



*Ådne Cappelen and Robin Choudhury*

# Rapport

**The Future of the Saudi  
Arabian Economy**  
Possible Effects on the World Oil  
Market

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## Rapporter

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# Abstract

*Ådne Cappelen and Robin Choudhury*

## **The Future of the Saudi Arabian Economy** Possible Effects on the World Oil Market

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Saudi Arabia has been well endowed by nature regarding oil resources. This has enabled the country's population to enjoy a standard of living higher than they otherwise would be capable of. There exist almost no export besides oil, and domestic supply of tradeables is very low. Domestic demand is kept afloat by government budgets, but since 1985/86 the government budget and the current account has been in deficits. This has restricted the government's prospects in policy-making. The economy has developed poorly during the 1990's. GDP per capita has been stagnant or even declining and severe financial imbalances have emerged. The country has a political and social structure that is probably not adequate in handling severe economic problems that cannot be eschewed much longer. This may lead to substantial changes in policies but also to changes in government that are very difficult to predict. This study focuses on alternative economic and political developments that may shape the future of Saudi Arabia. The first alternative serves as our reference case. No major changes in government policy or oil policy are assumed. Likely or not, historical trends are carried forward. It rather shows that something needs to be done because of poor economic results for the country as a whole. In the second alternative we assume that Saudi Arabia will enter WTO, and therefore will reduce subsidies, privatise and introduce taxation in order to increase non-oil revenue of the budget. The third scenario is more dramatic in term of oil policy. Lack of funds enforces the government to take on a more aggressive oil policy in an attempt to avoid financial imbalances.

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# 1. Historical and political background\*

Saudi Arabia in its present form was created in 1932 and is an absolute monarchy. The Al-Saud family rules the country. The legitimacy of this family rule has its origin in a religious and political compromise formed in 1744 when the Muslim leader Mohammed bin Abdel-Wahhab sought refuge with Mohammed bin Saud. The latter was then leader of a central but small part of what today is Saudi Arabia. Together they started a campaign across Arabia that aimed at attaining wider control of Arabia for the Al-Saud family and at the same time to give supremacy to orthodox Wahhabism. By 1810 Saudi forces had gained control over much of what today is Saudi Arabia. However, counter attacks from the Ottoman government led to the defeat of the Saudi forces that by 1818 had lost most of their territory. During the 19th century Saudi forces tried to recapture lost territory but support from the Ottoman government to another Arabian tribe (the Al-Rashid) living north of the Al-Sauds, prevented any Saudi military success. For a time the Saudis even had to take residence in what today is Kuwait.

In 1902 the Saudis succeeded in winning back Riyadh from the Al-Rashid and in 1932 Abdel-Aziz bin Abdel-Rahman or Ibn-Saud, declared himself King of Saudi Arabia. When he died in 1953, his 34 remaining sons inherited the Kingdom. Ibn-Saud's successor, King Saud, established the first Council of ministers, which is a form of collective system of government among the sons of Ibn-Saud. The Council of Ministers has both legislative and executive power although the final word is with the King. The members of the council are mainly members of the royal family, families related to it or in some cases technocrats such as the present (from 1995) oil and mineral resources minister Ali bin Ibrahim al-Nuaimi.

In 1992 following the Gulf war, political opposition and pressure from Western governments resulted in

King Fahd issuing three decrees. The first was the Basic Law of Government, which can be seen as the present constitution of Saudi Arabia. Human rights are guaranteed by the state as long as they are in accordance with Islamic sharia and judgements should not clash with the sharia. The second decree established the Consultative Council that now consists of 90 members appointed (not elected) by the King. The members of the council are mostly former senior government officials or highly educated individuals associated with tribal leaders, but there are also a few members from religious opposition groups. Its function is only advisory and decisions are accepted only if approved by the Council of Ministers and ultimately the King himself. The third decree established regional authorities in order to create a hierarchy within regions and a clearer relationship between central and local government. The members of the regional councils are also chosen by the King and are mainly tribal leaders and members of prominent merchant families.

The changes in government that have recently taken place can on the one hand be seen as responses to political pressure both of domestic and foreign origin. On the other hand they can be regarded as an updating of a system of governing by consensus. The population of Saudi Arabia was some 12 million (nationals) in 1992 and had doubled since the first oil price hike in 1973 ("OPEC I"). When Ibn-Saud died in 1953 the population was less than 4 million. Even though only men are candidates to various councils, the large increase in male population will put a government of consensus under pressure to develop new institutions for making political compromises. How should the various interest groups be allowed to and able to express their interests? The two new councils based on the 1992-decision can be seen as attempts to address this question (they were proposed by the later King Faisal already in 1962).

Saudi Arabia should be seen in a wider context and in relation to the "Arab nation". It was after World War I that territorial states emerged out of the final collapse of the Ottoman Empire with the peace accord in Sevres in 1920 when Turkey lost all its possessions. However,

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the new states in the region have not been able to establish themselves as strong nation states. To take just one superficial indication of this phenomenon, the Egyptian, Syrian and Iraqi national anthems and flags have been changed four times since World War II. The question of a successor to the Ottoman Empire is still a topic according to Salamé (1987). According to El-Harmassy (1987) there is little loyalty to the present Arab states but rather to an idea of a large Arab nation. It is also in this perspective one should view the surprisingly large popular support that Saddam Hussein received among many Arabs when he occupied Kuwait.

What are the main interest groups in Saudi Arabia and how might they to shape future policies? We shall distinguish between three main groups; the royal family, the religious community and the emerging business community. The main political force in Saudi Arabia is the Al-Saud family which in total amounts to some ten thousands depending how far from the main line of inheritance one chooses to draw the line. Because there is some uncertainty with regard to succession, rivalry and factions within the family are likely. These could form alliances within the family or with some of the other two groups referred to above. The royal family enjoys a material standard of living and privileges that are possible only for a minority in any country. With the family increasing rapidly in size, the financial burden increases and a westernised and affluent lifestyle provokes other citizens and religious groups in particular. Governing by consensus will be difficult if the living standard of the members of the royal family has to be financed by taxes on ordinary people. According to the Basic Law of the Kingdom "taxes and fees are to be imposed on the basis of justice and only when the need arises". The present Saudi compromise builds on the historical compromise between the royal family and religious Wahhabism, and implies that the Saudi population in general should benefit from the oil revenues of the Kingdom through generous provision of public services and subsidies. In practise this has largely been achieved by providing well paid jobs to Saudis in the government or in companies controlled by the government or the royal family.

With the present King Fahd being ill, his half brother Crown Prince Abdullah is regarded as being in charge of daily policies and the most likely successor to King Fahd. Abdullah is considered to be less pro-Western than King Fahd and has been very active in his foreign policy. In particular, his pro-Arab policy moves seem to have been quite successful. The election of Mohammed Khatemi as president of Iran in 1997 has helped to bring Iran closer to the Arab countries and Saudi Arabia has recently signed agreements to increase both economic and cultural links with Iran. The closer contact between the two countries was probably also important in establishing the most recent cut backs in

oil production within OPEC which more than doubled oil prices during 1999.

The majority of Muslims in Saudi Arabia are Sunni but there is a large Shia minority in the Eastern oil-rich region. The government suspects this minority to have links with Shia groups in Iran following the Iranian revolution in 1978-79 that sparked riots in that region. However, with the establishment of closer relations with Iran, as well as political changes within Iran itself, it is not reasonable to regard religious opposition as mainly a Shia phenomenon. Instead, during the first half of the 1990's there was a growing religious opposition within the Sunni majority and a more radical clergy emerged. The royal family has hoped that the religious leaders (ulema) will be able to control the critics and thereby maintain the historical compromise between Wahhabism and the royal family. The religious critics focus on the close relationship between Saudi Arabia and the US. In particular the governments' reliance on US troops to defend the country against Saddam Hussein was seen by many as loss of honour because a non-Muslim army had to defend Islam's Holy Land. In addition large sums had been spent for many years in building up Saudi military capacity apparently without much success. Increasing hidden unemployment and unequal distribution of income and wealth are also factors that contribute to discontent with the government. The car bombs in 1995 and 1996 are indications of the anti-Western and anti-American sentiments that were present in Saudi Arabia. It is therefore of some interest to note that Crown Prince Abdullahs foreign policy focus on improving relations with other countries around the Gulf, including Iran. His policy in this respect is regarded as quite successful and popular. In the most recent years the religious opposition seems to be on the decline.

Economic development in Saudi Arabia since the 1970's have not only brought higher income for the country as a whole, but has also created a Saudi business class. Government policy has been to nationalise not only oil companies but also to provide beneficial conditions for national companies generally. Until recently it has therefore been difficult for foreign companies to establish themselves without a Saudi national counterpart. With the possibility of a future Saudi membership in WTO this policy will have to be changed. The royal family together with other Saudis are the main entrepreneurs in the economy. The links between the royal family and the business class can be seen partly as an attempt to widen the political basis for the government in a country without parties or civil society in any Western sense. However, the links between the government and the business elite are put under strain whenever oil revenues have diminished and the government must delay payments to the private sector. In addition there are no clear border-

lines between the government and the private economy of the royal family and contracts are widely believed to be part of a “gift” system rather than being market based. Thus competition is limited and this drives up costs for the government. The business class is therefore in favour of liberal reform.

## 2. Economic structure and development 1970-1999

### 2.1. Introduction

In order to analyse what the future might bring for the Saudi economy it is necessary to fully understand the country's present condition, which will be the starting point of our analysis. This section presents an outline of the economic development in the period from 1970 to 1999.

### 2.2. Oil Market

Saudi Arabia is certainly of importance to the world economy as a result of its dominant position in the affairs of oil. The Kingdom accounts for more than a quarter of the world's proven oil reserves and is the world's largest producer and by far the biggest exporter. Quite apart from this fact, the Kingdom also possesses virtually all the idle production capacity in the world. This, needless to say, is of strategic importance to control the oil price through the OPEC. With its large capacity for exporting oil it is only natural that oil and the related industries of petrochemicals and gas dominate the economy. Oil is the key to the Kingdom's balance of payments as well as to government revenues, and has been crucial for the general economic well being of the country. For every USD 1 drop in the oil price, the Kingdom wave goodbye to USD 2.5 billions a year in revenue. In spite of the fact that the government on many occasions have expressed the wish for the economy to be more diversified away from the oil related industries, oil has dominated the economy, and still does.

By means of exploiting the vast oil reserves, the ruling family has relied upon its ability to provide the majority of the citizens with incomes and a comprehensive welfare system to forestall an inevitable criticism or pressure for any change in the way the country is governed. However, the rapidly growing population and the lower growth rates in oil revenues since the second half of the 1980s, implies that such a policy seems unsustainable.

Saudi Arabia's oil epoch is approximately as long as the history of the country itself. Detection of oil was first made near the Persian Gulf in the 1920s, and before long the oil companies took an interest in the Saudi

territory. In 1933 an American oil company was given concession, on very generous terms, for 66 years involving exploring, producing and exporting the oil. In 1938 commercial amounts of oil was recovered, and the Aramco company, a syndicate of four American oil companies, provided the exploitation. The agreement was gradually made more favourable for the Saudi authorities and Aramco was entirely taken over by the Saudis in 1980 and renamed Saudi Aramco.

In the late 1960s and through the 1970s Saudi Arabia built up its facilities to handle larger amounts of production. It currently has a theoretical capacity to produce more than 12 million barrels of oil a day, and has demonstrated an ability to sustain production at a level of more than 10 mbd. over long periods of time. Although no significant additions have been made to the productive capacity of the Saudi oil industry in recent years, it would be possible to increase production facilities substantially if the Saudis so desired. On the basis of the country's proven reserves it would be possible to build and operate facilities to produce more than 20 mbd. In fact, prominent leaders publicly proposed a complex of this size in the 1970s, and preliminary plans was drawn up for evaluation, but it never materialised.

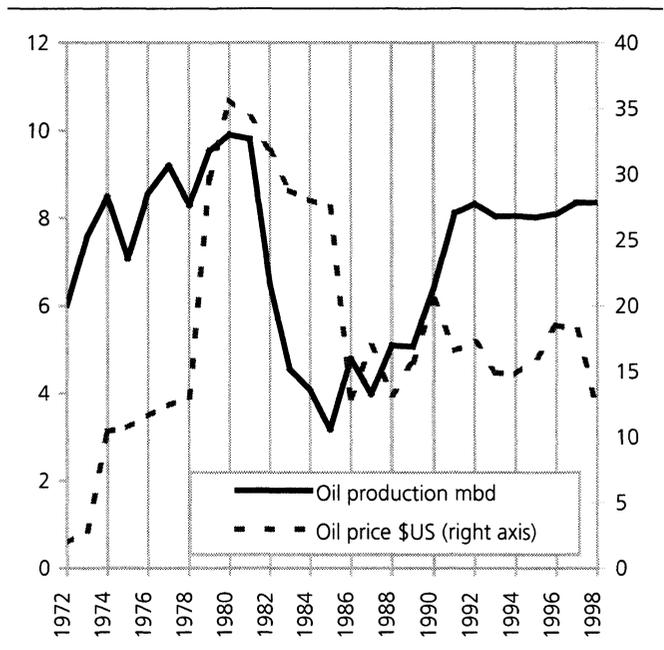
The reasons for the cost competitiveness of the Saudi oil industry are many. On average the Saudi oil fields are the biggest in the world, and associated to almost every field there is high pressure gas allowing the oil and gas mixture to be brought to the surface under its own pressure. Not even fields that have been producing for a long time needs expensive artificial lifting pumps, but can be kept running by their own pressure by water injection. These geological conditions, together with the already existing infrastructure regarding processing and transportation, are the basis for the low average and marginal production costs in the industry. Even though the production costs have increased significantly over the past two decades none of the main oil producing countries are cost competitive. At high levels of capacity utilisation the average cost per barrel are less than 50 US cents and marginal costs even lower, according to T. R. McHale

(1986). In the mid 1980s the cost of producing a barrel was less than one dollar, while Saudi Aramco's production cost in 1994 and 1995 was \$2.50 and \$2.65 respectively.

Figure 2.1 shows the evolution in Saudi oil production and in the oil price since the beginning of the 1970s. As mentioned above, there has been ongoing production since 1938, but until 1970 the cumulative production volume was just on the lower side of 12 million barrels. The expansion in Saudi oil production during the 1970s has been spectacular. Production increased from 3.8 mbd. in 1970 to 8.5 mbd. in 1974. As can be seen from figure 2.1 this increase in production was accompanied by the sharp rise in prices, culminating in the 1973-74 huge increase. This rise in the oil price was initiated by the Organisation of Arab Petroleum Exporting Countries (OAPEC) embargo of oil export to any nation giving military or political support to Israel. There were also plans for major cutbacks on production aimed at increasing the pressure on Israel and its supporters. It is a fact though, that the non-Arab countries in OPEC increased their production and exports during the embargo. After the events of 1973-74 there was a depression in the market causing Saudi oil production to drop by almost 1.4 mbd., or 16.6 per cent from 1974 to 1975, but in the two following years the production rose to a new peak of 9.2 mbd. In the late 1970s during the Iranian revolution, which resulted in diminishing leverage of Iran in OAPEC, this, together with a growing disunity within the organisation, led the Saudis to take a more major role in OPEC. At this stage there were fundamental disagreements with respect to the oil-pricing policy; the Saudis were afraid that oil was in danger of pricing itself out of many markets, and advocated that OPEC should avoid large price increases. In the period 1979 to early 1982, Saudi Arabia refused to go in company with the organisation's marker-crude reference price in its sales to its ARAMCO consortium partners. This resulted in a two-tier pricing system. The Saudis were selling at a price substantially lower than the market clearing price, and were also increasing its production and exports attempting to moderate a price policy they considered would increase the search for alternative sources for energy as well as conservation.

The demand for oil declined as a result of high prices, and in 1983 Saudi Arabia, against strong opposition, advanced reasons for retaining the price competitive. At this time the marker-crude reference price was USD34 a barrel and considered unrealistically high. To sell the idea of cutting the marker-crude price for the first time and establish production quotas for all member countries, the Saudis accepted to take a "swing" position in the international oil market. OPEC publicly announced a 15 per cent cut in the marker-crude price, but this did not stop the pressure on the spot market price. The demand continued to drop,

Figure 2.1. Volume of oil production and oil price



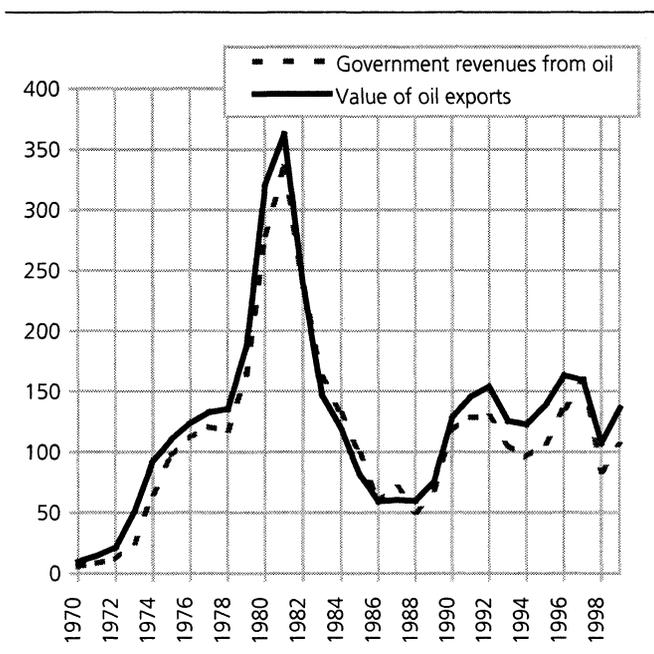
Source: OPEC 1998 and BP Amoco 1999.

while non-OPEC producers and cheating OPEC members expanded their production and exports. Despite this fact the Saudis fulfilled its obligations to OPEC until 1985, when they recognised the hopelessness in their position. By mid-1985 the Saudi production was cut down to just above 3 mbd., lowering the exports to only 2.1 mbd, compared to production levels at about 10 mbd and export of more than 9 million mbd during the first year of the 1980s.

In retrospect, what the Saudis did in the 1980s was to take about 8 mbd off the international oil market. In figure 2.1 it could be noticed that this appeared to put a brake on the drop in the oil price, but not until 1986. For Saudi Arabia, however, their contribution to stabilise the price, cutting back production from 9.9 mbd in 1980 to 3.1 mbd in 1985, did not only drastically reduced their market share, but also drastically cut down their income from oil exports, as can be seen from figure 2.2. One reason why the crude oil price increased only just a little is that others replaced much of the oil taken off the market by the Saudis such as the producers from the Soviet Union and the North Sea.

The increase in production in 1990, shown in figure 2.1, was made to fill the supply gap created by the embargo on Iraqi and Kuwaiti oil. To do this the Saudis had to put old facilities into operation and have ever since, despite the overproduction from many OPEC members, produced close to their quota level at a little more than 8 mbd. figure 2.1 shows that this has stabilised their production volume between 8 and 8.5 mbd.

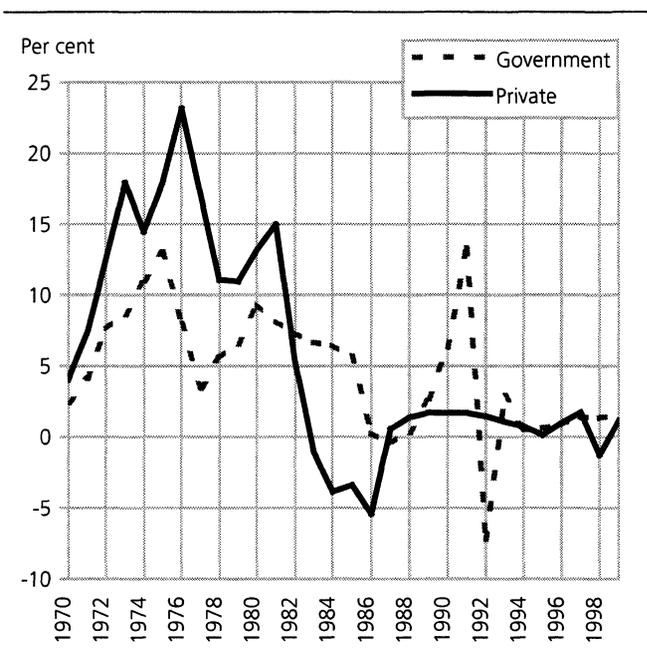
Figure 2.2. Value of oil exports and government revenues from oil. SR bn



The value of crude oil exports and government revenues from oil is shown in figure 2.2. After the steep rise in income from oil exports, reaching a peak value of Saudi Riyals (SR) 362 billions in 1981, the income was reduced to less than a sixth in only five years. Over this period the annualised growth rate of the value of oil exports was -29 per cent, caused by cutbacks in production and exports, as well as a sharp decline in the oil price, particularly at the end of the period. From 1987 to 1989 world market oil prices fluctuated between USD 13 and USD19, while Saudi Arabia produced between 4 and 5 mbd of oil. In late 1990 the Saudis expanded their production and exports by more than 2 mbd to compensate for the loss of Kuwaiti and Iraqi oil supply. On an annual basis the increase was from 5 mbd in 1989 to 6.4 mbd in 1990. The production continued to increase through 1991 and eventually stabilised at a new and higher level at more than 8 mbd. Since 1991 the oil income has fluctuated with the oil price, which is particularly apparent in 1998 when the oil prices were very low, and in 1999 when there was steep rise in prices.

Saudi Arabia also possesses considerably amounts of natural gas. The gas production is entirely used domestically, providing both industry and private households with electrical power. The domestic demand is growing fast, and Saudi Aramco has estimated the increase from 1996 to 2006 to be 77 per cent, from 3.45 to 6.1 billion cubic feet per day. Projects to increase the gas production are aimed both at meeting the underlying increase in demand, but also to replace crude oil used for generating electricity in some provinces. Gas production has traditionally relied on the utilisation of associated gas from the oil fields, and thus is related to the level of oil production.

Figure 2.3 Growth in volume of government and private value added. Per cent



### 2.3. Non-oil Production

Figure 2.3 shows the developments in the volume of private and government GDP. Both sectors had strong growth rates during the 1970s and the first years of the 1980s. The private sector went into negative growth rates in 1983-86, and have ever since showed a modest growth at less than 2 per cent per year. The government sector did not reduce its activities at the same rate, and had a growth between 5 and 10 per cent from 1980 to 1985. At that time the Saudi government's financial situation made them able to fund their activities by running their budget into deficits. From 1983 to 1986 the average annual budget deficit was SR 47 billions. Whether this was a deliberate counter-cyclical policy from the government, or resulting from a sluggish government sector is difficult to say. For the rest of the decade the annualised growth rate in the government sector was 1.5 per cent. The Gulf conflict increased government production in 1990 and especially in 1991, when the growth rate was more than 13 per cent from the previous year. The next year output was reduced substantially, both because the needs arisen in connection with the Gulf conflict was temporary, and because the government was no longer in a position to finance its spending by drawing down funds.

Disregarding the Gulf conflict, figure 2.3 indicates a similar trend in the government and private sector during the late 1980s and through the 1990s. A possible explanation to this is a relative stable oil market. Throughout history it looks like the private sector is hit harder by a downturn in the oil market than the government sector. But this may change as the scope for the government is restricted by its income

**Table 2.1. Value added as share of GDP. Current prices**

	1970	1975	1980	1985	1990	1995	1999
Agriculture	5.2	1.0	1.1	4.4	6.4	6.6	6.7
Other manufacturing	2.3	1.2	1.5	4.3	3.5	4.5	4.8
Construction	5.0	7.7	9.8	12.3	8.7	9.1	8.6
Trade	5.3	3.3	4.3	9.6	7.0	7.2	6.5
Transport and communication	6.9	2.1	3.5	7.6	6.3	6.5	7.1
Petrochemicals and refined products	6.9	3.9	2.4	3.5	4.6	4.4	3.9
Miscellaneous	9.6	6.0	5.7	12.6	10.6	9.5	10.9
Oil and gas	49.9	70.6	65.8	28.1	35.4	34.2	32.2
Government	9.0	4.2	5.8	17.5	17.5	18.0	19.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

from oil, while the private sector will have to learn how to get through difficult times.

Private sector expansion has been amongst the most central topics in the development plans, and it is expected to play a central role in the overall development objectives. Economic activity in the private sector has been closely linked to the general development path since the adoption of the first development plan (1970-74), when the sector began to expand the scope of its activity beyond its previous emphasis on trade into some modest form of production activity. During the first plan period the annualised growth rate in the volume of value added in the private sector was 13 per cent. During the second and third development plans the large increase in government expenditures started to shape the modern emerging private sector which carried into effect industrial, agricultural, health care, transport and maintenance projects. For these two periods the annualised growth rates in the volume of value added in the private sector were 15.5 per cent and 3.9 per cent respectively. With the fluctuation in oil revenues during the fourth and fifth development plans the private sector had to adapt to times of adversity, and there were signs of a more mature and

autonomous private sector whose reliance upon the government expenditure had been reduced. The annualised growth rates in the volume of private non-oil value added were -0.5 per cent and 1.2 per cent respectively for these two periods. In recent years the volume of value added in the private and in the oil sectors has been of the same size.

As we see in table 2.1 the construction sector has dominated the non-oil economy and accounted for 9.1 per cent of total GDP at current prices in 1995, while in 1997 this figure was 8.5 per cent. The sector employed about 15 per cent of the total workforce, although the labour has been drawn almost entirely from the expatriate community. The activities in the sector are almost entirely in private hands, but the government's involvement has been extensive by requiring that 30 per cent of any construction award to a foreign company is subcontracted locally, and by splitting up major construction projects into smaller job

lots. The government is also the main client of the industry.

The wholesale and retail trade sector is the second largest non-oil sector and accounted for 9.6 per cent of total GDP in 1985, but have fluctuated around 7 per cent as share of total GDP in the 1990s. The development in the sector shows a similar pattern as most other industries as it grew very fast until the first half of the 1980s, then there was a period of decline from 1984 to 1989, followed by a slight growth from 1990 to 1997. During this period the growth rate in volume has been 0.9 per cent annually.

The agricultural sector (including forestry and fishing) can refer to a history of continuous growth. The development of the sector is somewhat different from the general development of the economy, in the sense that it grew relatively slow during the 1970s and, as opposed to most other sectors, it was not negatively affected by the downturn of the economy in the 1980s. On the contrary, the agricultural sector went into a period of strong growth despite the decline in oil revenues. The explanation is the government's effort to pursue a policy of greater self-sufficiency in agriculture, particularly in wheat and dairy products. This was achieved by means of large subsidies. In the 1990s the agriculture's share in the value of GDP has stabilised at between 6 and 7 per cent. Agriculture also serves as an important source of employment, and in 1994 the labour in the sector constituted 5.5 per cent of the total workforce. The sector operates under extreme natural limitations, and the cultivation is restricted to about 2 per cent of the land area. Desalinated water is too saline, even after treatment, to be used in agriculture so farmers have to rely on underground water and rainfall. Despite the success in increasing production, government policy became a serious threat to the Kingdom's water reserves, and of questionable economic sense. It is estimated that between 85 and 90 per cent of the water consumption is used for agriculture, and the production relies on non-renewable underground water. These reservoirs have an estimated lifespan of some 15 to 30 years at the current rate of depletion. The 1990/91 wheat harvest was estimated to have cost the government around USD 480/tonne, compared with the world

market price of USD 100/tonne. However, in the aftermath of the Gulf conflict the government was forced to cut subsidies and instituting quotas on the volume that government would buy from the farmers.

Other important non-oil sectors are transport and communication and manufacturing. As part of building up the Kingdom's infrastructure the road-building programme was given priority in the early five-year development plans, but with the completion of major infrastructure projects, and in view of the fiscal problems calling for tighter budgets, this emphasis has diminished in subsequent years. Although there is an urgent need to upgrade and expand many facilities, the annualised volume growth rate of the transport and communication sector (see table 2.2) was only 1.2 per cent during the fifth development plan (1990-94), compared to the second plan (1975-79) growth rate of 20 per cent. The sector's share of GDP, shown in table 2.1, grew rapidly until the mid-1980s when it constituted 7.6 per cent. After a period of stagnation, there has been a slight upward trend during the 1990s.

The government has encouraged the development of manufacturing in an attempt to increase economic diversification and to create employment opportuni-

ties. The strategy has aimed at promoting heavy industry such as petrochemicals, fertilisers and steel. But this has been dominated by the public sector. Heavy industry is almost entirely managed by the Saudi Basic Industries Corporation (SABIC), which is 70 per cent government-owned. The private sector's participation in manufacturing is increasing, and the petrochemical sector is opened up for private investors. The manufacturing sector's share of total GDP in 1995 was 4.5 per cent. From table 2.2 we observe that the sector's growth has fluctuated in the past 15 years, and that the most recent development has been modest.

Saudi Arabia is rich in minerals besides oil and gas. There are known to exist considerable amounts of gold, iron ore, copper, phosphates, silver, uranium, bauxite, coal, tungsten, lead and sink. The government has neglected exploitation of these in the past because of the dominance of the oil, but has shown renewed interest in developing other mineral resources in conjunction with the private sector. During the sixth development plan the mining and quarrying sector (part of miscellaneous) is assumed to grow at an annual average rate of 9 per cent, depending mainly of the developments in the construction sector, but including 1997 the volume growth rate is just above 1 per cent.

**Table 2.2. Average growth rates in GDP**

	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99
Agriculture	3.6	7.6	11.5	12.2	1.4	1.1
Other manufacturing	11.3	16.0	13.7	-4.9	3.8	1.3
Construction	21.6	14.7	-3.2	-5.3	1.5	-0.3
Trade	14.4	23.5	6.4	-1.9	1.0	-1.3
Transport and communication	8.1	20.0	7.2	-0.9	1.2	2.7
Petrochemicals and refined products	1.6	6.8	5.3	17.1	2.9	1.5
Oil	19.5	4.8	-19.6	11.8	5.9	-0.1
Miscellaneous	9.1	12.5	4.1	0.8	0.9	0.4
Total	15.2	8.7	-4.1	2.8	3.0	0.5
- Non-oil	11.3	12.9	4.4	-0.2	1.5	0.8

**Table 2.3. Final demands as share of GDP. Current value**

		1975	1980	1985	1990	1995	1999
Private consumption	31.4	13.8	22.1	50.5	39.8	39.9	46.1
Government consumption	18.4	14.6	16.9	36.4	31.8	25.7	1970
Investments	14.1	16.7	21.0	24.3	19.1	18.2	19.4
Exports	62.0	77.4	70.8	36.0	46.8	43.7	42.0
Imports	26.3	22.9	30.4	43.9	39.4	28.9	37.9
Non-oil GDP	41.8	25.2	31.2	67.4	59.2	60.7	63.1

**Table 2.4. Average growth rates in final demand**

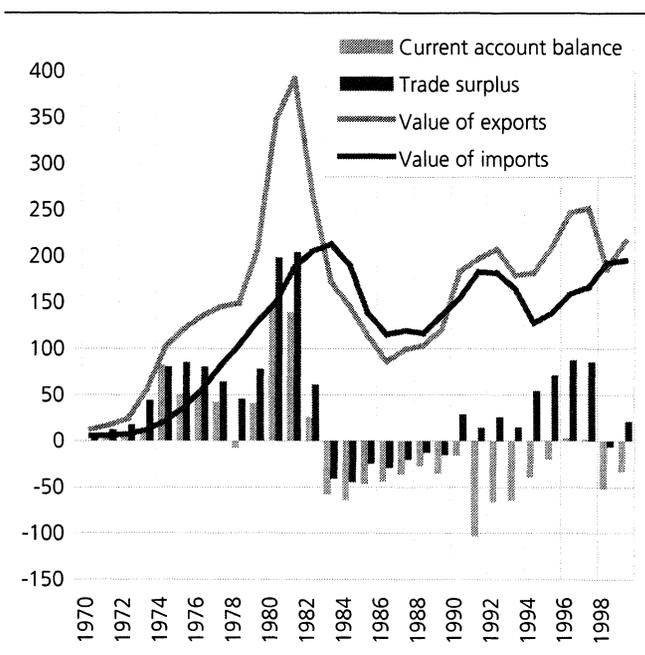
	1970 - 1974	1975 - 1979	1980 - 1984	1985 - 1989	1990 - 1994	1995 - 1999
Private consumption	8.7	32.4	10.2	-4.1	2.9	4.0
Government consumption	20.2	16.3	5.3	-2.6	-2.7	4.4
Investments	23.2	20.5	-2.5	-11.2	-0.6	1.9
Exports	16.0	6.3	-15.9	9.5	4.0	0.5
Imports	32.6	30.7	6.2	-9.7	-3.8	9.2
GDP	15.2	8.7	-4.1	2.8	3.0	0.5
- Non-oil GDP	11.3	12.9	4.4	-0.2	1.5	0.8
- Private GDP	13.0	15.5	3.6	-0.5	1.2	0.6

### 2.4. Foreign Trade and Balance of Payment

Being the dominant sector in the economy, the importance of the oil receipts is even more evident when we discuss foreign trade and the current account. As we can see from figure 2.4 Saudi Arabia's history regarding its current account can be divided into three periods. First there is a period of current account surplus, from 1970 to 1982 (apart from 1978), when the country was building up its oil industry in order to exploit its immense oil reserves by developing the production and transporting facilities. In this period two events of world importance occurred, the Yom Kippur war and the Iranian revolution, lifting the oil price from less than USD 2 to more than USD 35. Increased oil exports at a very high price was sufficient to generate a continuous current account surplus. From 1983 until 1995 there was a continuous current account deficit. The reasons for this development were loss of income from exports without a corresponding reduction in imports. The Kingdom was approaching a balanced current account at the beginning of the 1990s when the Gulf War disarranged the economy. But in 1996 the current account balance again showed positive numbers. 1997 was pretty much the same. The trade balance showed a surplus of more than SR 85 bn, a slight decrease from the previous year. But in 1998 the oil market was hit by very low oil prices and the value of exports dropped in such a way to make the trade balance negative for the first time in the 1990s. The current account again went into a deficit of about SR 50 bn. In 1999 the production cutbacks by OPEC and some non-OPEC members in 1999 brought the prices up and this resulted in improved trade balance and current account as can be seen in figure 2.4.

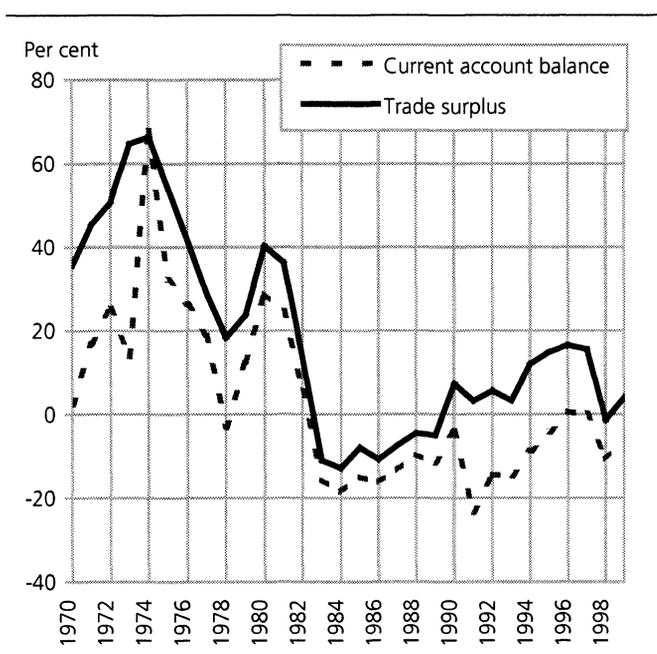
In the 1970s Saudi Arabia's exports had an average share of 70 per cent of GDP. In the 1980s the average share had fallen to 46 per cent, and from 1990 to 1997 the share is slightly reduced to 44 per cent. The main component constituting the exports is oil and refined products. The petrochemical sector was not developed before the mid-eighties, and non-oil exports have not reached the amount planned for by the authorities. During the 1970s oil exports, on average, accounted for 89 per cent of total exports, while in the 1980s this share was reduced to 77 per cent. In this decade there was a tendency towards a lower share of oil exports in total exports. In 1980 oil exports accounted for more than 92 per cent, while in 1989 this share was reduced to 63 per cent. This tendency was broken in the first years of the next decade. From 1989 to 1992 this share increased to 74 per cent due to the increased production when Saudi Arabia made up for the loss of supply from Kuwait and Iraq. Although, during the first seven years of the 1990s the average share has fallen further, to just below 70 per cent.

Figure 2.4. Current account balance, trade surplus, value of exports and imports. SR bn



In the early years of the 1970s the value of oil exports increased at a modest rate due to increased export volume. After the 1973 oil price shock the current account balance went skywards, from SR 9.3 billions in 1973 to SR 82 billions the next year. At this time the government made extensive plans for distributing the wealth across the nation, but first they had to build up the Kingdoms infrastructure. To accomplish this they had to increase imports substantially, but as we can see from figure 2.4 the trade surplus still increased from SR 17.3 billions in 1972 to SR 80 billions in 1974, and kept afloat until the next oil shock in 1979-80. Again the receipts from oil exports increased the trade balance from SR 77.4 billions in 1979 to a peak level of SR 204 billions in 1981. In the following years the value of the oil exports was dramatically reduced. From 1982 to 1983 the exports receipts were reduced by almost 36 per cent, and for the first time the current account showed a deficit. From 1981, when the value of oil exports peaked, to the bottom in 1986, the value decreased from SR 362 billions to SR 59 billions. At the end of the 1980s and the first years of the 1990s the income from oil exports again started to rise. This was partly due to increase in prices, but mostly because of increased volume by more than 2 mbd during 1990. In this period the value of oil exports more than doubled, from SR 75.8 billions in 1989 to SR 154 billions in 1992. While in the same period, imports increased moderately, from SR 136 billions to SR 155 billions. All of the improvement in the trade balance was directly related to the increase in oil production to compensate for the loss of the Iraqi and Kuwaiti supplies. The income from oil exports from 1990 to 1997, on an annualised basis, increased by 3.1 per cent.

Figure 2.5. Current account balance and the trade surplus.  
Per cent of GDP



The exports of refined products increased from an average of 7 per cent out of total exports in the 1970s to 12 per cent in the 1980s. From 1990 to 1997 the share has increased further to 14 per cent. For the petrochemical sector, which was not developed until the early 1980s, there was a sharp increase in exports until 1988 when it stabilised at a level between SR 6.5 billions and SR 9.1 billions. Since 1995 export value has increased further to more than SR 12 billions, and in 1997 the value was more than SR 16 billions.

Oil revenues provide the Kingdom with the foreign exchange required for imports of goods and services. Given the specialised production structure associated with oil-related products, construction and heavy industry, the Kingdom's main categories of imports are transport and machinery equipment, consumer goods, for the most clothing and furniture's, and food and beverages. The major suppliers are the United States, Japan and the United Kingdom. In 1995 the value of non-competitive imports constituted 93 per cent of total imports. 86 per cent of this was manufacturing goods, while almost 6 per cent were agricultural products. It is considered a major goal for the Kingdom to develop the manufacturing sector in such a way that it becomes competitive.

Other factors contributing to the current account balance are non-oil exports and consumption by non-residents inside Saudi Arabia. Even though non-oil exports is small, its average share of total exports has grown from 1 per cent in the 1970s to 3 per cent in the 1980s, and from 1990 to 1997 it account for 5 per cent. Despite the small magnitude there is an increasing trend. Consumption by non-residents has

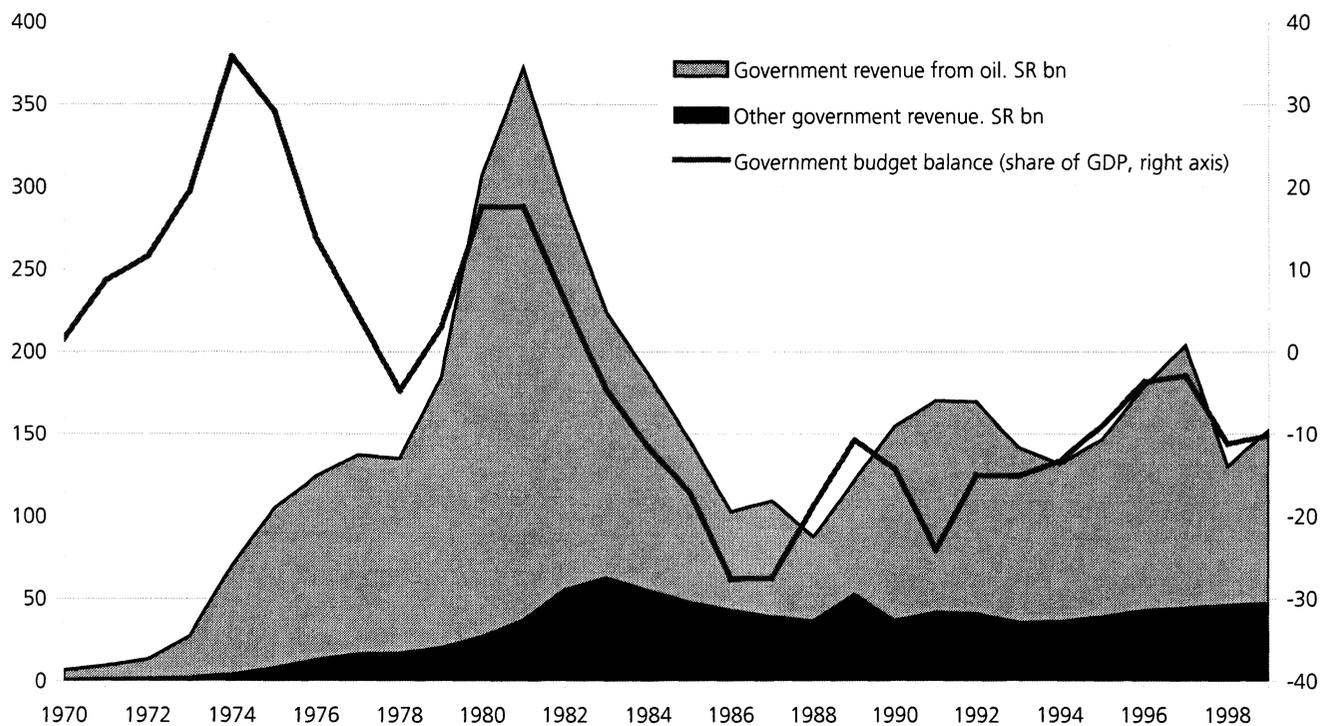
shown a fairly fixed share of total exports since the mid-eighties fluctuating between 6 and 9 per cent. Included here is the important source of foreign exchange, the local expenditure of foreign companies and the pilgrimage traffic. Since 1974 there has been an annual influx into the Kingdom of between 700000 and 1 million pilgrims. It was estimated that pilgrims spent a total of SR 4.5 billions in the 1995 season, of this more than 20 per cent was spent by foreign pilgrims, who tends to purchase consumer durable. This is an important stimulus to private sector investments in retail outlets.

Saudi Arabia's current account balance accumulated into huge amount of net foreign assets during the heydays of the oil era. In 1982 the foreign assets balance reached its maximum of almost SR 600 billions. From that time the Kingdom has tapped its foreign assets, particularly during the Gulf War and the subsequent years when the balance was draw down heavily. Since 1994, net foreign assets have been negative and in 1997 foreign countries had net claims on the Saudis worth SR 26 billions.

## 2.5. Government budget

Not only as a major source of export revenue is oil the key to the Saudi economy. It is also the primary source of the government's revenue (see figure 2.6). From 1990 to 1997 other sources of revenues have fluctuated between 21 and 27 per cent out of total revenues. The buoyant conditions in the world oil market during the two first development plans (1970-79) strongly affected the government revenues in Saudi Arabia. During the first plan period the government revenues rose from SR 6.6 billions in 1970 to SR 104.7 billions in 1975. As a share of GDP this constituted 33 per cent and 67 per cent respectively. The reason for this strong growth in revenues was more than a treifold increase of the oil price resulting from the trade embargo following the Yom-Kippur war. The Iranian revolution caused a new steep rise in prices, levelling the oil price at almost USD 30 per barrel. This contributed to continuous growth in the government revenues. From 1979 to 1980 the revenues from oil increased from SR 164 billions to SR 280 billions, or 50 per cent and 57 per cent of GDP respectively. The high level of the oil price, and expectations of even higher prices in the future, resulted in a total budget of SR 498 billions. During the first two development plans, covering the 1970s, revenues from the oil exports constituted between 87 and 94 per cent of total government revenues. Although the government's current expenditures over the first two development plans showed a strong correlation with its revenues, the levels were different. The revenues were substantially higher than the expenditures, and the fiscal dividend accumulated to SR 143 billions from 1970 to 1979.

Figure 2.6. Government budget balance and revenues



This trend was adversely affected during the third development plan (1980-1984). The world demand for oil declined as a response to the high price, and in an attempt to keep up the price level Saudi Arabia drastically reduced its production resulting in a significant decline in total government revenues. From figure 2.6 it appears that 1981 marked a turning point in the fiscal history of Saudi Arabia. The budget surplus was reduced from 17.6 per cent of GDP to 6.1 per cent the preceding year. In 1982 the governments revenue from oil exports was reduced by 29 per cent from the previous year, dropping from a peak level of SR 335 billions to SR 237 billions. In 1983 the budget showed a deficit of 4.1 per cent of GDP and Saudi Arabia has been running persistent fiscal deficits ever since. The reason for this is reduced income from the oil exports and a continuous high level of expenditures. Relatively low government revenues from the oil industry continued for the rest of the third plan period. The government cut back its expenditure in the same period, but not at the same rate as the income loss. Total government revenues for this period summed up to SR 138 billions and the total expenditure to SR 123 billions.

The fourth development plan (1985-89) showed no signs of improvement in the oil market. From 1985 to 1988 the government revenues fell from SR 146 billions to SR 87 billions, and the annual budget deficits fluctuated between 17 per cent and 28 per cent of GDP. However, both price and production started to increase in 1989 and this showed up immediately in

the government revenues, which rose from SR 87 billions in 1988 to 121 SR billions in 1989. By this time the government had managed to hold back some of its spending, so its budget deficit was reduced to about 11 per cent of GDP in 1989.

Bearing in mind the signs of improvement in the government finances at the end of the fourth development plan, the authorities aimed at a further strengthening of the budget through the fifth plan period (1990-94). However, the invasion of Kuwait and the subsequent outbreak of the Gulf war posed enormous financial challenges to the Saudi economy. The Gulf crisis led to large expenditure on weapons and other military equipment, and both in 1990 and 1991 the expenditures rose more than 30 per cent from the previous years. More than a third of the public funds put down for the plan was used for military activities and strengthening of the Saudi Arabian defence. In addition Saudi Arabia paid a significant share of the belligerent countries expenses by drawing down foreign assets. In addition to this, subsidies, some of them, which were introduced during the Gulf war, remained in place. The two first years of this plan period the government budget deficit increased to 14.2 per cent of GDP and 24.1 per cent of GDP respectively. In 1992 and through the end of the plan period the government finances improved slowly. On average over the fourth plan period (1985-89), oil revenues accounted for 61 per cent of the governments total revenues. During the fifth plan this figure jumped to 75 per cent because Saudi Arabia, as a result of the UN

embargo on oil imports from Iraq and occupied Kuwait, increased its oil production from less than 5.5 million barrels daily at the beginning of 1990 to more than 8 mbd at the end of the year. This increase in production volume more than offset the effect on the revenues from falling prices at the beginning of the decade. At the end of the fifth plan the government revenues from oil constituted 73 per cent of total revenues while the budget deficit, as a share of GDP, was 13 per cent.

For the most recent years, into the sixth development plan period (1995-99), there has been improvement in the fiscal imbalances. From 1994 to 1995 the government budget deficit was reduced from 13 per cent to 9 per cent of GDP, and in the two subsequent years the deficit were further reduced, to 3.6 and 2.9 per cent of GDP respectively. The main reasons for this improvement was the oil price, which increased by 9 per cent in 1995 and 15.3 per cent in 1996 (see figure 2.1). Also contributing to the improvement was the King's decision to reduce the government spending and to raise charges on utilities. The following year however, in 1998, the oil price dropped more than 34 per cent and the consequences turned out more dramatic for the Saudi economy. The fiscal deficit rose to 11.3 per cent of GDP. The outcome of the 1999 budget is expected to be better due to the rise in oil price during that year.

In recent years the authorities have opted to finance budget deficits through domestic borrowing. This has resulted in a rapid rise in the stock of domestic debt. According to the IMF, total domestic debt rose from 52 per cent of GDP in 1992 to 86 per cent of GDP in 1995. The amount of domestic borrowing to finance the large fiscal shortfall in 1998 is estimated to have pushed this figure to over 100 per cent of GDP.

In retrospect, the government has attempted to use its massive oil revenues to finance an ambitious develop-

ment programme drawn up in the five-year plans. The aim has been to build up and develop the infrastructure, the industrial and agricultural sector, and modernise the health and education systems. The Saudis has also allocated massive amounts of money to build up the armed forces. The achievement of this goal was possible in the aftermath of the first oil shock in 1973, but from the mid-1980s lower oil prices has squeezed the government finances, and has led to rising domestic debt and delayed payment to government contractors and suppliers. Cuts in subsidies and other efforts to curb the government expenditures in 1995, in combination with higher oil prices in 1996 and 1997, contributed to reduce the fiscal imbalances substantially. However, the low oil price during 1998 again forced the government to cut expenditures. The 1999 budget target was initially a deficit of SR 44 billions. The government's forecast that revenues would decline was based on maintaining taxes and fees at the same level and that oil prices would remain weak. However, with the increase in oil prices since March 1999 as an outcome from the agreement by OPEC and non-OPEC producers to reduce oil supplies to the market, the fiscal difficulties appear to be waning, and the budget projections for 1999 now seems to be too pessimistic. The difficulty for the Saudis is that short of a buoyant oil market, there are no other immediate ways of increasing revenues. This is so partly because some 50 per cent of annual budget revenues goes to meet the public sector wage bill alone, and military spending are the highest in the world, amounting to some 15 per cent of GDP.

## 2.6. Population and Labour Market

The Saudi population was estimated to be on the high side of 20 millions in 1998 (EIU, 2/1999). This number includes foreigners, which constitute more than 7 millions. The growth rate of the Saudi population is close to 4 per cent annually, and at least 60 per cent of the population is under the age of 20 years.

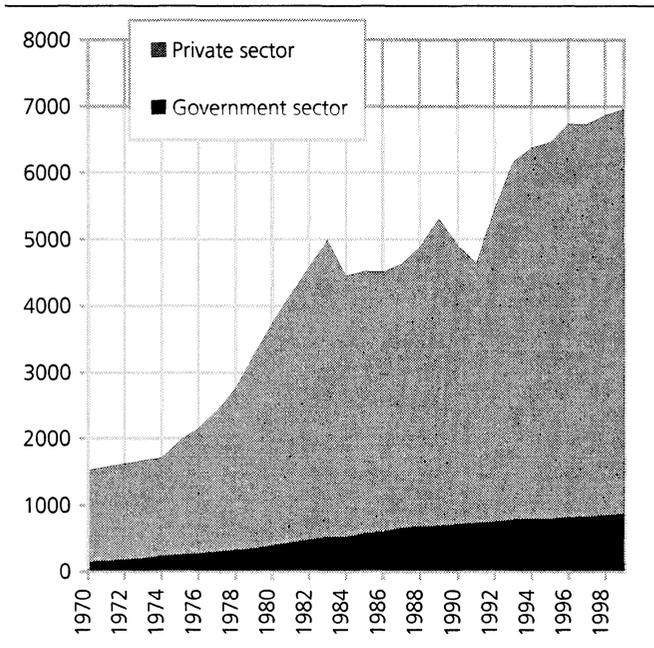
Table 2.5. Sectoral allocation of government expenditure. SR bn

	1996	1997	1998	1999	2000
Education	27.6	41.7	45.6	42.9	49.4
Health services & social development	13.3	17.8	19.7	18.7	19.9
Municipal services & water	5.4	6.5	7.6	6.6	7.1
Transport & communication	9.2	10.4	11.8	5.2	5.6
Infrastructure, industry and electricity	6.1	8.6	7.3	4.8	5.5
Subsidies and social programmes	6.9	7.1	10.7	8.5	9.1
Total	68.3	92.1	102.7	86.7	96.6 <sup>1</sup>

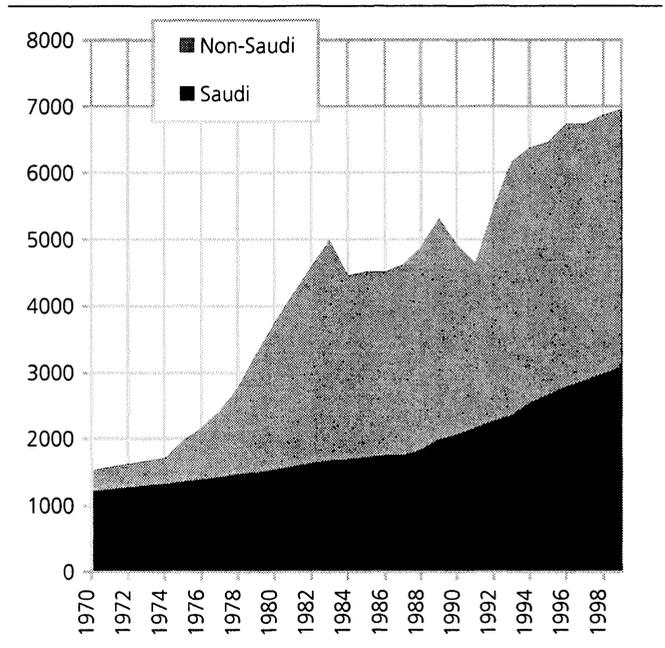
<sup>1</sup> 52.2 per cent of total expenditures; the remainder will go mainly on defence & security and general administration.

Source: Middle East Economic Survey

**Figure 2.7. Employment in private and government sector.**  
1 000 persons



**Figure 2.8. Employment by Saudi and non-Saudi.**  
1 000 persons



During the first two decades of planned development in Saudi Arabia, i.e. the years 1970 to 1990, the labour market went through rapid and profound changes. Over this period total employment increased at an annualised growth rate of just below 7 per cent, representing about 4.1 million new workers. The sixth plan (1990-1994) renewed the emphasis on replacing non-Saudis with Saudis, and the formula for success is to rationalise the growth of the non-Saudi labour force. According to the Sixth Plan there should also be increased job opportunities for women. Mostly due to Saudi Arabia's conformity with the Islamic Sharia laws, women's labour force participation rate has been very low. In 1990 the female working age population was 3.2 millions, while the female civilian labour force was only 169 thousand, or 5.3 per cent. The female participation rate was 5.5 per cent in 1995, and is estimated to be 5.8 in 2000. Also for the male population the labour force participation rate is low, and has been rather constant around 54-55 per cent. The population census carried out in 1993 showed a Saudi population of 12.3 millions of whom 7.4 millions were in the working age group (12 years and over). At the beginning of the Sixth Plan the total participation rate was at the international low level of only 30.2 per cent. Of most importance for this low level is the age structure of the Saudi population, with about 50 per cent aged under 15 years, the large number of young Saudis enrolled in the educational system, and the low participation rate of females. The extensive structural shifts that have occurred in the economy have caused major changes in sectoral, occupational, and national composition of the labour force.

From figure 2.8 it is evident that the Saudi labour market is dominated by foreign employment. The rapid economic growth made possible by the oil income could not have been realised without a massive import of foreign labour. Labour was imported from neighbouring countries, and Asian countries such as the Philippines, Pakistan, India and Sri Lanka. Since 1979 employment by non-Saudis have outnumbered Saudi employment, and this development has worried the authorities. A principal and controversial element of government efforts to change this feature is the so-called "Saudiization" programme, the process of replacing foreigners with Saudi manpower. The Saudiization programme was introduced in the fourth development plan (1985-89), and it is evident from figure 2.8 that the results were modest. The main reason for this is the wage differentials between Saudi and non-Saudi workers. A widening wage gap between the two groups became a serious obstacle to the expansion of Saudi employment in the private sector, especially for those with low skills. The Fifth Development Plan certainly emphasised the needs for reducing these wage differentials to such an extent that the private sector would be able to give priority to Saudi workers.

The government's wish for a stronger participation of Saudi labour in the private sector have some undesirable side effects, one of them in direct conflict with another main policy goal; to diversify the economy away from oil related industries towards private non-oil sector. In the Fifth Development Plan it was emphasised that the achievement of Saudiization of the private sector would depend upon to the extent to which employers' perception was positive with

respect to the quality of Saudi new entrants. The government was aware that these perceptions could be influenced by easy access to cheaper and more experienced non-Saudi workers, and, in retrospect, this seems to be what have happened. It is clear from figure 2.8 that the effects from the Saudiization process have been modest. After the invasion of Kuwait by Iraq in 1990 many foreign workers were sent out of Saudi Arabia, but it did not take long before the amount of non-Saudi workers reached the same level as before the war. In the period 1984 to 1989 the share of non-Saudi workers out of total employment was rather constant at 63 per cent, in 1990 the share dropped to 57 per cent, and in 1991 to 53 per cent. In 1992 the non-Saudi share started to climb again and reached 58 per cent, and the next year it was back to pre-war figures at 62 per cent.

In the 1990s the government focused a great deal on the mismatch between the output from the education and training systems and the needs of the private sector. Although there was a need for qualified labour in all sectors, the authorities gave preference to those requiring technical skills. The principal reason for this skill mismatch between graduate output and the private sectors needs was the rapid enrolment growth in academic institutions at the expense of more scientific and technically based education. The authorities did not manage to reverse this trend during the 1990s, and the result was a continued dependence upon imported technicians. This skill mismatch put obstacles in the way of replacing non-Saudi workers with Saudis. At the same time, there was a rapidly rising demand for unskilled non-Saudi workers in the community and personal services sector. This increased the difficulties in finding such jobs for poorly qualified Saudis, who made up a high proportion of new entrance to the labour market.

Because the greater part of the foreign workers holds short term working contracts, one may anticipate that using such a great number of non-Saudi workers would give the authorities some flexibility to respond to economic circumstances. But that has really not been the case. For example, following the economic downturn in 1982, the total numbers of non-Saudi workers was decreased only by 100 000 three years later. In the years to follow, the numbers of non-Saudi workers continued to grow at relatively high rates, regardless of the calls in the fourth and fifth Development Plans for a reduction of non-Saudi workers to make the number in line with the needs of the economy.

It is a matter of common knowledge that illegal immigrants or overstayers are sought-after in the labour market. Most of the illegal immigrants are pilgrims overstaying their pilgrimage to Mecca. To find a job they will accept lower wages than others will. Most of the overstayers are assumed to be unskilled, and they

are particularly numerous in the construction sector. In 1997 the authorities gave a three months amnesty to try to get rid of the overstayers in an attempt to make more room for unskilled Saudi workers. During the amnesty period more than 100000 exit visas were issued, and later there were some reports of problems finding enough manpower, especially in the construction sector.

### 3. Scenarios for the Saudi economy 2000-2010

Saudi Arabia has been very well endowed by nature regarding oil resources. This has enabled the country's population to enjoy a standard of living much higher than they otherwise would be capable of. However, there exist almost no export besides oil, and the domestic supply of tradeables is very low. Domestic demand is to a great extent kept afloat by government budgets, but since the decline in the oil prices in 1985/86 the government budget and the current account has been in deficits. This has restricted the government's prospects in policy-making.

The Saudi economy has developed poorly during the 1990's. GDP per capita has been stagnant or even declining and severe financial imbalances have emerged. The country has a political and social structure that is probably not adequate in handling severe economic problems that cannot be eschewed much longer. This may lead to substantial changes in policies but also to changes in government that are very difficult to predict. This study focuses on alternative economic and political developments that may shape the future of Saudi Arabia. The economic consequences for Saudi Arabia of the various assumptions are calculated using a general equilibrium model for the Saudi economy described in detail in Cappelen et al (1998).

The first alternative, which we will refer to as "baseline" serves as our reference case. In this alternative no major changes in government policy or oil policy are assumed. Historical trends are carried forward with no fundamental shift in policy. We do not think this is a particularly likely alternative. It rather shows that something needs to be done because of poor economic results for the country as a whole.

The second alternative, which we consider more likely than the baseline, is called "policy reform". We assume that Saudi Arabia will enter WTO, and therefore will reduce subsidies, privatise or at least deregulate some industries/companies and introduce some measures of taxation in order to increase non-oil revenue of the budget. This alternative which in many ways are in line with the kind of policy reforms which the World Bank

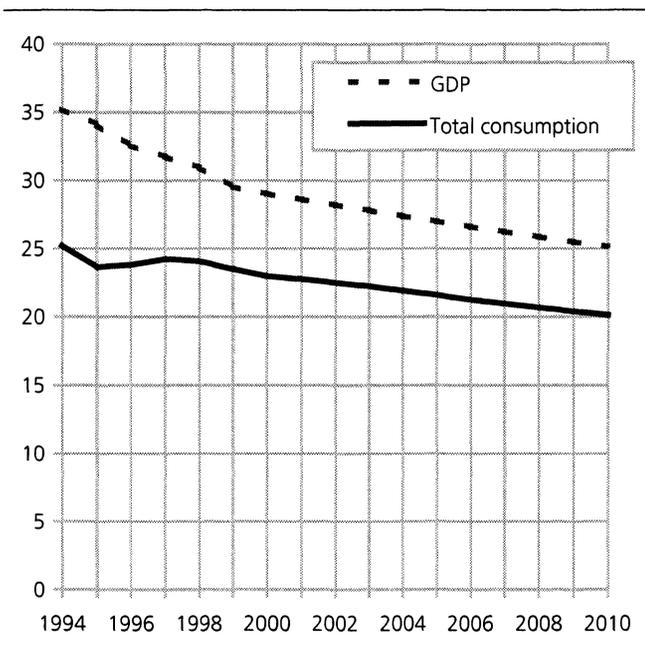
has been advocating for a long time, will be politically difficult to implement. It may well be only partially effectuated and not able to meet material demands of large sections of the Saudi population.

Therefore, a more dramatic scenario in term of oil policy is possible, where lack of funds "forces" the government to take on a more aggressive oil policy in an attempt to avoid financial imbalances. This third alternative called "oil market grab" could be combined with the previous alternatives. However, in terms of historical events we see it as more likely following a failure of liberal reform. This scenario is however unlikely for many reasons. First of all, its success will depend on the Saudi share of an increase in OPEC oil supply. Saudi Arabia is regarded as being able to increase its oil production substantially within a few years and at very low costs. Not many other OPEC countries are in a similar position. Thus this scenario will most likely lead to a complete breakdown of OPEC. That will have huge political effects in many countries, also Arab countries. Those OPEC countries that cannot increase output much will see their oil revenues dwindle and what Arab unity there is, will most likely be ended. It is also a risky business for the Saudi government because it will be seen as an attempt to rescue its own economic and political position at the expense of others. In a country where you can hear people say "First Muslim, then Arab, and finally Saudi" (observe how strange this ranking would be applied to the US or any European country!), a nationalist Saudi policy move like in this scenario, may not gain much support neither from the public in general nor from the religious opposition. This scenario is discussed in chapter 4 below.

#### 3.1. The baseline scenario

As suggested above, our baseline scenario is based on assumptions of no major changes in policies and that recent economic trends continue in ways which we present below. We also assume that the recent OPEC policy of moderate production in order to keep the crude price around 20 USD per barrel continues.

Figure 3.1. GDP and total consumption per capita



### Oil market assumptions

During most of the 1990's Saudi crude production has been some 8 mbd. Following the most recent cutbacks in OPEC production the Saudi quota is only 7.8 mbd. Over the next decade we assume Saudi crude output to increase by 2.5 per cent annually. This is slightly more than our assumed increase in total OPEC supply (which is assumed to grow by 2 per cent) because Saudi Arabia took a large share of the production cutbacks in 1999 and therefore will demand compensation as new quotas were set in the spring of 2000. In addition the country has the largest potential for increased supply in the long run within OPEC, possibly with the exception of Iraq. Saudi Arabia also has a potential for exports of natural gas to neighbouring countries that are not regulated by OPEC. One may see attempts to substitute oil for gas to increase export earning more than 2.5 per cent, but we have not assumed this to take place within the next decade. Instead domestic use of natural gas is expected to increase.

The crude oil price increased strongly during 1999 and was well above 25 USD per barrel during the winter. OPEC will increase production during 2000 and some of the countries that supported the OPEC cutback (Mexico and Norway) will increase their output too. Even if one may see prices well above 20 USD for 2000 as a whole, it is not likely that prices will stay that high. We have assumed that the crude price (for Arabian Light) will stay around 20 USD the next few years and increase less than consumer prices in the OECD area. Thus we assume falling real oil prices from the current level over the next decade, but only a moderate reduction. The nominal oil price on Saudi

crude export is assumed to be approximately 23 USD in 2010. Details of our assumptions are presented in table 3.1 below.

### Other assumptions regarding the world economy

Although the main effect of the world economy on Saudi Arabia comes through the effects on the world oil market other aspects also have some importance. The Saudi Riyal (SR) is pegged to the USD at a rate of 3.745 per dollar. We assume the exchange rate to be constant over the coming decade. Although some speculation against SR took place during 1998/99 when oil prices plummeted, there was no devaluation. With consumer price inflation in the OECD of around 2 per cent a year we assume Saudi import prices to grow by one percent annually. Saudi non-oil related exports are modelled using the Armington-approach. The foreign demand for Saudi non-oil exports is assumed to grow by 7 per cent equal to the assumed growth in world trade. The Saudi export price is determined by Saudi costs while the competitive price is assumed to grow at the same rate as Saudi import prices.

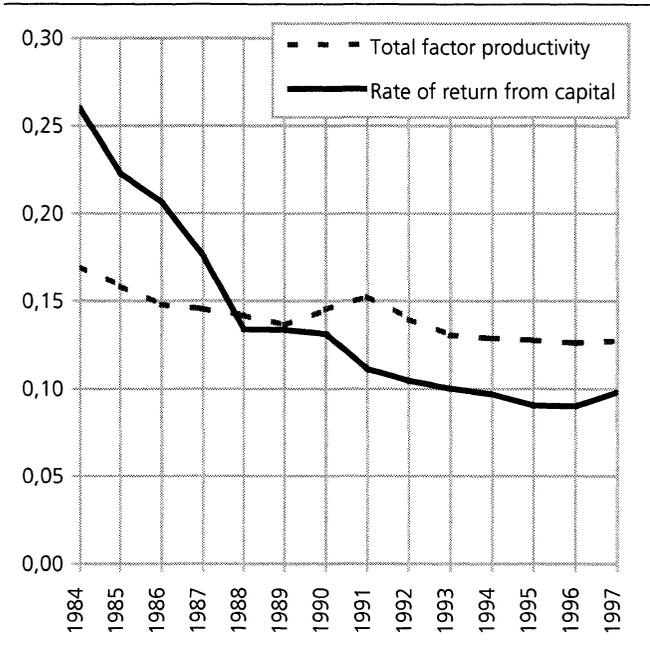
### Population and labour force

The Saudi population as of 1999 consists of roughly 16 million Saudi nationals and some 4 million foreign nationals. Nearly all non-nationals are employed (3.95 million to be precise) while the employment of Saudis is estimated to be roughly 3 million. The birth rate is very high and population growth is assumed to be 3.5 per cent over the next decade. We assume that the supply of Saudi labour will grow in line with population while the amount of foreign labour will be kept constant. The official policy has for some time been that of Saudization, meaning the absolute decline in the number of foreign workers. This has however been difficult to achieve and in the baseline scenario we assume that only relative Saudization which will take place due to population growth. Labour supply by Saudis and non-Saudis are shown in figure 2.8. Total labour supply will grow by 1.7 per cent from 2000 to 2010 on average.

### Government expenditures

We assume expenditures on social sectors to increase in line with population in real terms while expenditures on defence and administration are constant in real terms. Government consumption will thus grow by 1.5 per cent annually over the next decade. Government investment on the other hand is assumed to be constant. There is no direct taxation in the Saudi economy except for the zakat, which is very small. There is no indirect taxation either, but some customs duties that amounts to less than 2 per cent of GDP. Duties are held constant in value terms. Taxes and subsidies on factor incomes are also small and all rates are assumed to be constant.

Figure 3.2. Total factor productivity and rate of return from capital



**Total factor productivity**

In our model of the Saudi economy, all private sectors are modelled with Cobb-Douglas technology. For all non-oil private sectors, total factor productivity (TFP) is assumed constant. Historical data for TFP is only available for total non-oil private sector. Figure 3.1 below shows that TFP has been falling during most of the 1980's and 1990's with the exception of the Gulf war years. Recently the decline in TFP seems to have slowed down or even stopped. Our assumption of constant TFP's by sectors thus seems reasonable.

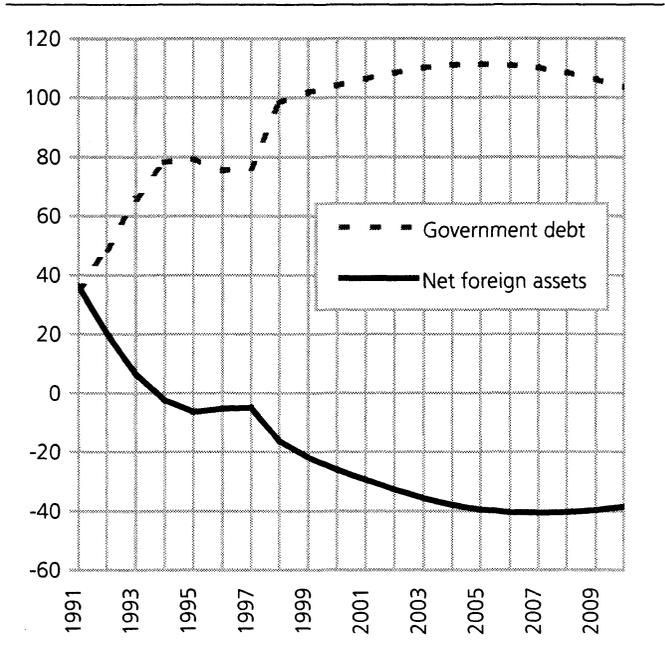
**Rate of return to capital**

In the model, producers are assumed to maximise profits taking wage rates and the user cost of capital as exogenous variables. Since there is no direct corporate taxation the user cost is simply the gross investment price multiplied with the sum of the rate of return to capital and the depreciation rate. Both are assumed exogenous. The historical rate of return to capital for the private non-oil sector is shown in figure 3.2. This rate has also been falling for some time just like TFP and the rate of return seems to have settled around 9 per cent or so in recent years. This seems to be a reasonable level for a risk adjusted rate of return for an economy that in terms of capital markets may be regarded as quite open. Given recent developments, we regard the assumption of a constant real rate of return to capital to be reasonable.

**Macroeconomic developments 2000-2010**

With the assumption of constant returns to scale production functions relating value added in each sector to labour and capital, and assuming total labour supply, the rate of return to capital, and TFP to be exogenous,

Figur 3.3. Government debt and Net foreign assets. Per cent of GDP



the capital output ratio will be roughly constant in each sector. Thus both capital and value added grow in line with labour growth. This implies that non-oil GDP per capita is growing at a rate roughly half of population growth. Given these assumptions we can conclude that private non-oil GDP will grow less than 2 per cent annually over the next decade.

The assumption of 1,5 per cent growth in government consumption will result in a similar growth rate for government GDP while our assumptions regarding oil and gas supply will imply a somewhat higher contribution to total GDP-growth from the oil sector than for the non-oil sectors. Total GDP will thus grow close to 2 per cent annually according to our simulations. GDP per capita will fall by 1.5 per cent annually over the coming decade. This is a indeed bleak prospect for any economy and even for Saudi Arabia with a GDP per capita of roughly 7000 USD in 1999. Real disposable income for the country will grow somewhat more than GDP because export prices will grow half a percent more than import prices, but this will only moderate the fall in national real income per capita slightly, see table 3.1.

With no growth in productivity, there is little scope for increases in real wages. Traditionally rapid wage growth in the public sector has carried over to other parts of the Saudi labour market although not for foreign workers. We assume that the government manages to keep wage growth quite low in the years ahead partly in response to the large budget deficit and partly due to the large inflow of young Saudis who traditionally have been looking for jobs in the government sector. Consumer prices are estimated to increase by 1.2 per cent annually so that real wages increase

only marginally. Note that in this baseline scenario no policy reforms are carried out such as reducing government subsidies of utility prices.

With oil prices above 20 USD per barrel the Saudi current account deficit will improve considerably over the coming years. The deficit is estimated to be close to 5 per cent in 1999 but will gradually be reduced during the next decade. The reason for this is of course a very moderate growth in imports following slow growth in domestic demand and output. However, the government budget deficit will remain in spite of very slow growth on government expenditures. This has to

do with the fact that this deficit has been much larger as share of GDP during the second half of the 1990's and widened considerably due to low oil prices in 1998 and the beginning of 1999. We assume that the interest rate on government loans will stay close to 7 per cent. Government debt has probably passed 100 per cent of nominal GDP during 1999. Thus the present deficits are clearly not sustainable when nominal GDP increases by roughly 3.5 per cent according to our simulations. Indeed, government debt to nominal GDP will reach 111 per cent in 2005 before slowly decreasing but is still over 100 per cent by 2010 according to our calculations, cf. figure 3.3.

**Table 3.1. Macroeconomic figures in the baseline scenario**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Annual growth, percent											
Total consumption	1.3	2.6	2.4	2.4	2.1	2.0	2.0	2.1	2.2	2.2	2.2
Private consumption	1.2	3.3	3.0	3.0	2.4	2.3	2.3	2.5	2.6	2.6	2.7
Government consumption	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Gross fixed capital formation	5.1	3.8	4.0	1.7	1.4	1.5	1.7	1.8	1.8	1.8	1.8
Private	7.3	4.7	3.5	2.6	2.1	2.2	2.6	2.7	2.7	2.7	2.7
Government	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oil	8.8	12.0	25.5	0.3	0.4	0.4	0.2	0.2	0.2	0.3	0.3
Exports	1.5	2.6	2.6	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Crude oil and natural gas	3.5	2.2	2.3	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Petroleum refining	-6.6	6.5	5.4	2.3	0.9	1.1	1.1	1.2	1.2	1.2	1.2
Petrochemicals	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3
Other exports	-0.1	2.2	3.2	3.6	3.8	3.8	3.8	3.8	3.8	3.8	3.9
Imports	2.3	4.5	4.2	3.0	2.1	2.0	2.1	2.3	2.4	2.4	2.5
Gross domestic product	1.7	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
Private sector	1.8	1.8	1.9	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0
Government sector	1.5	1.3	1.3	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Oil sector	1.8	2.8	2.7	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Employment	1.5	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.8	1.8
Private	1.5	1.5	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.8	1.9
Government	1.5	1.3	1.3	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Saudi	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Non-Saudi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Price indices											
Consumption	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
GDP	4.2	2.5	1.6	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Exports	7.9	3.8	1.8	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Imports	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Oil	10.6	4.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Percent of GDP											
Current account	-5.5	-4.5	-4.4	-4.0	-3.4	-2.8	-2.2	-1.6	-1.1	-0.7	-0.2
Trade balance	6.4	6.8	6.6	6.6	6.8	7.1	7.4	7.6	7.8	8.0	8.1
Government budget	-8.1	-6.7	-6.0	-5.3	-4.7	-4.1	-3.4	-2.8	-2.1	-1.5	-0.8
Saving	13.8	14.7	15.1	15.3	15.7	16.2	16.6	17.0	17.4	17.7	18.0
Private	14.8	14.4	13.8	13.5	13.5	13.5	13.4	13.4	13.2	13.0	12.8
Government	-1.0	0.3	1.2	1.7	2.2	2.7	3.2	3.7	4.2	4.7	5.2
Policy goal indicators											
Saudization (% of total)											
Saudi employment	44.7	45.6	46.4	47.3	48.1	49.0	49.8	50.7	51.6	52.4	53.3
Diversification (% of GDP)											
Private production	42.6	42.0	41.8	41.7	41.6	41.5	41.4	41.3	41.3	41.2	41.1
Non-oil exports	2.9	2.9	2.9	2.9	3.0	3.0	3.1	3.1	3.2	3.2	3.2
Imports	36.9	37.3	37.8	38.0	37.9	37.8	37.6	37.6	37.6	37.5	37.5
Privatization (% of GDP)											
Private investment	12.4	12.6	12.7	12.7	12.7	12.7	12.7	12.8	12.8	12.9	12.9
Private consumption	44.6	44.6	44.9	45.2	45.3	45.4	45.4	45.5	45.6	45.7	45.9
Private employment (% of total)	86.6	86.6	86.6	86.6	86.6	86.6	86.6	86.6	86.6	86.7	86.7
Real disposable income (annual growth)	4.0	4.7	3.0	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6

Table 3.1 shows some main figures from this baseline scenario along with some historical figures for comparison.

**Summing up**

The baseline scenario tells us that present policies are probably not sustainable in spite of what some might say are quite optimistic oil markets assumptions. The major problem with this scenario is that the Saudi economy becomes even more dependent on oil as the private non-oil sector grows very slowly. Also large budget deficits continue for many years as we have assumed constant per capita supply of government services. This may well be considered too optimistic or perhaps careless. The deficits have so far been financed domestically by the banking sector and with loans from government owned companies. It is a question how much longer this can go on. Politically it may be difficult to sustain a decade of negative income growth and private consumption growth per capita, as the 1990's have also been a disappointment in this respect. There is need for policy reforms and we now turn to an analysis of some likely proposals.

**3.2. The policy reform scenario**

The economic reforms that Saudi Arabia is likely to try to implement during the next few years are many and very different in nature. Some of the reforms will have to deal with the serious macroeconomic imbalances that have been building up for some time and these reforms will therefore resemble an austerity program. On the other hand a number of reforms have been discussed which are more in line with the World Bank slogan "getting prices right". Our reform scenario will mix all these components together finally, but we will start by showing the marginal or partial effects of many of these reforms one by one. Saudi Arabia is not part of WTO but has conducted serious negotiations for some time in order to become a member. When this will take place is not known but it is expected to take place quite soon and perhaps already during 2000. Even if a WTO membership should be postponed to 2001, it is one of the policy reforms that should be included in a reform scenario. We shall start by analysing possible effects of a Saudi membership in WTO assuming that the consequent reforms take place in 2000.

**Effects of Saudi membership in WTO**

A membership in the WTO will generally involve the reduction of trade barriers. Both tariff barriers and non-tariff barriers are expected to alter. A WTO membership will affect both the domestic Saudi economy as well as international markets that will have to open up to Saudi products. Consequently we can illustrate this by the following table.

Cappelen et al (1998) chapter 5 contains a more detailed discussion of the effects of WTO membership and with somewhat different assumptions from what

**Table 3.2. Alternative channels of effects from joining the WTO**

	Tariff Barriers	Non-Tariff Barriers
Domestic markets	Reduced tariffs on imports	Reduced producer subsidies
International markets	Reduced tariffs on Saudi exports	Better access to foreign markets

we will use here. We assume import tariffs to be reduced by 50 per cent from 2000. Tariffs are assumed set with constant rates in the baseline scenario. As tariffs make up approximately 5 per cent of the value of imports excluding tariffs (cif.), the domestic import price including tariffs will decrease by 2 per cent compared to the baseline. This decline in the import price will lower domestic prices as well, but not by a similar amount. Thus the price competitiveness of Saudi producers on the domestic market will be reduced. The import share will increase, as the price elasticity of imports is -0.7 in the model. This increase in total supply will allow for more private consumption and consumer prices fall by nearly one percentage point. More output will only come forward when the capital stock has been increased so investments need to increase for some time in order to build up the required capital stock. Higher imports will increase the deficit on the current account. The effect on the government budget balance is a small increase in the deficit during the first three years, followed by a gradual, but small improvement for the rest of the period. The negative effects during the first years are mainly due to the reduced tariffs on imports. Afterwards it is the positive effects from reduced producer subsidies, and, to some extent, from the reduced tariffs on Saudi exports, which dominate the effect on the government budget balance. A reduced tariff on imports brings down government revenues, amounting to SR 5.7 bn. at the end of the period. Interest payments on government debt increases by SR 4.8 bn. over the same period. Reduced producer subsidies, mainly to the agricultural sector, lower government expenditures (chapter 3, amounting to SR 4.7 bn. at the end of the period), and also contributes to reduced government debt and consequently interest payments (chapter 4, amounting to SR 4.3 bn. at the end of the period). Reduced tariffs on Saudi exports increases the operating surplus in the private sector. The government plays a significant role in the private sector, and thus the government revenues from operating surpluses increase.

A WTO membership will improve the competitiveness of Saudi non-oil exports. Crude oil is not part of the WTO treaty but there exists a well functioning world market for crude oil. For Saudi Arabia exports of petrochemical and refined products constitute nearly one fifth of total exports. Both these goods are met with tariffs abroad. Without these tariffs Saudi exporters would earn higher prices and export more. We assume that tariffs on Saudi goods will be reduced

**Table 3.3. Main effects from WTO membership**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Per cent deviation											
GDP	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
GDP private sector	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6
Private consumption	2.1	1.9	2.0	2.2	2.4	2.4	2.4	2.3	2.2	2.1	2.1
Private investments	8.4	4.2	2.8	2.4	2.2	2.1	2.0	1.9	2.0	2.0	2.0
Exports	1.0	1.4	1.6	1.8	2.0	2.1	2.2	2.4	2.5	2.6	2.8
Imports	5.9	4.8	4.6	4.9	5.1	5.3	5.4	5.4	5.4	5.5	5.5
Import market share	3.1	2.6	2.5	2.6	2.8	2.9	2.9	2.9	2.8	2.8	2.8
Public debt	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-0.1	-0.2	-0.3
Consumer price	0.05	0.03	0.03	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.07
Absolut deviation											
Current account balance	-9328	-6584	-6101	-6589	-7111	-7364	-7411	-7387	-7365	-7356	-7346
Government budget balance	-704	-52	-40	11	91	181	278	384	502	635	783

by 10 percentage points. The effect of this is mainly to increase exports that somehow restore the current account problems that stem from the reduction of Saudi tariff rates. The positive effects on total exports of lower tariffs abroad may seem very small. It is however, worth noticing that most of Saudi exports consists of oil. Non-oil exports increase by more than 10per cent but since oil production is assumed to be unaffected by a Saudi membership in WTO (due to production quotas within OPEC), oil exports will decrease as more crude is used domestically as inputs to the petrochemical industry. Thus non-oil exports will to some extent "crowd out" oil exports and thereby moderate the total change in exports.

The reduction of Saudi non-tariff barrier will be a necessary part of a membership in WTO. The extent and size of these reductions are not obvious and some rough assumptions have to be made. Since 1995 prices on utilities have been raised several times in order to improve the government budget balance. In this way government subsidies to production have been reduced. It is likely that they will be reduced even further if Saudi Arabia joins the WTO. In exchange, non-tariff barrier that Saudi exporters face abroad will be reduced too. In this study we have removed subsidies to the agriculture and electricity sectors.

The extent and size of non-tariff barriers facing Saudi exporters abroad, are not well known. As a rough approximation we have increased the market size for Saudi non-oil exports by 10per cent. This will of course over some time increase Saudi exports, but again as non-oil exports are small in relation to the economy as a whole, the macroeconomic consequences are very small. However, the qualitative effects are worth mentioning. And improvement in the current account, lower consumption, more investment and therefore a higher capital stock leading to higher GDP. Thus there is a reallocation of production factor between sectors that will lead to somewhat higher total factor productivity in the non-oil sector.

These policy changes will increase Saudi producer prices and consumer prices. Although prices that increase are largely on non-tradables, with agricultural products being the most important exception, through the input-output structure of the economy (and the model) Saudi prices on tradables will increase too. Thus competitiveness is reduced, non-oil exports decline and imports increase. This lowers output and investment. So reduced exports and investment together with more imports, increase the room for private consumption but with a larger current account deficit. On the other hand, less subsidies and higher prices on utilities will improve the government budget balance somewhat. The price effects are roughly the opposite of those due to lower import duties so that the overall effect on consumer prices of a Saudi WTO membership is probably small.

All in all, a Saudi WTO membership will not improve much on the economic situation facing Saudi Arabia according to our baseline scenario presented above. Even if GDP will increase somewhat, it will do so only to a limited degree. Private consumption will increase somewhat more but that has a negative effect on the current account that may lead to some fiscal policy measures. However, the budget balance will, if anything, be somewhat improved even in the absence of such measures.

### **Fiscal policy measures**

From the baseline scenario it is apparent that although government debt is gradually brought down as share of GDP in the long run, the short to medium deficits are quite large. Possible policy measures would be either to introduce some taxation or to cut expenditures. We assumed in the baseline that government spending on welfare and education should increase in line with population while other expenditures remained constant in real terms. It is of course possible to cut military expenditures a good deal in Saudi Arabia. However, it is likely that regional security issues are still worrying the Saudi leadership and for good reasons. Another possibility would be to cut spending

within the royal family but what the size of such measures could be is difficult to say.

Instead we have assumed the introduction of some excise taxes, mainly on consumer goods that either have a high import content or damages health (smoking) or pollutes (petrol) so that traditional Pigou-arguments are valid. In addition we have introduced taxes on some luxury goods according to the income elasticities that are in the consumer demand system of the model. It may of course be argued against such a policy that it is not acceptable to introduce these taxes without changes in the political system. (No taxation without representation.) As an illustration we think it is reasonable to study the introduction of some taxation, particularly in a country where there is hardly any taxation at all.

In a short time horizon, the introduction of a broadly based VAT-system is not possible. One should therefore focus on taxes that are easy to collect and also could be defended besides the revenue side. In table 3.4 we show some macroeconomic effects of introducing these taxes compared to baseline. The size of these tax introductions can be inferred from the change in consumer prices that increase by 1.6 per cent compared to baseline. It is obvious that we have introduced a small tax increase, not a major fiscal policy package. Private consumption drops but only moderately so. Consumer demand is reallocated towards goods with lower import content. This explains why domestic output and investment increases as these sectors also contribute more to GDP than those that face lower demand due to the changes in relative prices. Lower imports improve the current account by one billion SR annually. The effect on the government budget balance is around 5 billion SR the first couple of years. However, this effect gradually increases further due to lower interest payments on government debt. Thus by 2010 government debt is reduced by more than 10 per cent of GDP compared to baseline, i.e. down from 105 per cent of GDP to 94 per cent. Thus as a measure to improve fiscal balances somewhat, the introduction of some excise taxes seems well worth contemplating.

### Diversification

A major goal for the Saudi authorities is to diversify the economy. Diversification may comprise changes in two aspects: The first is to become less oil dependent by achieving a higher growth rate in the non-oil sectors, which implies, due to the government budget constraints, increased growth in the private non-oil sector. The second issue is to reduce the relative control of the government sector in the economy. In World Bank jargon this is often formulated as "letting the government take the back seat", provide a stable macroeconomic framework and concentrate on providing a legal and administrative system for the private sector to take the drivers seat in economic development. In many countries this policy has been implemented by large-scale privatisation of government owned companies. However, this is not the only way to accomplish this. The point is that the government should not involve itself in the management of the companies. It may well own them, but should not run them as parts of government administration with close political control. A way of promoting a diversification is to change policy so that the private sector starts investing in non-oil sectors. We have constructed a scenario where we assume new investments take place in the mining sector as well as tourism that promotes exports. The main part of the increase in investments in the mining sector happens during 2002-04, amounting to a total of SR 317 million, or an average annual growth rate of 34 per cent, through this years.

In table 3.5 we show the effects from diversification compared to the baseline scenario. Growth in private sector GDP increases the first five years, thereafter it is stabilised at a one per cent higher level. This is due to increased value added in the mining sector. As a consequence, investment in the mining sector is increased to build up the capital stock. Private consumption is reduced moderately for the benefit of more investments and exports. There is a rise in exports because of increased consumption by tourists, which is classified as a component of exports, and because of a (small) increase in exports from the mining sector.

**Table 3.4. Main effects from taxation. Deviation from baseline scenario**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Per cent deviation											
GDP	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
GDP private sector	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Private consumption	-0.4	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Private investments	3.0	1.5	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Exports	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Imports	0.1	0.0	-0.2	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Import market share	0.0	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
Public debt	-0.8	-1.6	-2.4	-3.2	-4.0	-5.0	-5.9	-7.0	-8.1	-9.4	-10.9
Consumer price	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7
Absolut deviation											
Current account balance	179	448	888	1085	1078	1012	972	975	1005	1045	1087
Government budget balance	4312	5150	5710	6334	6999	7715	8494	9345	10272	11280	12375

**Table 3.5. Main effects from diversification. Deviation from baseline scenario**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Per cent deviation											
GDP	0.2	0.2	0.3	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4
GDP private sector	0.4	0.5	0.6	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Private consumption	-0.3	0.0	-0.1	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Private investments	1.0	1.3	1.3	1.2	1.2	0.9	0.7	0.7	0.7	0.7	0.7
Exports	0.6	0.6	0.7	0.8	0.9	0.9	0.9	0.9	0.8	0.8	0.8
Imports	0.2	0.4	0.3	0.1	-0.1	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3
Import market share	-0.2	-0.1	-0.1	-0.3	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Public debt	0.0	-0.1	-0.1	-0.2	-0.3	-0.3	-0.4	-0.5	-0.6	-0.7	-0.8
Consumer price	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Absolut deviation											
Current account balance	830	345	716	1473	2203	2401	2690	2858	2916	2931	2948
Government budget balance	84	303	370	453	571	667	720	781	853	933	1019

**Table 3.6. Main effects from privatisation. Deviation from baseline scenario**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Per cent deviation											
GDP	0.1	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5
GDP private sector	0.2	0.4	0.6	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Private consumption	0.0	0.0	0.0	0.0	-0.1	-0.2	-0.3	-0.4	-0.5	-0.5	-0.6
Private investments	-0.7	-1.0	-1.2	-1.3	-1.5	-0.9	-0.7	-0.7	-0.7	-0.7	-0.6
Exports	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Imports	-0.5	-0.8	-1.1	-1.4	-1.8	-1.7	-1.8	-2.0	-2.0	-2.1	-2.1
Import market share	-0.3	-0.5	-0.8	-1.0	-1.3	-1.3	-1.3	-1.4	-1.5	-1.5	-1.5
Public debt	-1.9	-1.9	-2.0	-2.0	-2.1	-2.2	-2.2	-2.3	-2.4	-2.6	-2.7
Consumer price	-0.3	-0.6	-0.9	-1.2	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
Absolut deviation											
Current account balance	939	1593	2315	3198	4184	4082	4467	4957	5367	5677	5937
Government budget balance	578	979	1037	1093	1144	990	1059	1118	1178	1243	1312

Lower imports in the long run, together with increased exports, improves the current account balance by almost SR 3 bn annually in the long run. The government budget balance is improved moderately because revenues increases as private sectors share of operating surplus increases, and because expenditures is reduced as the value of government investment and consumption is reduced through lower prices.

### Privatisation

As part of our policy reform scenario we have simulated the effects of privatisation. We have assumed selling off government assets to national or foreign companies in the private sector. Focus is put on privatisation of telecommunication and air transport, constituting roughly half of the Transport and Communication sector. Further, we assume that privatisation will increase the surplus of the companies due to more efficient production. Increased productivity will affect prices negatively, as distinct from what might happen in reality in which companies may take advantage of their market power in the first place, and as a consequence increase prices. In any case, we assume there will be more competition in these markets. This will not happen without any government intervention to promote competition and prevent private monopolies from establishing market power. We have decided not to counteract the negative price effect given by our model. We assume that private sector

finances the purchases of the companies by drawing down on assets abroad, and that the government use the payment to reduce its international debt. For simplicity we also assume that the reduced interest payment from international assets to the private sector equals the reduced interest payment from the government on its international debt.

Table 3.6 shows the results from this scenario. In the long run value added in the Transport and Communication sector increases with around 3per cent, resulting in a 1per cent increase in GDP for the private sector. Increased productivity leads to a moderate increase in production volumes together with a significant reduction in producer prices. The modest effects on output volumes arise from the constant return to scale assumption, implying no (explicit) relationship between producer prices and output volumes. Reduced producer prices, however, leads to less input of capital and employment, which reduces the production volume. The resources being freed from the sector is allocated to other sectors. Reduced domestic producer prices implies that imported goods has become relatively more expensive, and leads to reduced import market share and imports. This, together with a small increase in exports, provides a marked improvement in the current account balance. The government budget balance, as mentioned above, is improved through reduced debt due to the sale of assets and lower interest payments.

Table 3.7. Policy reform scenario

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Annual growth, percent</b>											
Total consumption	2.1	2.8	2.5	2.4	2.1	2.0	1.9	2.0	2.1	2.1	2.2
Private consumption	2.6	3.7	3.1	3.0	2.4	2.3	2.2	2.3	2.4	2.5	2.6
Government consumption	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Gross fixed capital formation	12.9	0.3	2.5	1.2	1.1	1.6	1.6	1.7	1.9	1.9	1.9
Private	19.9	-0.7	1.2	1.8	1.7	2.4	2.4	2.6	2.8	2.8	2.8
Government	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oil	8.8	12.0	25.5	0.3	0.4	0.4	0.2	0.2	0.2	0.3	0.3
Exports	3.1	3.0	2.9	2.7	2.6	2.4	2.4	2.4	2.4	2.5	2.5
Crude oil and natural gas	3.2	2.1	2.2	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Petroleum refining	-6.8	6.3	5.4	2.3	0.9	1.1	1.2	1.2	1.2	1.2	1.2
Petrochemicals	7.7	2.4	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.4
Other exports	10.5	7.2	5.9	5.4	5.1	5.0	4.9	4.9	4.8	4.8	4.9
Imports	8.2	3.1	3.4	2.6	1.8	2.2	2.0	2.2	2.3	2.5	2.5
Gross domestic product	2.2	2.2	2.2	2.2	2.2	2.0	2.0	2.0	2.1	2.1	2.1
Private sector	3.1	2.0	2.2	2.2	2.2	1.9	1.9	1.9	2.0	2.0	2.0
Government sector	1.0	1.4	1.4	1.5	1.6	1.5	1.5	1.5	1.5	1.5	1.5
Oil sector	1.8	2.8	2.7	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Employment	1.5	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.8	1.8
Private	1.5	1.5	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.8	1.9
Government	1.0	1.4	1.4	1.5	1.6	1.5	1.5	1.5	1.5	1.5	1.5
Saudi	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Non-Saudi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Price indices</b>											
Consumption	2.6	0.9	0.9	0.9	0.8	1.2	1.2	1.2	1.2	1.2	1.2
GDP	4.6	2.2	1.3	1.2	1.2	1.4	1.4	1.4	1.4	1.4	1.4
Exports	8.1	3.6	1.7	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Imports	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Oil	10.6	4.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
<b>Percent of GDP</b>											
Current account	-6.8	-5.2	-4.7	-4.1	-3.3	-2.7	-2.0	-1.3	-0.8	-0.3	0.2
Trade balance	5.0	6.1	6.2	6.4	6.9	7.2	7.5	7.8	8.1	8.3	8.4
Government budget	-7.2	-5.6	-4.8	-4.0	-3.3	-2.6	-1.9	-1.1	-0.4	0.4	1.2
Saving	13.6	14.5	14.9	15.3	15.8	16.3	16.8	17.3	17.8	18.2	18.5
Private	13.8	13.1	12.6	12.3	12.3	12.2	12.2	12.1	11.9	11.7	11.4
Government	-0.2	1.4	2.4	3.0	3.5	4.1	4.6	5.2	5.8	6.5	7.1
<b>Policy goal indicators</b>											
<b>Saudiization (% of total)</b>											
Saudi employment	44.7	45.6	46.4	47.3	48.1	49.0	49.8	50.7	51.6	52.4	53.3
<b>Diversification (% of GDP)</b>											
Private production	43.3	42.6	42.4	42.2	42.0	41.9	41.9	41.8	41.7	41.6	41.6
Non-oil exports	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2
Imports	38.7	38.6	38.9	39.0	38.7	38.6	38.5	38.3	38.3	38.3	38.3
<b>Privatization (% of GDP)</b>											
Private investment	13.7	13.2	13.0	12.9	12.9	12.9	12.9	12.9	13.0	13.0	13.1
Private consumption	45.3	45.4	45.6	45.8	45.7	45.7	45.7	45.7	45.7	45.8	45.9
Private employment (% of total)	86.7	86.6	86.6	86.6	86.6	86.6	86.6	86.6	86.7	86.7	86.7
Real disposable income (annual growth)	4.9	4.7	3.1	2.8	2.7	2.6	2.6	2.6	2.6	2.6	2.6

### The combined policy scenario

In table 3.7 we show the main effects from the compound shift constituting the partial analyses discussed so far. If we compare this to the baseline scenario showed in table 3.1 we see that most of the adjustment to new equilibrium levels take place during the first half of the period, and we observe no major changes in the long term growth rates. From table 3.8, showing the deviation from the baseline scenario, we see that GDP for the private sector is 2.8 per cent higher in the policy reform scenario than in the baseline. This increase makes room for both private

consumption and private investments to increase. Private consumption shows a bell-shaped improvement over the baseline scenario. In 2000 it is 1.3 per cent higher, the difference reaches 1.8 per cent in 2005, before it drops back to 1.1 per cent in 2010. Export and import are altered by all the scenarios. The WTO - scenario alone worsen the trade balance by SR 7.3 billions at the end of the period. The partial effects from the other scenarios are positive, and improves the trade balance, resulting in a SR 3.2 billions overall improvement in the current account balance. The growth in the consumer price index is 1.3 percentage

point higher in 2000 in the policy reform scenario, then, for the next four years it is 0.3 - 0.4 percentage points below. For the rest of the period growth rates are the same. The effect on the consumer price is mostly due to the introduction of some consumer taxes (see table 3.4).

In figure 3.4 we compare government debt and net foreign assets in the two scenarios. We observe a considerable reduction in the government debt in the policy reform scenario, which is reduced from 104 to 88 percent of GDP in 2010. Net foreign assets is turned for the worse during the first half of the simulation period, but is only just reaching the same level at the end of the period. This should not be a worry as this is due to higher investment, leading to a higher capital stock.

To conclude, it is worth noting that the policy reform scenarios has not led to sustained higher growth but a higher level of GDP with improved financial balances, particularly for the public sector. The problematic feature of falling consumption per capita has not been resolved. In our view, one possibility to overcome this feature would be to increase female labour participation. That is however, a controversial issue in Saudi Arabia.

Figure 3.4. Government debt (left axis) and Net foreign assets (right axis). Baseline and policy reform. Per cent of GDP

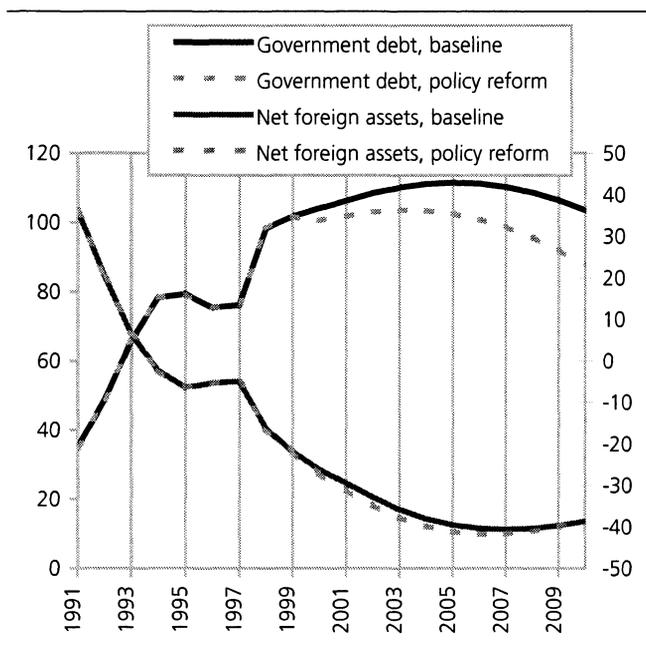


Table 3.8. Main effects of the policy reform scenarios. Deviation from baseline scenario

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Per cent deviation											
GDP	0.5	0.7	0.8	1.0	1.2	1.2	1.2	1.2	1.2	1.3	1.3
GDP private sector	1.3	1.6	1.9	2.3	2.7	2.7	2.8	2.8	2.8	2.8	2.8
Private consumption	1.3	1.7	1.8	1.8	1.7	1.8	1.6	1.4	1.3	1.1	1.1
Private investments	11.8	6.0	3.7	2.8	2.5	2.6	2.5	2.4	2.4	2.5	2.6
Exports	1.6	2.0	2.3	2.6	2.9	3.0	3.1	3.2	3.3	3.4	3.6
Imports	5.8	4.4	3.6	3.1	2.8	3.0	2.9	2.8	2.7	2.7	2.8
Import market share	2.7	2.0	1.6	1.2	1.0	1.0	1.0	0.9	0.8	0.8	0.8
Public debt	-2.5	-3.4	-4.3	-5.3	-6.3	-7.4	-8.5	-9.8	-11.2	-12.8	-14.6
Consumer price	1.3	0.9	0.5	0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Absolut deviation											
Current account balance	-7323	-4079	-1977	-520	776	571	1182	1894	2440	2836	3184
Government budget balance	4338	6423	7092	7876	8750	9495	10477	11537	12697	13966	15347

## 4. Possible effects on the world oil market

Saudi Arabia is a major supplier of crude oil to the world oil market with a market share of more than 10 per cent. The country has on a number of occasions acted as the main swing producer within OPEC. Since the early 1990's Saudi crude production has been roughly 9 mbd., but more recently below 8 mbd. The OPEC market share has gradually increased to around 40 per cent of world supply after having fallen to only 30 per cent in 1985. The combination of the Asian crisis and the OPEC decision of November 1997 to increase production quotas, are usually thought of as the main causes for the oil price collapse during 1998. A somewhat neglected factor is the substantial increase of crude production in Iraq. From December 1997 to December 1998, Iraqi production increased by 1.7 mbd and Iraq is now back in the market with volumes not seen since the invasion of Kuwait. Several attempts by OPEC to restrict supply finally succeeded in March 1999 and the oil price increased during 1999 to a level close to the previous peak price during the winter of 1996/97. It is probably fair to say that the recent OPEC-success in restricting oil supply has surprised most experts in the oil market.

In this chapter we will analyse the potential benefits to Saudi-Arabia and OPEC of a more aggressive production policy than what seems to be the present policy. We discuss first what we will refer to as the baseline scenario for the world oil market. This scenario has been included in our two scenarios for the Saudi economy presented earlier. Then we present an analysis of a scenario where OPEC-capacity and production are increased in order to grab a larger share of the world market than what is the case in the baseline. The idea is to study if such a policy could reduce those fiscal imbalances for the Saudi economy that have been presented above.

### 4.1. The baseline oil scenario

Our simulations are based on a small model of the world oil market cf., Lorentsen and Roland (1986). In this model world demand is disaggregated by two regions, OECD and the rest of the world except former centrally planned economies where net crude supply to the world market is exogenous. Demand depends on

income (GDP) and the real oil price adjusted for refining costs and taxes. Supply from OECD and other market economies depend positively on the real oil price and technological change. OPEC production balances the market. The crude price is modelled as a function of capacity and production in OPEC so that higher capacity utilisation in OPEC will increase the crude price. In our alternative scenario, the OPEC-countries are assumed to increase their production capacity. This drives the price down and OPEC production as well as capacity utilisation increases. This will in turn lead to higher prices. We shall return to this scenario below.

GDP growth in the OECD countries is assumed to be 2.5 per cent while the growth rate for the rest of the world is assumed to be 4.5 per cent. Production capacity in OPEC is assumed to grow by nearly 2 per cent annually. Net supplies from former planned economies the most important being Russia and China is assumed to be constant at approximately 2 mbd.

The average crude price per barrel in 1999 is estimated to be 18 USD and OPEC supply is 31 mbd. During the second half of 1999 the crude price has increased substantially and the Brent Blend spot price has even reached 25 USD during some weeks. We have assumed that prices will go down from this level during next year and average some 20 USD.

In 2010 OPEC supply is estimated to be 37 mbd and the crude price 24 USD assuming 2 per cent inflation. Thus in the baseline the crude price in real terms is roughly constant from our assumed level in 2000. The growth rate of non-OPEC crude supply is estimated to be roughly equal to that of OPEC. While OPEC supply is estimated to increase by 6 mbd from 2000 to 2010, non-OPEC supply increases by almost 8 mbd. The market share of OPEC that reached 41 per cent in 1998 will be fairly constant according to the baseline scenario. The main characteristics of the baseline are presented in table 4.1.

Table 4.1. The world oil market. Baseline scenario

	1990	1995	2000	2005	2010	1990-2000	2000-2010
						Average growth rates	
World demand (mbd.)	66.4	70.1	76.0	82.5	90.0	1.4	1.7
OECD	41.6	44.9	48.0	50.7	54.0	1.4	1.2
Other market ec.	12.8	16.5	19.5	22.8	27.0	4.3	3.3
World supply (mbd.)	66.9	70.1	76.0	82.5	90.0	1.3	1.7
OPEC	25.0	27.7	31.0	33.5	37.0	2.2	1.8
Market economies	27.4	32.0	34.5	38.0	41.0	2.3	1.7
Net supply planned ec.	2.5	1.7	2.0	2.0	2.0		
Crude oil price (USD)	22.3	17.2	20.0	22.0	24.0		

This scenario is of course subject to large uncertainties. One important aspect is related to the non-OPEC supply potential. Recently there has been a renewed interest in the relation between oil reserves and long run production capabilities in the world. Recent contributions to this debate are Campbell and Laharrere (1998), Bakhtiari (1999) and Martin (1999). The main argument in Campbell and Laharrere (1998) and earlier studies by Campbell is that the world is running out of cheap oil and that conventional oil production will peak very soon. The arguments supporting these conclusions are summarised in Bakhtiari (1999):

- 80 per cent of total world output comes from fields discovered before 1973
- There is now a tendency of overestimating reserves rather than the opposite
- The last giant oil field was discovered in 1986
- It is unlikely that the world contains any major undiscovered oil province

These arguments usually made by geologists are of course met with scepticism from economists who tend to argue that technological progress will reduce extraction costs and increase recoverable reserves. If a scarcity should appear and the oil price increase substantially, more exploration will take place and more oil will be found so that a long-term major price increase will be avoided. When the Club of Rome launched its resource scarcity view more than 30 years ago, it was met with criticism and soon sunk into oblivion. On that background it is difficult to find many people who today support a renewed worry for resource scarcity. However, one day the wolf may actually turn up (as indeed it has in Norway, literally speaking)!

The most recent long-term forecast for Norwegian crude production indicates that after reaching a peak in 2002/3 at 3.4 mbd, output will fall to 2.7 mbd by 2010. But the uncertainty is substantial with a suggested confidence interval of plus minus one mbd around the point estimate in 2010, cf. OED (1999). This implies that Norwegian authorities do not think that it is very likely that output will increase beyond the peak reached in a few years time. If this

development should also apply to UK output which produce from the same province in geological terms and taking into account trends in North-American production, it may well be that the forecasted output of the OECD countries (exc. Mexico) in table 4.1 is actually on the optimistic side.

On the other hand, there are relatively unexplored provinces such as the Caspian sea that could prove to be a major area for new growth in production outside OPEC. Even within OPEC the return of Iraq to the scene and the possibility of a normalisation of the political situation in that country could prove that low cost reserves are as high as suggested by the non-geologists.

#### 4.2. The market grab scenario

In the simulation model we use, OPEC is not modelled as a single rational body that tries to maximise net revenues from oil. Given the behaviour of OPEC during the last 30 years, this is probably not a very controversial assumption. But it is far from obvious what an alternative model of OPEC behaviour should look like. In the model we use, OPEC is assumed to set prices so that a target level of capacity utilisation is met. This behavioural assumption has some empirical foundation. However, the model leaves the OPEC capacity unexplained and is consequently only a partial model. In this section we analyse what happens to the world oil market and the crude oil price in particular if OPEC decides to increase its capacity substantially compared to our reference scenario where capacity is assumed to grow close to 2 per cent annually over the next decade. We now assume that OPEC increases its capacity by another 5 mbd and lowers the crude price in order to increase demand for OPEC production. Over time the increase in capacity will gradually be followed by higher output so that capacity utilisation is roughly constant. By comparing the two alternatives, we may see if OPEC has any incentive to change its decisions compared to the baseline.

Let us start with a simple model in order to understand the main mechanisms of our simulation. OPEC production is assumed to be the difference between total demand (D) and non-OPEC supply (S)

$$XO = D(PC) - S(PS)$$

where the real consumer price of oil (PC) is given by

$$PC = (\alpha * PS + (1 - \alpha) * P) * (1 + t)$$

The consumer price of oil depends on the producer price (PS) or the crude price times a share  $\alpha$  that captures the share of crude in total refinery costs. Other costs are simply taken to depend on the general price level (P) or the GDP-deflator, which we shall assume, is constant. Oil products are heavily taxed in most countries. This is represented by the indirect tax rate  $t$ .

OPEC revenue is given by

$$R = PS * XO - C * XO$$

where  $C$  is production cost per unit in OPEC. Inserting the first two equations into the revenue function and differentiating gives

$$dR = [(1 + (D - S) / (\alpha * (1+t) * \epsilon * D - \sigma * S)) * PS - C] * dXO$$

where the first term is OPEC marginal revenue taking into account the supply response of non-OPEC producers and the last term in brackets is marginal costs of increasing OPEC production. This model of the oil market treats OPEC as a Stackleberg-leader, and has certain shortcomings, see the discussion in Lindholt (1998), but is simple and transparent in the short to medium run. If we define the OPEC market share as

$$ms = XO / D,$$

we can formulate the condition that has to be fulfilled if OPEC can benefit from higher output as

$$C / PS < 1 + ms / (\alpha * (1+t) * \epsilon - (1-ms) * \sigma)$$

The denominator on the right hand side will always be negative as the price elasticity of demand ( $\epsilon$ ) is negative and the supply elasticity ( $\sigma$ ) is positive. Thus the right hand side will always be less than one. The cost-price margin for OPEC on the left hand side of the inequality sign will also be less than one so it is not obvious how to conclude. In addition we must take into account that all the parameters on the right hand side are not parameters in the strict sense of the word because they will all depend on the crude oil price (PS).

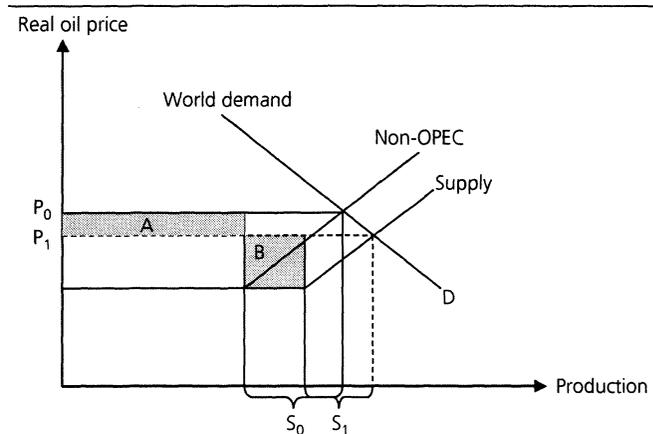
One obvious qualitative result is that if the oil price is low, the OPEC cost-price margin will be high. That in itself will make it less probable that the inequality sign is fulfilled. This is also reasonable because OPEC is more likely to decrease output when the oil price is low than when it is high. Indeed, this is also what we observe and which has led many observers to state that

OPEC functions better as a cartel when the oil price is low than when it is high. The other side of this argument is just as obvious. For producers within OPEC with high marginal costs, the cost price margin will be high. Thus higher output is not seen as the best OPEC strategy for these countries. The opposite is the case for low cost producers within OPEC. They will most likely earn more if OPEC expanded output given that it is just these low cost producers that are allowed to expand production. This difference in policy within OPEC has been observed a number of times and limits the effectiveness of OPEC as a cartel particularly in times of high prices when low cost producers would benefit the most from higher output on the margin.

It is also worth noting that the higher the tax on oil products ( $t$ ) in consumer countries, the more likely it is that OPEC will gain from higher output. This is because there is less demand response due to the large wedge between consumer and producer prices. Thus the tax rate acts just as a high price elasticity of demand (in absolute terms). It produces a "flat" demand curve that makes demand very responsive to higher prices so that when OPEC increases supply, prices will not have to go down much since consumers are so flexible. Also the more elastic the supply is outside OPEC the more likely is OPEC to benefit from higher output because a small reduction in price will lower non-OPEC output more than when supply responds less.

The model is illustrated graphically in figure 4.1. World demand (line D) is downward sloping. In the short run it is probably quite steep, but much "flatter" in the long run. Initially, non-OPEC supply is  $S_0$  and price  $P_0$ . Then OPEC increases its supply so that the horizontal part of the total supply curve is extended. Non-OPEC supply is reduced from  $S_0$  to  $S_1$  and the price drops to  $P_1$ . Total OPEC revenue is increased by the shaded area B due to higher output, but reduced by lower price illustrated by the shaded area A. If higher OPEC output is to be profitable, we must have  $A < B$ .

Figure 4.1. World oil market



**Table 4.2. The market grab scenario. Absolute changes compared to baseline**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020
OECD demand (mbd)	0.3	0.6	1.1	1.6	2.0	2.2	2.4	2.5	2.5	2.5	2.4	2.1	2.0
Other market econom.	0.2	0.4	0.8	1.1	1.4	1.7	1.9	2.0	2.1	2.2	2.2	2.1	2.2
World supply (mbd)	0.4	1.1	1.9	2.7	3.4	3.9	4.3	4.5	4.6	4.7	4.6	4.2	4.2
OPEC	0.9	2.0	3.1	4.1	4.8	5.3	5.6	5.7	5.7	5.6	5.5	5.0	5.0
Market economies	-0.5	-0.9	-1.2	-1.4	-1.4	-1.4	-1.3	-1.2	-1.1	-0.9	-0.9	-0.8	-0.8
Crude oil price	-1.9	-3.3	-4.6	-4.8	-5.0	-4.7	-4.4	-4.0	-3.6	-3.2	-2.9	-2.6	-2.6

Little more can be said about the general results. We therefore now turn to some model simulations. The model we use is of course not the "truth" in any sense. However, any OPEC strategy will have to be based on a set of empirical assumptions regarding the oil market and a model is a useful tool in organising the discussion and to perform sensitivity analyses. Ideally we should have compared the results from many different models of the oil market in order to study the problem of "optimal" OPEC behaviour, as there are large uncertainties with regard to the important parameters. We do not have access such a variety of models so the one we have must do.

We assume that OPEC changes its policy in 2000. Higher output and lower oil prices have effects on the world economy due to the importance of oil as a world commodity. To be consistent we should in principle change our assumptions of GDP-growth that drive demand. Given the results we have in this scenario compared to baseline, these effects will be very small and are neglected for simplicity. In their most recent Economic Outlook, OECD shows the effects of a permanent increase in the crude price of 10 USD. The effect on OECD GDP seems to be - 0.3 per cent while consumer prices increase by 0.8 per cent. The price effects we arrive at are only half of this. Thus we neglect the effect on the OECD area.

Table 4.2 presents the effects of this market grab scenario as absolute changes compared to the baseline simulation. Most effects seem to stabilise after approximately ten years and we do not present annual results beyond 2010.

If we focus on long-term results, we notice that the crude price (both nominal and real) is reduced by some 2.5-3 USD per barrel and OPEC output has expanded by 5 mbd in line with capacity. The supply response to lower prices in non-OPEC countries is very small according to our model. In itself this makes it less likely that higher output will be optimal for OPEC according to our theoretical discussion above. One argument in favour of this result and in line with our model is that as long as prices are as high as in both scenarios, operating costs will be covered for most non-OPEC producers. Thus the rent is reduced but it still pays to produce roughly as before at least on already developed sites.

For OPEC as a whole, gross revenue in 2010 is 897 mill. USD per day in this scenario as opposed to 888 mill. USD in baseline. If we assume that marginal costs in OPEC are 2 USD per barrel, net revenue in 2010 is slightly higher in the baseline scenario than in this market grab scenario, roughly speaking they are the same in both. However, if marginal production costs are much higher because the increase in OPEC output is spread among many OPEC countries and not those with the lowest costs, it clearly does not pay to expand output according to our model. Beyond 2010, the effect on the crude price is somewhat lower than in 2010 and higher output is then more likely to be beneficial to OPEC. On the other hand, the lower price applies to a higher output as OPEC capacity is assumed to increase beyond 2010. Thus also in 2015 the difference in gross revenue is very small between the two scenarios according to our simulation results.

Taken as an investment strategy, any increase in net revenues will have to be discounted against the loss in revenues that comes during the first ten years or so. Notice that the crude price drops considerably during these years, before gradually stabilising at 2.5-3 USD lower than in baseline. For many years this market grab scenario actually implies a decline in the crude price compared to the average price in 1999 (18 USD). In 2002 and 2003 the crude price is around 16 USD per barrel and the loss in revenues for OPEC is very large in the market grab scenario compared with baseline during the first years. Since the cost of market grab come early and possible increases in net revenue much later, the market grab scenario does not seem an optimal policy for OPEC as a whole according to our model.

So far, we have discussed the market grab scenario as if it applied to OPEC as a whole. Now suppose that only a few countries within OPEC actually have the potential to increase their crude production considerably. Suppose further that these countries also are low cost producers. In fact this is just what is true of countries such as Iraq and Saudi Arabia. It is not clear how fast Iraq can increase its output, but there is little doubt that Saudi Arabia can increase output from around 8 mbd that is close to present production to say 14 mbd by 2010 (assuming growth in baseline with a constant quota within OPEC in addition to 5.4 mbd according to table 5.2.). In 2010 Saudi gross revenue is estimated at 234 mill. USD per day. In the market grab

scenario gross revenue would be 318 mill. USD a day and taking into account a marginal cost of producing the extra 5.4 mbd at 2 USD a barrel would give a net increase in revenues of  $(318 - 2 \times 5.4 - 234)$  73 mill. USD a day. For Saudi Arabia there would hardly be any short run costs to this strategy. Thus if Saudi Arabia could increase its production while the rest of OPEC did not, Saudi Arabia would economically benefit a lot from such a policy. But taking into account the results for OPEC as a whole, roughly all of the Saudi benefit would be at the expense of other OPEC member countries. It is thus not likely that OPEC would survive if such a policy were to be undertaken by the Saudis. Obviously this would also change the whole political scene in the Middle East and within the "Arab nation".

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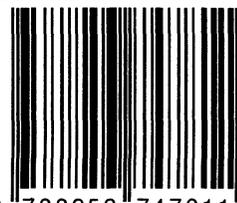
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