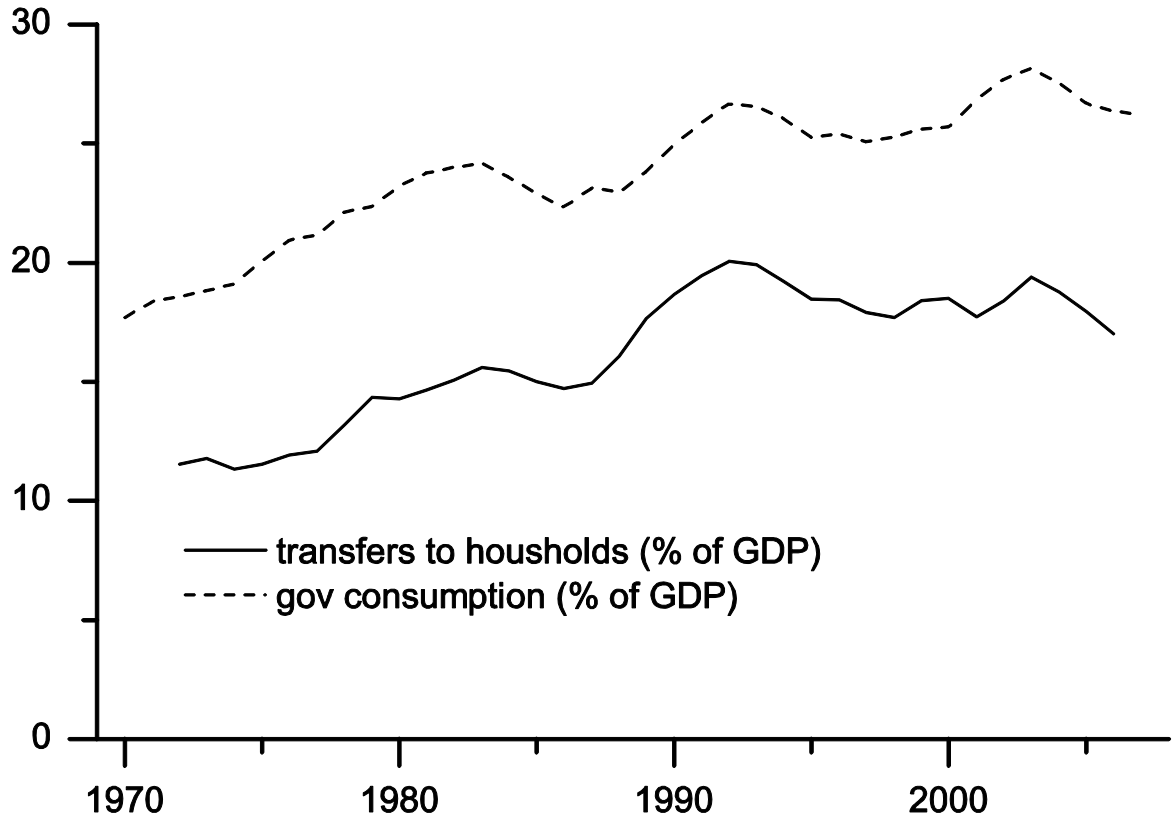

Figure 6. Government expenditure as fraction of non-oil GDP