The impact of oil revenue fluctuations on the Saudi Arabian economy.

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THE IMPACT OF OIL REVENUE FLUCTUATIONS ON THE SAUDI ARABIAN ECONOMY

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Dedication

To the memory of my beloved parents

Abstract

The Saudi Arabian economy experienced two major stages in the period 1965-97, the first of which, was the oil export boom from 1965 to 1981, while the second was the oil slump from 1982 onwards. This study firstly analyses the impact of the oil revenue fluctuations on the Saudi Arabian based on the Dutch disease theory, and secondly discusses the government response used to mitigate the negative effects of such fluctuations. The main empirical findings indicate that the Saudi Arabian economy was subject to a unique case of the Dutch disease during the boom. Some of the symptoms of the disease, notably the rise in relative prices, appreciation in the real exchange rate and expansion of the supply of nontraded goods, were applicable, while, in contrast to the theory, the supply of tradable goods expanded, but far below that of nontraded goods, due to the influence of subsidies, the influx of foreign labour and the world price effect. During the slump period, the domestic economy was subject to a decline in relative prices, depreciation of the Saudi currency, and a contraction in the supply of nontraded goods. The supply of traded goods was affected as the theory predicts. This was possibly because of the continuation of subsidies. The policies associated with the oil slump focussed mainly on a reduction of government spending, drawing from foreign reserves and borrowing from local and international financial agencies. In general, the study suggests that the developing oil-exporting countries can build up foreign assets as a policy of stabilising expenditure. This approach tends to reduce the oil export instability through accumulating foreign reserves to be used to counter any downward movements in the future. In addition, the study suggests that the necessity to diversify the sources of income by improving non-oil sectors' production, particularly, the services and some tradable goods.

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Needless to say, all faults or shortcomings are solely mine. Also, It should be added that this study does not necessary in any way reflect the views of my sponsor or any one else but myself.

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Chapter One

Introduction

1.1 Identification of the Problem

Saudi Arabia can be categorised as a developing country. Nevertheless, it differs from the majority of the developing countries, which have low income, high populations to land ratios, high shares of agriculture in GDP, and high foreign debts. The Saudi Arabian economy is characterised by: (i) the dominance of the public sector due to the fact that the state owns the oil fields; (ii) a high dependence on international trade. It is the largest oil exporter in the world, and it possesses about 26% of the world proven reserves, with 261 billion barrels compared with world reserves accounted for 1036 billion barrels. It is also the largest importing country in the Arab world; (iii) there is a high reliance on foreign labourer. According to the last Saudi census, non-Saudis were one third of the total population.

The oil sector plays a crucial role in the economic activity, and the Saudi Arabian economy can be characterised as an oil-dependent economy due to the high proportion of the oil exports in the country's total exports and of the oil share in the overall GDP. The oil windfall, which accrued to the government in the aftermath of the Arab-embargo of oil in 1973, led the country to spend heavily in order to accelerate the economic development.

An oil export boom (if oil revenues are monetised) might be expected to lead to an improvement in national income, disposable income, and produce a surplus in the balance of payments. Despite the welfare achieved and associated with the energy boom, an energy-producing economy can suffer from negative side-effects emanating from a boom, such as the deterioration in manufacturing and agricultural sectors because of an appreciation of the real exchange rate and an expansion of the nontraded goods sector This was first identified following the discovery of the Slochtern gas field in the Netherlands in the 1960s, which caused an appreciation of the Dutch Guilder.

Similarly, the Saudi Arabian economy experienced an oil export boom during the 1970s and early 1980s due to the unexpected sharp increase of oil price and production resulting, amongst other factors, from Arab-Israeli war and Iranian revolution. Therefore, the national income rose and the balance of payments went into surplus. Such an outcome would have been normally considered as a blessing. Nevertheless, adverse side-effects may occur, notably an asymmetrical effect on resource reallocation and on income distribution. This can be evident from: (i) the rise in the relative price of non-traded goods sector with respect to the traded goods sector; (ii) the appreciation in the Saudi real exchange rate (iii) a deterioration in the traditional non-oil traded goods sector, which may cause a de-industrialisation or/and de-agriculturalisation and an expansion in the non-traded goods sector at the expense of the traditional traded goods sector. The negative side-effects of the export boom is recongised in the economic literature as the 'Dutch disease phenomenon', 'Oil-Syndrom' or 'de-industrialisation'. It is worth mentioning that in Saudi Arabia the traditional traded goods sector in the lean years was confined to livestock raising, production of small tools by craftsmen and primitive agriculture. Therefore, the Dutch diesease in this thesis is carried out with the assumption that Saudi Arabia may suffer from a decline of the traditional traded goods sector, while the manufacturing base is likely to evolve in the futrue as a diversification target of not highly reliance on the oil as the major source of national income.

The boom which has been enjoyed was followed by gradual and then dramatic decline in oil revenues. This occurred especially after the mid-1980s when Saudi Arabia stopped practising the role of a “swing producer” in OPEC in order to maintain the price of oil. It has been adversely affected by OPEC members, and independent oil producers when they increased their quotas at the expense of Saudi quota. Accordingly, the production of Saudi Arabia declined from five to less than three million barrells in the mid 1980s. Consequently, it might be expected that there would be a reverse consequences of the boom due to the decline in oil price and production. Fluctuations in oil revenues over time may reflect and affect the Saudi small and open economy positively and/or negatively through both the oil export boom and the oil export slump.

1.2 Purpose and Importance of the Study

The main purpose of this study is to examine empirically the consequences of the oil boom (oil slump) on the Saudi Arabian economy during the period from 1965 to 1981 (Stage I) and from 1982 to 1997 (Stage II). An examination is made of the impact of the oil revenue fluctuations on the Saudi Arabian economy during the sample periods in order to answer the following questions:

- Has the oil boom (slump) represented by oil revenue, oil price and the spending effects, positively affected the relative price of the nontraded goods sector relative to the traded goods sector? If so, to what extent has the oil boom (slump) affected relative prices?

- Has the real exchange rate appreciated (depreciated) in response to the oil revenue, oil price and spending effects? If so, to what extent has the appreciation (depreciation) of the real exchange rate been affected?
- Has the traded goods sector been squeezed (expanded) as a result of the oil boom (slump)? If so, to what extent has it been affected and what have been the causes of such an outcome?
- Has the oil boom (slump) brought about an expansion (contraction) of the nontraded goods sector? If so, how and to what extent has it done so?

The answers to these questions may not be adequate unless the policy response to the boom and slump is discussed. Therefore, the secondary purpose of this study is to discuss the government policy responses both within the context of the analysis and also separately.

This study has to be seen in the context of the previous studies conducted with respect to the impact of natural resources export boom (slump) on the domestic economy in different countries experiencing the same situation. These studies can be categorised as follows:

1. The studies concerned with developed countries, which rest mainly on assumptions, which are consistent with the structure of these economies. These assumptions may not be relevant to oil-exporting developing countries, as they include full-employment, highly developed financial markets, and a

large scale manufacturing sectors, a substantial role for the private sector, a flexible exchange rate and sound macroeconomic management. Corden and Neary (1982), Eastwood and Venables (1982), Buiter and Purvis (1983), and Forsyth and Kay (1980) among others are samples of these studies.

2. Studies dealing with fixed exchange rates put emphasis on changes in oil prices rather than in production or oil revenues. The oil price may not be the only factor that determines oil revenues, but oil production may be raised to offset the fall in oil prices. Some examples of such studies are Harberger (1983) and Edwards and Aoki (1983) among others.

3. Some studies assume explicitly or implicitly that oil revenues accrues to the private sector, whereas in most developing countries, particularly in OPEC countries, the oil revenues accrue directly to their governments. This implies that oil revenue fluctuations may have different impact on the economy through the role of government control over the economy. All studies, which are conducted in some Western countries (Britain, Holland, and Norway), in relation to the Dutch disease, are examples of this category.

4. Some studies conducted in developing countries mainly deal with the impact of a primary agricultural product boom on the economy. The agricultural sector has forward and backward linkages, whereas the oil sector is mainly known as an enclave sector with few linkages with other sectors in the economy. Examples of these studies are Kamas (1986), Edwards (1986), Musond and Luvanda (1991). The first two studies focus on the effect of the coffee export boom on the Colombian economy, whereas the latter explain the effect of coffee export boom on the Tanzanian economy.

5. With regard to the Saudi Arabian economy, most studies related to the Dutch disease concentrate mainly either on the positive effects of the boom rather than the adverse side-effect, resulting from external shock or dealing with an export boom rather than the export slump. Taher (1987) and Al-Gaeed (1991), are samples of this tendency.

6. Studies conducted with respect to oil revenue declines include those by Al-Yousuf (1990), Ibrahim (1987), Mabro (1985). They covered the period prior to 1990, before the Saudi Arabian economy had been severely affected during and after the invasion and liberation of Kuwait in 1990-1991.

The Dutch disease theory does not merely refer to the problem of de-industrialisation, but also to the decline of the tradable sectors in total GDP, or slower than normal growth in response to exogenous windfalls resulting particularly from oil export (Roemer, 1984, Braker and Brailovsky, 1981). This thesis, unlike the core Dutch disease model applying this disease to the oil exporting countries, highlights the uniqueness of the Saudi oil economy taking into consideration assumptions that are relevant to this economy, such as the dominance of the government sector, undeveloped manufacturing and agricultural sectors, the limited role of the private sector and low economic absorptive capacity. In addition, the study attempts to quantify the negative and positive effects of both export boom and slump. One can conclude that this thesis is the first of its kind that comprehensively examines the topic in the context of Saudi Arabia over more than three decades. This thesis depicts how oil revenue fluctuations may affect the relative prices, real exchange rates and sectoral shifts in the economic history of Saudi Arabia providing required analysis of policies used by industrialising economies benefiting from favourable exogenous shocks. This study highlights the main limitation aspects of the Dutch disease model in analysing the experience of oil revenue fluctuations, especially when it is implemented to industrialising economies. These limitations, unlike the Core Dutch disease model, do not depend upon the structure of prices as the only variable to examine the impact of oil revenue fluctuations, but they include challenging of the theory's assumptions based upon full-employment, developed financial market, a significant role of the private sector, fixed labour supply and flexible exchange rate. Furthermore, this study challenges the two mechanisms of the resource movement and spending effects used by the Core mode to examine the boom effect on changing relative prices. This is discussed in more details in chapter 4.

1.3 Methodology

A sectoral model of an open economy, based on the Dutch theory is used to analyse the impact of the oil price, oil revenues and the proxy for the spending effect (i.e., the government spending and the money supply) on the real exchange rate and the relative prices of nontraded goods versus traded goods. Furthermore, the sectoral model depicts how the oil boom and slump affect the allocation of resources through the impact of the proxy for the spending effect, the price of oil, oil revenues, the estimated real exchange rate, the relative prices and the world price index.

In addition to the analysis of these effects, the government policy responses to moderate the impact of the boom and slump are discussed, both in the context of the study and separately. These policies include the government subsidies, income-generating measures, and the adjustment of government expenditure. However, recruitment of foreign labour has played a considerable role, especially during the oil boom, to mitigate the negative effects of the oil boom. The foreign labour through remitting incomes home, consuming imported goods and shifting some service industries to the tradable sector, could dampen the spending effect and hence limit real exchange rate appreciation, as well as the rise in the relative price of nontraded goods.

Consequently, two stages will be suggested to achieve the main objectives of the study. These stages will be divided as follows:

Stage I - This is devoted to an investigation of the impact of the oil export boom on the economy during the period from 1965 to the end of the oil price increase in 1981. It is worth mentioning that the pre-boom period (e.g., 1965 to 1972) did not witness any dramatic economic changes, but it is included in the sample period for the sake of econometric needs and shortages of monthly and quarterly data availability. The main purpose of adding the pre-boom years is to increase the degrees of freedom since one cannot include more years after 1981 as the last year of the boom. The main task of the study is to examine the existence of the adverse side-effect of the oil export boom in the national economy during and after the Arab-Israel war in 1973 and in 1979 when Iraq-Iran war took place. The impact of the oil export boom will be examined through changes in the relative price of non-traded goods in terms of traded goods, the appreciation of the real exchange rate, and thus the structural changes in output of the traded and non-traded good sectors. In addition, the government's policy response to this boom including subsidies and importing foreign labour will be examined in order to see if it succeeded in mitigating the negative effects of the external shocks.

Stage II – This is intended as an analysis of the impact of world oil prices deterioration on the national economy during the period from 1982 to the last published data in 1997. This will also be examined through changes in the relative prices, depreciation in the real exchange rate and the output of traded and nontraded goods resulting from the slump in the price of oil and production and thus oil revenues. The emphasis is on how the government response affected the economy. In other words, whether the government succeeded to diversify the economy and lessen reliance on oil by reallocation of resources towards industrialisation of agriculture.

1.4 Organisation of the Study

Chapter two provides a review of the theoretical literature on Dutch disease in developing and developed countries. Moreover, empirical studies of the export boom in developing countries are covered.

Chapter three highlights the characteristics and the structure of the Saudi Arabian economy. It examines the role of the oil sector and its connection with the world oil market in general and in OPEC in particular. The role of the non-oil sector including manufacturing, agricultural, services and construction is assessed. Other sectors such as the public sector (its components of the budget and the government revenues and expenditures) and the external sector containing exports, imports and the balance of payments are covered as well.

Chapter four is devoted to an examination of the adverse-side effects of the Dutch disease. This is conducted within a static theoretical macroeconomic framework where natural resource export's fluctuations impact on the domestic economy. This is followed by constructing a model relevant to the Saudi case, and based on the Dutch disease model. To give a clear picture of the government reaction to such changes, policy responses are provided.

Chapter five is concerned with the description of data. The aim of this chapter is to give a clear definition of selected endogenous and exogenous variables employed in the empirical study. This is based on the need to explain observed differences in traded goods, non-traded goods, the relative price of nontradable goods in terms of tradable goods and the real exchange rate indicators.

Chapter six is reporting and discussing in detail the empirical study's results with respect to the oil export boom. In this stage (i.e., 1965-1981), the prediction of the adverse-side effect of reallocation of resources is examined through changes in the relative price of non-traded to traded goods and in turn changes in the real exchange rate.

Chapter seven deals with the empirical study results concerning the deterioration in the oil export foreign exchange earnings. During this period (i.e., 1982-1997), the reverse natural resource boom predictions are examined. Changes in the relative prices and the real exchange rate appear crucial in reallocating domestic resources.

Finally, chapter eight is devoted to the summary and conclusion of the study. Recommendations are made based on the empirical results of the study.

Chapter Two

The Literature Review

2.1 Introduction

There is an abundant literature on the economic consequences of the impact of natural resource exports in general and oil export boom in particular on the domestic economy. Most of the theoretical and empirical literature is related to the economic changes in the economies of developed countries. The developing countries have had relatively less attention given to them in comparison. On the other hand, there are a few contributions conducted to analyse the economic consequences of the collapse of oil prices, particularly for oil-exporting developing countries with low absorptive oil-exporting countries such as Saudi Arabia. This chapter is divided into seven sections. Section 2.2 is devoted to literature on the natural resource exports instability and its impact on an economy. In section 2.3, a theoretical survey of the predictions of the natural resource exports boom on the economy is reviewed. These predictions are termed as the 'Dutch disease'. Some empirical studies of the Dutch disease in developed and developing countries are reviewed in section 2.4, while the literature on the slump of the natural resource is reviewed in section 2.5. In section 2.6, a summary is provided.

2.2 Literature on the Natural Resource Export Instability.

Many economists, particularly, the neo-classical figures, would not have believed that the production of natural resources would come to play a major role in the activity of an open economy. They had imagined that instead, manmade resources, technology and synthetic materials would increasingly replace and have more influence than natural resources (Morley 1989). Such a conclusion would have seemed relatively acceptable prior to the 1960s. However, the 1973 oil price increase, and its aftermath, proved that the natural resources, notably oil, played a vital role not only in the domestic oil producing economies but also in the entire world economy. A surge in oil revenues resulting from dramatic changes in the world oil market has drawn more attention to natural resource economics. Since most of the less developed countries (LDCs) concentrate on the production of primary agricultural and mineral commodities, they heavily rely on these for foreign exchange earnings (Dick et al. 1983). Hence, export receipts accrue, either to the owner of factors of production as income, and/or to the government as taxes and royalties. Consequently, any changes in export earnings may affect both of these and be reflected in their economic behaviours.

The fluctuations in export price and earnings may be attributed to the inelasticity of demand and supply curves of primary products and to unpredictable demand and supply shocks (Kindleberger and Lindert, 1978). Inelasticities of demand and supply imply that any changes in quantity demanded or supplied would reflect sharply on the price and thus the revenue of the primary commodities. On the demand side, if the demand for a primary commodity declines slightly, the price and thus the revenue will decline sharply and vice versa. On the supply side, any fall in a primary commodity's production may be accompanied by a sharp increase in its price. One can ask about causes leading to disturbances in supply and demand of primary commodities. To answer this question, one should consider causes on the supply side, which can include harvest problems or political events, whereas, on the demand side, these would include business cycles or inventory speculation.

According to Dornbusch and Helmers (1989), the largest single source of export instability in LDCs has been the business cycles in industrial countries. Such cycles lead to fluctuations in export earnings and thus to a variation in the terms of trade. It is agreed that changes in terms of trade in LDCs are larger than in developed countries (DCs), and some studies suggest that mineral exporters may be subject to wider fluctuations in export prices than other LDCs (Gelb, et al. 1988).

Nevertheless, It is worth noting that in the oil market, it is necessary to take into account the changes in oil market rather than just levels of sales and prices. This is due to the fact that market fluctuations have been poorly predicted. Although the market had been tightened in previous years, the first oil price increase was not widely expected, and many economists disagree about its causes. Many theories emerged with different implications for the future pattern of prices (Gelb, et al. 1988). Four of them will be summarised as follows:

a - The property right theory attributes the price increases in 1973 to the transfer of the ownership of crude oil from the multinational companies to the producing countries (Johani, 1986). The establishment of OPEC in 1960 threatened the position of the foreign companies in an oil-dominated market. Consequently, the companies increased the oil production before losing their control. They tried to maximise their discount rate and in turn to minimise the producing countries' discount rate. As a result, the governments of OPEC members decided to shift the power of determining the production volumes away from the multinational companies. This transfer of ownership into host countries caused the oil price to rise in 1973, (Johani, 1986).

b - The target revenue theory attributes the production reduction in 1973 and afterwards to the limited absorptive capacity of the oil producing countries which prevented them from absorbing the huge earnings from exports at that time. They then had to reduce production, which led to an increase in oil price. The studies of Salehi-Isfahani (1987), and Cremer and Salehi-Isfahani (1980) showed that OPEC members' policy rests on reducing production when oil prices rise to avoid the consequence of a high rate of inflation due to their low absorptive capacity (Al-Yousef, 1994).

c - The cartelisation theory attributes the rise in oil price to the OPEC consensus to set a determined price in order to raise the price of oil. Pindyck (1978) and Adelman (1982) developed models to explain the OPEC price behaviour. They concluded that the oil market is dominated by the oil cartel to maximise their profits through setting prices with no competition among OPEC members.

d - The market theory argues that the gradual evolution of demand and supply conditions in the oil market since the 1960s has led to the rise of the oil prices (Gelb et al. 1988).

However, empirical studies have not yet arrived at a full consensus on whether export instability can influence economic activity. Studies, for example those by McBean (1966) and Coppock (1962), have found little evidence that export instability had harmful effects on investment and growth. While Maizels (1968), Massel et al. (1972) and Lim (1976), in contrast, have shown a significant positive relationship between export earnings and national income instability. Their assumption is based on the fact that export earnings instability is the only contributor to national income instability (Dick, et al. 1983).

On the other hand, the study by Rangarajan and Sundararajan (1976) aimed at isolating the contribution to the national income made by export earnings instability from that of other factors. These factors include consumption, investment, imports and GNP. Rangarajan and Sundararajan concluded that a reduction in export instability leads to a reduction in income instability. Their model distinguishes only macro aggregates and precludes them from obtaining insights into the sectoral and economy-wide effects of instability originating in individual commodity markets.

Dick, et al. (1983) developed a model to examine the short-run effects of commodity price instability on economic activities in three countries: Colombia (coffee), Ivory Coast (coffee and cocoa), and Kenya (tea). They concluded that there are two options in relation to the export instability in terms of price and earnings. The first one is the domestic stabilisation option. This option implies that the relevant commodity production sector can successfully be isolated from the effects of the price and earnings shock if (i) these governments have a large amounts of foreign reserves and (ii) they pursue a fixed domestic absorption policy in the face of the price instability. Such an option seems more appropriate in a case where the world commodity price movements represent genuine fluctuations in the trend rather than a shift in the trend.

The second option reflects the exchange rate changes required to maintain the balance of trade equilibrium as a result of the price shock. Such changes affect the sectoral output due to the reallocation of resources among the sectors in each domestic economy. This option would seem to be rational only when the price shock could be considered as representing a shift in the price trend (Dick et al. 1983).

The instability of commodity prices raises the question of whether the export prices can be stabilised. Stabilisation is in the interest of producers because it reduces the fluctuations in their export incomes and also reduces instability in their macroeconomies (Dornbusch and Fischer 1994). Price stabilisation was experienced by the International Wheat Agreement among the wheat-exporting and wheat-importing countries before the 1970s, using a programme called a 'buffer stock'.

This stabilisation programme implies that the governments involved determine a ceiling price for the commodity concerned and then buy the commodity when the price is below that and sell when the price is above the ceiling price. Such a programme faces many problems: The first problem is the cost that these governments have to pay in order to stabilise the price. These extra costs can be storage, labour, insurance, and transportation costs. The second problem is the availability of funds needed to absorb the commodity surplus in the market, and the third one is how can they predict and determine the future prices and the quantity to be purchased or to be sold to absorb the excess supply or demand. Any failure can lead to more instability in prices and revenues. Moreover, difficulties arise in negotiation over which government will bear which shares of the total cost of the buffer stock scheme.

To avoid such problems, import-substituting industrialisation can be taken as an alternative means to moderate fluctuations in primary export price and revenue. So, it is argued that since industrialisation is a force contributing to overall economic improvement, developing countries must cut their reliance on exporting primary products and adopt policies allowing industries to grow at the expense of the agricultural and mining sectors. This outcome emerges from the view that raw materials prices are bound to decline in the long run relative to the prices of industrial goods. Moreover, even though industrialisation might run counter to comparative advantage, two facts have to be taken into account. First, comparative advantage has to be considered in a dynamic perspective. Given enough time and experience, LDCs could achieve efficiency in these sectors and thus ultimately justify initial protection. Second, while perhaps costly in terms of resource allocation, protection policy may have a major stabilisation influence by reducing dependence on single commodity in the world economy, (Dornbusch and Fischer 1994)

Finally, one can say that the instability of export price and revenue is the reason why LDCs try to diversify their production and exports as a goal of policy. To the extent that production and trade are diversified among different primary commodities and between commodities and manufactures, there is more stability of total export revenue. Disruption in the market in this case has a smaller effect on total exports.

2.3 Theoretical Survey of the Literature on the Dutch Disease

The sizeable growth of the natural resource industry has triggered a large and growing literature focusing on the impact of such growth on the rest of the economy. The exports boom sector may affect the other sectors negatively and/or positively. It creates some macroeconomic changes through changes in the exchange rate and relative prices.

The balance of payments of the economy may be affected as well. Such adverse effects resulting from the boom are termed the 'Dutch disease'. This 'disease' was diagnosed after the discovery of natural gas in the Netherlands' economy in the sixties. The Netherlands' economy experienced some sectoral structural changes. These changes were in the form of a contraction in the non-natural resource traded sector (de-industrialisation) and an expansion in the services sector. The exchange-rate appreciation of the local currency (guilder) combined with a modest increase in domestic money wages and the increasing cost of the social security system caused these outcomes (Ellman, 1981).

However, the analytical studies of the impacts of natural resource discoveries on other sectors first started with John Cairnes (1857). He studied the effects of the 1851 Australian gold discoveries on other sectors of the Australian economy. The extensive theoretical literature that followed has been surveyed by other economists such as Corden (1982), Corden and Neary (1982), Wijnbergen (1984), Eastwood and Venables (1982) and others. Accordingly, one should demonstrate selected theoretical studies, dealt with the impact of price and production increase of one commodity on the other sectors in the economy.

Salter (1959) presented the two-sector framework for the macroeconomic model. He introduced a simple diagram to illustrate the features of the relationship between price and expenditure effects. To reconcile the full-employment policy and the balance of payments, he divides the commodities market into two single categories: traded goods and non-traded goods. Traded goods consist of exportables and importables with perfect substitution. Their prices are determined exogenously. On the other hand, non-traded goods are consumed and produced domestically so their prices are determined in response to the domestic demand and supply interactions.

Salter highlighted the three means by which one of them might cause an external and internal disequilibrium. These means can be illuminated as follows:

- *Excess demand*: The rise in income will bring about excess demand for both categories of goods and thus causing the expenditure to rise. Changes in relative prices will appear if the expenditure effect persists leading to a rise in price of non-traded relative to traded goods. Such an outcome resulting from the price effect, will cause the slope of the income and expenditure lines to be steeper. The magnitude of reactions in supply and demand for both categories of goods depends upon the elasticities of substitution. However, the excess demand will lead to a balance of payments deficit. To restore simultaneous internal and external balance, one can adjust the relative prices by lowering home costs and prices relative to those of overseas. Such an adjustment can be made by deflation or devaluation associated with an additional cut in expenditure.

- *A rise in world prices:* Since the price of traded goods is determined exogenously, any increase in the price of domestic traded goods will follow. Consequently, on the supply side, the production of traded goods will expand at the expense of non-traded goods. On the demand side, as the world price increases, the impact of the expenditure effect will depend upon the behaviour of consumers' domestic income. If the money expenditure is constant, the real expenditure declines, causing a fall in the quantity demanded. Unemployment may take place particularly when the elasticity of demand is larger than one. This implies that the real expenditure effect is more than the price effect that may reduce the relative prices. The remedy for that is the appreciation of the exchange rate. On the other hand, if the money expenditure rises, the money income rises as well causing over-employment and a balance of payments surplus. Elimination of such an outcome can be done through an exchange appreciation coupled with other measures to reduce money expenditure.

- *Overseas capital inflows*: Such an inflow will increase the expenditure shifting its line upwards and creating over-employment. Extra expenditure will reflect on excess demand for non-traded goods and /or a rise in investment bringing about an increase in relative prices. The imports may rise as a result of extra expenditure if the internal balance exists (i.e. no changes in production and prices of non-traded goods) leading to structural changes. The remedy will transfer the extra expenditure to the balance of payments enabling domestic balance to reconcile with capital inflow.

The preceding analysis is associated with the assumption that the terms of trade remain fixed, but the overseas price changes may affect the terms of trade regarding exportables and importables. Hence, the terms of trade determine the shape and position of the transformation and indifference curves. Hence, a fall in exportable prices may lead to an adverse movement of the terms of trade, and therefore national income will fall when it is measured in terms of importables and rise in terms of exportables.

To restore internal and external balances, devaluation is more likely in the case of a fall in exportables' price to increase non-traded goods prices and raise demand for traded goods, and in turn, an appreciation takes place in event of an increase in importables price causing non-traded goods to be cheaper and traded goods to be more expensive. Such remedies can be considered when the domestic policies cause secondary terms of trade, which results from the reaction by other countries to domestic devaluation, appreciation and expenditures cut.

Salter has highlighted the impacts of import restrictions designed to prevent a drain on foreign funds. That action may lead to an increase in demand for non-traded goods causing internal imbalance. To avoid an excess demand being transferred to non-traded goods, a temporary cut in expenditure is needed until changes in the relative price take place to restore equilibrium. This cure can be effective under some conditions such as: (i) the effectiveness of home costs and prices to shift the resources towards tradables; (ii) when the expenditure does not result from excess full-employment levels and (iii) when the balance of payments is not subject to long -run disequilibrium.

The preceding analysis is concerned with long-run changes. Such analysis postulates the mobility of the factors of production. In reality, the proportion in which traded and non-traded goods may be produced is more or less determined by the short-run current structure of production, rather than long-run prediction. Consequently, reactions to changes in relative prices are initially on the demand side, while reactions on the supply side contribute little in the short-run either to external or internal equilibrium. The full burden of the short-run adjustment has been placed on the expenditure effect. However, the remedy cannot be through devaluation or deflation because of the likely severe results on production, but it can be through adjustment in relative prices. This outcome will sacrifice the balance of payments for the sake of fullemployment (Salter, 1959). Finally Salter's analysis incorporates export-traded goods and other traded goods in one sector rather than separating them. Such a division would help to examine the effect of changes in export sales or price on other traded goods as well as on the non-traded goods sectors.

Gregory (1976) developed a partial equilibrium model to test the impact of the Australian tariffs and the discovery of mineral resources on the sectoral structure of the economy. As a result of the new discovery, the surplus in the balance of payments has affected the exports and import-competing industries through the exchange rates and the relative rates of inflation in Australia and overseas.

His empirical analysis shows that the effects of the mineral resource exports is equivalent to a doubling of the tariff on the traditional export sector, while the rapid growth of mineral resources export, from the viewpoint of import-competing sector, is equivalent to the removal of the tariff. The effects of the new discovery of mineral resources on the sectors have been equivalent to a 25% of general reduction of tariffs. He tested only the impact of the spending effect resulting from the mineral new discoveries. The adjustments required to restore equilibrium depend on the extent of the mineral discoveries, the price elasticities of supply and demand of mineral exports and the price elasticity of demand and supply of imports and traditional exports. He ignored the effects of the income and the costs of import-competing and traditional exports industries. Gregory's two mechanisms to bring about the negative side-effects of the boom have been improved and extended by Snape (1977), Corden and Neary (1982), Long (1983) among others.

Snape (1977) developed a general theoretical equilibrium model resting on

Gregory's assumptions. He aimed to examine the effect of the mineral discoveries on the rents of factors specific to minerals, income, and on the costs of import-competing and traditional exports industries. In addition, he examined the impact on price elasticities of supply and demand for mineral exports, imports and traditional exports. His results regarding the impact of spending and resource effects can be summarised as follows:

- Output of some non-mineral goods may rise, in spite of anticipated decline in its production.
- Social benefits can be gained even if outputs of non-mineral goods do not change.
- The production of non-traded goods can fall or increase even if its price is expected to rise.
- An increase in the rents of factors specific to minerals and a decline in the rents of factors specific to other traded goods can be expressed.

Eastwood and Venables (1982) developed a theoretical macroeconomic model to test the impacts of a discovery of oil on an open economy, assuming that oil is perfectly tradable and its revenue is independent of oil depletion policy. That implies a zero oil extraction cost. The economy is assumed to have full-employment, zero inflation, and capital and current accounts balanced. Since they assume perfect international capital mobility, rational expectations of exchange rate and slow price adjustment of domestic goods prices (i.e., uninstantaneous market clearing), their assumptions are based closely on Dornbusch's (1976) approach, using five equations: money market equilibrium, foreign exchange equilibrium, domestic non-oil demand, output and Phillips curve.

They concluded that anticipated oil revenues, lead to unemployment and price deflation if spending is not adjusted immediately after the oil discovery. They tested the impacts of oil revenue wealth on the spending effect only, ignoring such an effect on money demand. According to Neary and Wijnbergen (1984) this omission is hard to justify and a situation in which an oil discovery would raise spending and leave money demand permanently unchanged would be inconceivable. Neary and Wijnbergen justified their view on liquidity grounds. The oil revenues as a transfer will affect the money demand either directly through the private sector or indirectly through the government. Hence, the wealth of the private sector should rise through the anticipated reduction in future tax liabilities.

To bridge this gap, Neary and Wijnbergen used Eastwood and Venables' model incorporating the wealth effect on asset markets. Assuming a strictly positive wealth elasticity of money demand, the higher wealth resulting from oil discovery would induce excess demand for money. To accommodate this situation, a rise in real money stock has to take place, hence, a greater appreciation of the exchange rate and a lower post-shock price level than those of Eastwood and Venables case. Neary and Wijnbergen come to a conclusion that higher oil revenue may lead to a recession even without a spending lag. They justify such an outcome by arguing that a rise in wealth will increase the demand for money, causing a contractionary shock (with given nominal money supply). The effect of the contractionary shock may offset the direct expansionary effect of the oil discovery on domestic spending. The adoption of a monetary policy is required as a means to avoid recession without inflationary pressure. It is a worth noting that Eastwood and Venables examined the impact of oil discovery on the economy through the spending effect only.

Corden and Neary (1982) developed a theoretical Dutch disease framework introducing, spending and the resource movement effects resulting from a booming sector in a small open economy. They aimed to analyse the impact of the booming sector on the resource allocation, the factoral income distribution, and the real exchange rate. The assumptions of the model, limited by the absence of international capital mobility, are that there are real variables rather than nominal ones, there is full-employment, and that the returns of factors of production are spent by the owners directly (private sectors).

To examine the impacts of the boom, Corden and Neary use three models: the first one is a short-run model based on the assumptions of fixed capital and labour mobility between the three sectors. Hence, de-industrialisation may occur in three cases: (i) a fall in manufacturing output and employment with deterioration in the balance of trade in manufacturing; (ii) a fall in real returns to the factors specific to the manufacturing sector; (iii) a real appreciation in the exchange rate although some economists blame real appreciation as an independent cause of de-industrialisation. In the second model, the assumption is based on the mobility of capital between manufacturing and services while labour is mobile between the three sectors.

They conclude that the boom would affect real wages in terms of traded goods and rental on capital used in manufacturing and services. The outcomes depend mainly on the intensity of capital in each sector. If the manufacturing sector is capital-intensive and the boom takes place, the resource-movement effect will lead to a rise in output of manufacturing and a fall in services. In the third model when capital is mobile between the three sectors, the boom may cause de-industrialisation through the resource movement effect. That effect will reduce the output of the manufacturing sector due to the rise in returns of the factor used intensively by the energy sector relative to the manufacturing sector. On the other hand, the impact of the spending effect of a boom always tends to raise the output of services, but the effect on output of manufacturing depends on relative factor intensities. Such an analysis can be considered as an extension of Snape's (1977) study.

In reality, particularly in the oil-exporting developing countries where a large part of the rent accrues to the specific sector in the booming sector which is typically paid in taxes, so that revenues are spent by the government to determine the magnitude and the direction of the spending effect.

Long (1983) developed a theoretical model to explain the impact of an export boom industry via spending and resource-movement effects on the rest of the economy. His assumptions are very similar to those in the Dutch disease theoretical static framework. He incorporated the assumption of relative factor intensities and a mobility of two factors. He assumed too that there are three factors of production: a globally mobile factor, a factor which is specific to the non-traded goods industry and a factor which is mobile only within the two traded goods industries (mining and other traded). He focuses on changes in relative prices (prices of non-traded to traded goods) and output of each industry. Such changes will occur through shifts in the demand curve and mainly on the supply curve. The results of this analysis to some extent might be contrary to the predictions of the Dutch disease. Long formulated the following predictions:

- The price of non-traded goods may fall relative to the price of non-mining traded goods.
- The non-mining traded goods industry may expand even when its price falls relative to the price of non-traded goods.
- The expansion in the non-mining traded goods industry may be accompanied by a contraction of output of the booming mining industry relative to its pre-boom equilibrium output (Long, 1983).

Long's results are illuminated in Figure 2.1 where the relative prices of non-traded goods to traded goods is denoted Pn/Pt and represented on the vertical axis, whereas the output of the non-traded goods industry is denoted Qn and represented on the horizontal axis. Point A is the pre-boom equilibrium point where the demand curve intersects the economy's supply curve of the non-traded goods. On the demand curve, If the price of the booming industry (PB) rises, the level of utility will be higher. As a result, the demand curve will shift upwards to intersect with the supply curve at 1 causing relative prices and output of non-traded goods to increase. On the supply curve, If PB rises, the Stolper-Samuelson theorem predicts the following:

- An expansion in the booming industry will take place as long as it uses the globally mobile factor more intensively, and in turn there will be a contraction in the other sectors. Such an outcome will shift the supply curve upward to point 2 or 3 causing Pn/Pt to rise. If the non-traded goods sector uses the globally mobile factor more intensively, there will be an expansion in the traded goods industry and a contraction in the remaining industries. This will lead the supply curve to shift downwards to points 4 and 5 causing an increase in output of non-traded goods and a fall in relative prices.

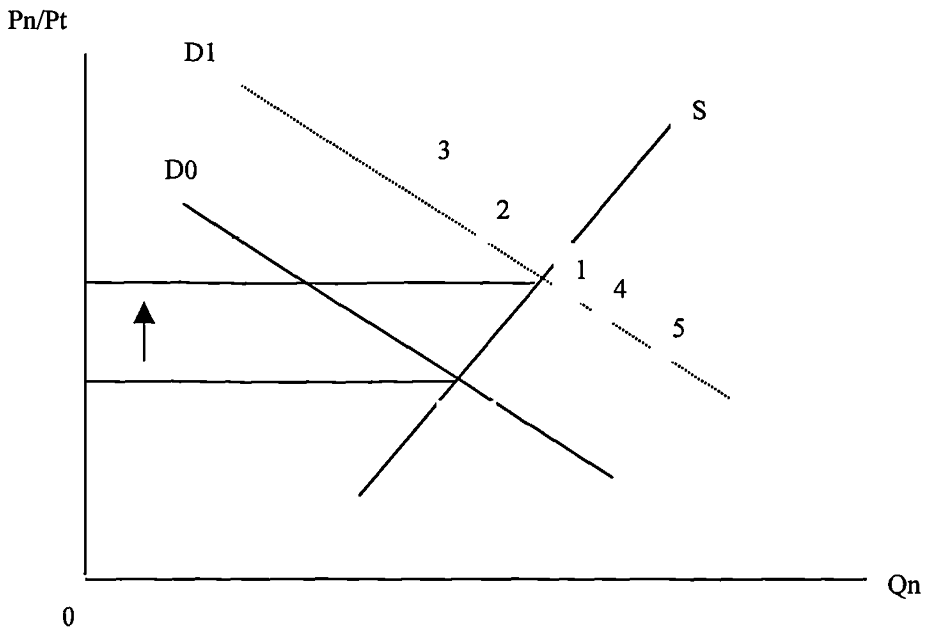


Figure 2.1 The Relationship between the Relative Prices and the Supply of the Nontraded Goods Sector

- If the non-mining traded sector uses the globally mobile factor more intensively, there will be an expansion in that industry and a contraction in the booming and non-traded goods industries. This result can be justified by the impact of the Rybczynski effect. This effect does not exist in Snape's (1977) and Corden and Neary's (1980) models which predict the movement of the supply curve upwards only at points 2 and 3.

Enders and Herberg (1983) have analysed the macroeconomic effects of a resource boom on a small open economy via changes in prices, real income, employment and sectoral structure in the short and long-run. Their analysis is based on a rather simple model assuming fixed exchange rate, short-run immobility of labour between traded and non-traded sectors, an absorption function as in the monetary approach to the balance of payments and a sectoral structure as in the Scandinavian model. They concluded that a resource boom is a mixed blessing for the country experiencing it. On the one hand, the country benefits from it as nominal and real income are raised. On the other hand, it suffers from negative side-effects resulting from typical Dutch disease, where the prices of non-tradables and wages rise and employment and output of tradables fall. They suggested seven cures: demand policy to offset a fall in the manufacturing sector, wage freezing, devaluation, subsidies, import tariff on the manufacturing sector, improvement in labour mobility and investment of part of the higher resource revenues in foreign-bearing assets. They analysed the impact of just the spending effect only on an open economy.

Wijnbergen (1984) illustrated that the short-run macroeconomic impacts of the higher oil prices, which arise from oil revenues increases in oil exporting countries. His analysis of the Dutch disease departs from the Salter-Swan-Meade model of an open economy. He concluded that higher transfers from abroad may lead to excess demand for non-traded goods. A real exchange rate appreciation associated with the resource movement out of the traded goods sector into the non-traded sector would induce a decline in the traded sector. He dealt also with employment changes and inflation resulting from such a boom. Since excess demand for non-traded goods exists, their prices relative to traded goods prices would increase. Hence, wages will follow the Consumers Price Index (CPI). If the CPI has a large traded goods component (as in the Gulf countries, where most of the traded goods are imported) a rise in the real wage in terms of traded goods allows for a large drop in the real wage in terms of non-traded goods. This will result in repressed inflation (excess demand for labour and non-traded goods).

In contrast, if the share of traded goods consumption is low (as in Latin America, where the volume of imported goods is relatively small), an increase in real wage in terms of traded goods, given CPI indexation, will not allow for a large decrease in real wage in terms of non-traded goods. So, the non-traded goods sector will not absorb all workers made redundant by the traded goods sector. Consequently, a classical unemployment situation arises (classical unemployment occurs when there is excess demand for goods associated with lack of demand for labour due to high wages)

Corden (1984) surveyed and consolidated the literature on the booming sector economics and the Dutch disease. He developed an analytical model to examine the impacts of the spending and resource-movement effects resulting from a boom on the economy. A boom can have one of three sources: a once-and-for-all exogenous technical improvement in the booming sector which would shift the production possibility curve upwards; a sizeable discovery of new resources causing an increase in the supply of the specific factor; and an exogenous rise in the price of the booming products which are sold only in the world market. The first source was given more attention in his analysis. As part of his analysis has already been covered in one way or another within the context of the chapter, and to avoid repetition, we will consider only these issues which need to be included, such as the migration effect and the dynamic model resulting from a boom.

Corden concluded that international and domestic migration would be induced by a rise in real wage (the gold rush effect) and by the Alberta effect. The Alberta effect may occur when the boom revenue goes primarily to the government, and then the government redistributes it to the rest of the population in the form of tax reduction, improved public facilities, social benefits and so on. This may attract migrants in the non-traded goods and traded goods sectors to share in the sectors' rents. As a result, the output of the traded goods sector could recover (as the rent of the traded goods sector rises), and in turn, appreciation of the real exchange rate could be moderated or even avoided (Corden, 1984). The second issue concerns the dynamic model, where the rise in the value of output, the income of the booming sector, and the real appreciation, have not all happened at the same time. However, the consequences of the boom may follow a particular time path. The time paths differ with the source of the boom and the expectations about it. The general picture can be depicted as follows:

Period 1 (the announcement period). Spending may rise to a new, higher level owing to the expectation of a boom. There will be a current account deficit due to decumulation of financial assets. There will be a once-and-for-all real appreciation of exchange rate owing to the spending effect. The price rise is expected, so consumption will rise. Domestic investment increases as the price rise as expected adds to the spending effect and hence to the real appreciation and the current account deficit owing to decumulation of foreign financial assets. One might expect that there would be domestic de-investment in period 1, reducing the current account deficit. But the lead-time consideration suggests otherwise: the expectation of the boom may lead to such a portfolio-balancing investment beginning in period 1, all which is very relevant for public investment in period 1 and 2. Gelb (1981) concluded that in response to the two oil price rises, there were big increases in the Indonesian, Nigerian and Venezuelan public sectors and hence public investment, leading to a large increase in the demand for nontradables (Services and Construction). At the very least, there was over-shooting in public spending, leading eventually to budget deficits.

Period 2 (the boom period.) Output or its value in foreign currencies may rise, surpassing the new spending level. There will be a current account surplus due to the accumulation of financial assets. There will be further appreciation attributed to the resource movement effect. The price actually rises. So consumption will rise. The precise pattern of consumption over time, depends on the world interest rate and inter temporal time preferences along Fischerian lines. The spending effect may take place with a lag, and may vary with expectations about future price patterns. Mistakes can be made and one can imagine over-shooting tendencies while the learning is still going on (Mexico and other countries experienced this in 1981-82 when the boom was anticipated by extra public spending, which increased consumption and hence reduced foreign reserves and by wage increases obtained by the unions). There will be extra domestic investment to maintain a portfolio balance (investment in a world capital market); the spending effect will be higher and the current account surplus less.

Period 3 (the decline in boom). Output may fall as the boom is temporary while the spending may continue. There will be a current account deficit due to decumulation of financial assets. There will be depreciation due to the resource movement effect. The price falls back again. There will be domestic de-investment along with decumulation of foreign assets.

Finally, Corden expects the government experiencing the adverse effect of a boom to protect the lagging sector or at least part of it. There are three policies, which can be applied to protect the lagging sector: (i) taxing the booming sector and using the revenue to subsidise the losing factors (tradables) of production (the conservative social welfare function argument based on pursuing the redistribution objective directly);(ii) subsidising employment directly to induce a desirable resource reallocation;(iii) protecting the infant industry especially when the boom is expected to be temporary and the decline of the traded goods sector is thought to lead to non-optimal decumulation of physical and human capital during the boom. If it is nevertheless desirable to protect the traded goods sector to some extent, the first and best method would be to subsidise output of the sector directly. Two popular protectionist approaches can be implemented:

- *Exchange rate protection*, namely a policy of avoiding real appreciation and hence protecting the traded goods sector at the expense of the non-traded goods sector. It can be brought about by exchange rate intervention supported by sterilisation, whether through open market operations or a budget's surplus, either of which will bring about the required reduction in spending. This method will lead to excessive accumulation of foreign assets compared to direct subsidisation, and thus will protect not only the traded goods sector but also the booming sector.
- *Increased ordinary protection by raising tariffs or tightening import quotas.* Avoiding a loss to import-competing industries will then be at the expense of traded goods sector exportables as well as the booming sector. The traded

goods exportables will then be hit twice, firstly by the real appreciation (which will now be greater than before as the prices of non-traded goods rise) and secondly by the direct resource loss to importables. However, that can be offset and moderated by the traded goods exportables. This will protect one part of traded goods sector at the expense of the other parts (Corden, 1984).

Harberger (1983) developed a simple neo-classical small open economy model. He used two versions of the model with a fixed exchange rate: the comparative static version and the monetary dynamic version. In the former, it is shown that a rise in the world price of oil must, *ceteris paribus*, cause the price level of non-traded goods to rise. In the monetary dynamic version, it is shown that the path of the non-traded goods price level may, as a result of oil shock, overshoot before the final equilibrium is restored. However, the degree of overshooting depends on the degree of spending generated by added revenues. So, if spending increases gradually, the degree of overshooting may decline and vice versa. Moreover, the degree of increase in the domestic price level can be limited to the degree of appreciation of the real exchange rate.

Wijnbergen (1984) has illuminated the impacts of high and temporary oil revenues through spending effect on the economies of the developing and developed oil-exporting countries. Many third world oil-exporting countries are encountering serious problems in building up a diversified export base owing to the delay in the 'Learning by Doing' experience, which would improve their comparative advantage in the manufacturing sector, while West European oil and gas producers are suffering from a decline in their traded goods sector, induced by real wage pressures. Wijnbergen argued that this was an efficient response to the increase in income from oil production, and hence the oil producers should move into oil-derived industries as well as non-traded goods production and forget about their manufacturing sector until oil reserves are exhausted.

Roemer (1985) reviews Corden and others' medium-term and Long's long-term theoretical Dutch disease's framework. He focuses on the impacts of an export boom on the developing countries' economies. He takes into consideration the characteristics of the LDC's environment in relation to the Dutch disease predictions resulting from the boom. He argues that in case of the LDCs, one cannot generalise about the traditional Dutch disease predictions. Such a conclusion emerges from the fact that these countries have different features, which lead to inconsistent impacts compared to what happens in DCs. The first difference is that LDCs are suffering from underemployment and/or disguised unemployment rather than full-employment.

Consequently, the impacts of resource movement and spending effects may not be effective due to the pool or surplus in labour supply. The excess labour supply would moderate the price increases and then tempers or even eliminates the real exchange rate appreciation. Moreover, the output of the traded goods sector may not fall, because this sector would not be subject to resource movement and then to shortages in labour.

The export boom may also lead to the same implications in less populated oil exporters, due to the large number of foreign migrant workers recruited. The resource movement effect, can be dampened by more foreign migrant workers, whereas the spending effect may lead to an expansion in the output of non-booming traded goods rather than de-industrialisation. That can be attributed to foreign labour remittances, a rise in demand for imports and domestic goods (some services are treated as tradables) and the nature of the oil sector as a capital-intensive and enclave sector. Consequently, the real exchange rate appreciation would be reduced. Nevertheless, some LDCs, as a result of a boom, have experienced spending and resource movement effects such as in Nigeria, and Indonesia. The second feature of LDCs is the long-run outcome resulting from the boom, which rests on the capital intensity of the two non-booming sectors.

In developing countries, it is hard to distinguish between traded and non-traded sectors, because the non-traded sector mainly includes capital-intensive utilities whereas transport services, household and personal services are labour intensive. Similarly, the traded sector includes agriculture and food production, both of which are quite labour intensive, whereas import-substituting manufacturing are probably capital intensive. Finally, the classifications of traded and non-traded goods are based on the characteristics of these goods and are identified as traded domestically or internationally respectively. Such identification may be obscure due to the protection of infant industries in many developing countries. Tradables can behave like non-tradable services during the boom.

Roemer traces three studies on the Dutch disease to estimate the impacts of the export boom in developing countries. These three models are utilised differently from Corden's. The Harberger model results show that an oil shock equal to 10% of national income can lead to real exchange rate appreciation of 2.6 to 16%. But the shift in income from the lagging sector to the non-traded sector is only 0.4 to 2% of the national product, which is consistent with Corden's findings. Harberger's model generates its greatest appreciation and shifts in output when income elasticity of demand for home products is highest (unity) (Roemer, 1985). The second study, conducted by Dick et al. (1983), tests the two year impact of a 10% increase in three agricultural products (coffee, cocoa, and tea) in three nations: Colombia, Ivory Coast, and Kenya. They found that after a sufficient appreciation of real exchange rate to restore external balance, the services sector enjoyed the most growth from 1-2.3% consistent with Corden's model. Most of the manufacturing sectors show little growth or decline.

The third study was conducted by Timmer (1982), who analyses the impact of energy prices on agriculture for seven countries, including both oil exporters (Indonesia, Malaysia, and Mexico) and importers (Korea, Philippines, Sri Lanka and Thailand). A change in oil prices works its way through the economy via a mechanism that includes changes in per capita income, exchange rate appreciation, and rural-urban terms of trade. Based on the structure and experience (from 1960 to 1980) of these countries, Timmer simulates a sudden and sustained rise in the oil export share of GDP from 2-4%. Five years after this boom has begun, agricultural value added per capita is about 15% below the pre-boom (Roemer, 1985).

2.4 Some Empirical Studies on the Dutch Disease

The economic implications of the natural resource revenues on economies have been increasingly covered by many economists. Most of the studies conducted have been suited to the study of macroeconomic policy in developed natural-resource exporting countries, such as the UK, the Netherlands, and Australia. Nevertheless, there are some studies, which have drawn attention to certain developing natural resource exporting economies, taking into consideration the economic structural differences between developed and developing countries. Our objective is to review some macroeconomic studies testing the effect of a natural resource export boom on developing economies.

Forsyth and Kay (1980) computed the effects of the growth of North Sea oil (NSO) production on the non-oil UK economy. The UK became an oil self-sufficient nation after being totally dependent on imported oil. The rise in NSO production led to a rise in the national income by at least 10%. So, the domestic absorption of imported manufacturers increased causing a contraction of the manufacturing sector rather than the agricultural sector that was protected by CAP. Forsyth and Kay concluded that a change in the exchange rate by about 20% from 1976 to 1980 led to a change in relative prices by about 12-15%. They gave two reasons why the manufacturing sector increased by less than 20%: (i) the domestic exporters were forced to absorb part of the impact of revaluation and (ii) the foreign exporters somewhat increased their margins. The structural changes were larger than the direct changes of oil on the UK economy, because of the increase in national income and thus in the non-traded sector and its major contribution in the traded sector. They concluded that the higher the exchange rate, the larger the benefits to the UK economy, despite the adverse effects which appeared in unemployment, resources reallocation and deficits. The study focuses on impacts of the spending effect only. The authors discuss the indirect effect on the British real exchange rate of a redistribution of world income away from countries that compete with the UK as exporters. One could argue that the severe UK real exchange rate appreciation of 1979 and 1980, can be attributed mainly to the monetary squeeze, not to a Dutch disease effect (Corden, 1984).

Benjamin, Devarajan and Wiener (1986) developed a general equilibrium model to test the impact of the oil boom in 1979 on the Cameroon economy. They concluded that there was an appreciation of real exchange rate by 8.5% leading to an overall reduction in exports by 6.1% and a rise in imports by 10.5%. Moreover, they found that there was a fall in the primary sectors and an increase in the non-traded sectors.

Fardmanash (1991) developed a three-sector reduced-form model to test the impact of world prices on the share of services, agricultural and manufacturing sectors in the non-oil GDP in five oil exporting countries in OPEC. He selected these countries with respect to the significant contribution of these sectors in the GDP. He came to the conclusion that an oil boom negatively affected the agricultural sector in favour of the manufacturing and services sectors. He ignored the impacts of the spending effect as well as the domestic prices on the tradable and non-tradable outputs.

Warr (1986) analysed the effects of the oil revenues from 1973 to 1982 on the Indonesian economy in terms of relative prices and income distribution. He found that the contribution of the agricultural sector in the overall GDP declined whilst the contribution of the manufacturing sector increased gradually.

Kamas (1986) developed a macroeconomic model to examine the Dutch disease effects resulting from the coffee and drugs export boom on the Colombian economy during the period 1967-1982. She found that relative prices of the non-traded goods sector rose and the exchange rate appreciated as a result of the boom; consequently, the growth of the non-traded goods sector increased, while the non-coffee traded goods sector experienced a slower growth. The Colombian policy responses to the Dutch disease effects allowed an appreciation of the exchange rate, which, however, was less than that required to equilibrate the balance of payments. The major focus of the Colombian policies was based on a reduction of the absorptive capacity through contractionary fiscal and monetary measures.

Gelb (1986) analysed the impacts of oil windfall gains on the structure of the economies of seven countries: Algeria, Ecuador, Indonesia, Iran, Nigeria, Trinidad and Tobago, and Venezuela. His study is based on Chereny and Syrquin's model, incorporating the construction sector with three sectors used in that model: Agriculture, manufacturing and services. The Dutch disease equation used in the study was as follows

$$DD = (SNag + SNma) - (Sag + Sma)$$

Where DD represents the shortfall in the share of the non-oil tradeables relative to their normal levels, SNag and SNma represent norms for shares in output of agriculture and manufacturing sectors in the GDP respectively, while Sag and Sma represent constant-price share of agriculture and manufacturing sectors respectively. Gelb concluded that Algeria, Trinidad and Tobago, and Venezuela had severely skewed economies in sectoral terms before the price oil increase. The Indonesian, Ecuadorian and Iranian sectoral structures were almost normal. The appreciation in the real exchange rate shifted the resources allocation towards the non-traded goods sector owing to the hesitance of these governments to devalue their currencies.

Al-Sabah (1988) investigated the existence of the Dutch disease in Kuwait during the oil boom. He used a computable general equilibrium model to explain the sectoral changes in the economy. The conclusions that he reached were: (i) a relative decline in the tradable sector is accompanied with an increase in the non-tradable; (ii) reallocation of resources results from the effect of the real exchange rate.

Looney (1990) developed a macroeconomic model to test the impact of the oil boom on the Saudi Arabian sectoral outputs through the Five-Year Plans. He estimated a series of equations linking sectoral output to factors affecting relative profitability. He tested the output of tradables (agriculture, manufacturing, mining and petroleum refining) and non-tradable (construction, wholesale and retail trade, transport, storage and communication, and ownership of dwellings) against the real exchange rate, level of inflation, level of government spending, overall non-oil GDP and the added value of oil. His results were significantly related to the existence of the Dutch disease in terms of real exchange rate appreciation and inflation.

Musonda and Lovanda (1991) developed a model to test the existence of the Dutch disease during the coffee export boom in 1976-77 on the Tanzanian sectoral output. They tested the impact of the boom on the real exchange rate and relative prices. They concluded that many sectors were not affected in terms of resource movement due to the government restrictions and intervention.

Al-Gaeed (1991) constructed a two-sector macroeconomics model to test the impact of the oil export boom on the sectoral structure of the Saudi Arabian economy. He concluded that the spending effect affected the consumption and investment positively and the relative prices and the real exchange rate negatively. However, the traditional sectors contracted in favour of the non-traded goods sector. He tested the impact of the spending effect rather than the resource movement effect.

Rowthorn and Ramaswamy (1997 and 1998) provide a definition, implications and causes of the de-industrialisation. This phenomenon is defined as a 'fall in the share of manufacturing employment to the total employment'. This definition is related mainly the world's most advanced economies. It has been observed in the 23 most advanced economies and found that there was decline from about 28 percent of the workforce in manufacturing in 1970 to about 18 percent in 1994. On the other side of the coin, the share of employment accounted for by services in the advanced economies has increased fairly uniformly, with all advance economies witnessing growth in services' employment since 1960. In the United States, for example, the workforce employed in services has increased from 56 percent in 1960 to 73 percent in 1994. The rise in employment in services has been accompanied by a decline in employment in manufacturing sector in all advanced economies. Hence, the manufacturing decline in GDP suggests that domestic expenditure on manufacturing has decreased while expenditure in services has increased.

Some economists regard de-industrialisation with alarm and suspect, it has contributed to widening income inequality in the United States and high unemployment in Europe. Some suggests that is a result of the globalisation of markets and its impact on the rapid growth of North-South trade (trade between advanced economies and the developing world) causes de-industrialisation. These critics assert that the faster growth of labour-intensive manufacturing industries in the developing countries is displacing the jobs of workers in the advanced economies.

On the other hand, an important implication of Rowthorn and Ramaswamy's analysis is that the de-industrialisation is not necessarily a symptom of the failure of a country's manufacturing sector, but it is simply the natural of result of successful economic development and it is generally associated with higher national and disposable incomes. As a result, de-industrialisation can be linked to difficulties within the manufacturing sector or in the whole economy as a whole. Economic development may cause a large appreciation in the real exchange rate, which in turn results in a loss of jobs in the manufacturing sector. With regard to the service sector, in these circumstances, the service sector may be unable to absorb a sudden increase in the supply of labour, causing higher unemployment or a fall in the growth of living standards.

To sum up, there have been negative features of de-industrialisation appearing in stagnant earnings and widening income disparities in the United States and rising unemployment in the European Union. Although some of these countries involved in the study are oil-producing countries, they are not similar to Saudi Arabia in terms of the structure of the economy, the role of government sector, the size of the population and the magnitude of the industrial output. Consequently, the findings may not correspond to those of the the Saudi Arabian economy.

Rosenberg and Saavalainen (1998) examines the dual challenge of the natural resource boom and managing the transition to a market economy facing the oil-rich former Soviet republics around the Caspian Sea in general and Azerbaijan in particular. This study identifies three areas in which the standard Dutch disease theories could apply to the case of Azerbaijan:

1- Macroeconomic adjustment problems through risks to monetary stability, risks to sustainability of the balance of payments, risks to the stance of the fiscal policy over time and risks to a continued nominal appreciation of the exchange rate.

2- Unbalanced growth

In Azerbaijan, the main potential losses would in agriculture, related processing industries (cotton, textile, wine and food processing) and manufacturing. The impact of resource movement resulting from the boom appears to have little effects due to two factors. First, the booming sector will be able to meet its labour demand from the surplus of state-owned firms without much loss in output. Second, the overall real wages have adjusted well to productivity changes in the country. On the other hand, the spending effect appears to have been strong due to high public sector's demand for nontradable goods. Moreover, the pent-up demand, particularly for consumer goods and services, stimulates a high demand for them. Indeed, there are indications that nontraded sector's share in GDP is expanding while prices of nontradables are increasing relative to non-oil traded goods.

3- Waste of oil wealth through unproductive government spending.

Azerbaijan oil revenues were not saved abroad or used to reduce budget deficits, but were invested in large projects, which may bear low rates of return. Moreover, the viability of the projects would very likely depend on continued subsidisation to traditional export industries. Once these sectors start suffering from the real exchange rate appreciation, many of these industries have little chance to be profitable. The reason behind this is that these industries are experiencing large overcapacities since they had originally been established to serve the overall Soviet market. Also, the multiplier effect of public subsidies would be weak as long as these industries have only small domestic backward linkages.

Finally, and more importantly, the incoming oil revenues can promote rent-seeking behaviour. The flight for rent ends up by inefficiently exhausting the potential wealth. There is corruption in the bureaucracy, particularly in a country with a weak political structure. The rent-seeking and its consequences have significantly negative impact on growth. Azerbaijan may be subject to the danger of detrimental rent-seeking as in other oil-rich developing countries.

As Azerbaijan is experiencing ill-effects of the boom, it tends to prevent the shift of economic activity towards the booming sectors for many reasons. Firstly, maintaining diversity for its export sector could reduce its exposure to external shocks. Secondly, prolonged appreciation of the real exchange rate may destroy a manufacturing base that cannot easily be rebuilt. Thirdly, the dependence on oil wealth promotes excessive rent-seeking behaviour and wasting of the newly acquired wealth. Fourthly, traditional export industries can play a vital role in human capital formation and/or in maintaining backward linkages to other sectors as well as the existence of learning by doing effect.

However, this theoretical analysis differs from the impact of oil boom in Saudi Arabia in many aspects: first, Saudi Arabia experienced an oil windfall resulting from the external shock, while Azerbaijan suffered from dual booms resulting from capital inflows addressed to the oil sector (i.e., oil discovery) and from an investment boom. Moreover, the economy of Azerbaijan is in a transition process, while Saudi Arabia is typically market-oriented economy. So the impact of the boom in Azerbaijan might be more severe than in Saudi

Arabia. Second, the industrial base in Azerbaijan is developed while in Saudi Arabia it is limited.

Therefore, the major feature of the Dutch disease (de-industrialisation) can be viewed in Azerbaijan more than in Saudi Arabia. Third, the exchange rate system in Azerbaijan is flexible regime, while in Saudi Arabia is fixed exchange regime. This implies that the boom in the former may be reflected in nominal appreciation and in the latte in higher inflation. In addition, there are many differences including economic capacities, magnitude and quality of labour force, wages, political and social matters among other difference. The interpretation of this is the extent and reinforcement of the boom may reflect negatively in different degrees.

2.5 The Literature Survey on the Slump of the Natural Resource

The economic consequences of the increases in the prices of natural resources in general and oil resource in particular, have attracted more attention from economists and policy makers than from the deterioration of oil prices and thus oil revenues. This can be attributed to one or more of the following factors: firstly, the rise in oil prices during the first and second oil shocks was sudden, unexpected and sharp, while the collapse in oil prices was expected due to economic and political factors (i.e., over-supply of oil in OPEC and non-OPEC members, energy conservation, new oil discoveries. etc); secondly, it might be believed that lower oil prices are beneficial to the world economy, particularly oil-importing developing countries and to the industrialised countries in terms of income redistribution and reduction of oil importing bills; thirdly, the impact of the decline of oil prices can be treated as a mirror image of the impact of the oil price increases since the institutional and behavioural factors that change the condition work in reverse; finally, in low absorption economies such as Saudi Arabia, the impact of oil price decline, particularly in the mid-1980s could be regarded as either a temporary down trend or could be handled by drawing down from foreign financial assets. This remedy can maintain its prevailing levels of investment, imports and consumption as they were before.

Nevertheless, there are few contributions that have been conducted to investigate the economic consequences of the collapse of oil prices. Although some of these studies are related to developed economies, namely the UK, or to high absorb oil-exporting economies such as Nigeria, there are few studies conducted in line of the decline of oil price in the Arab world. It is worth noting that these studies are only covering the period until 1986

The deterioration in oil prices started in 1982 and exacerbated in 1986 has been termed by some authors as the 'third oil shock', or the ' oil-demand crisis', while others may use some neutral terms such as the 'crash', the 'plunge' the 'collapse, or simply a sharp decline (Ibrahim, 1988).

This sub-section is devoted to reviewing the literature dealing with what is so-called 'third oil shock' and its impact on an economy.

Al-Yousuf (1990) investigated the impact of the collapse in oil revenues on the economies of Kuwait and Saudi Arabia. The loss of oil shares between 1981 and 1985 and the decline in the price of oil in 1986 together has been termed as the "third oil shock". The structural changes that took place in both economies following the fall in oil revenues were consistent with theoretical predictions. There was a rise in the value added of traded goods (mainly for the manufacturing sector, including petrochemical production) and a decline in the value added of private-sector non-traded goods sector, particularly construction.

By contrast, the value added on non-market public-sector non-traded goods (i.e., public-sector services) did not in respond to the decline in oil revenues. It merely remained fixed in real terms during the three years following 1986, which indicates that there was no retrenchment in the public-sector economic activity. On the other hand, public-sector consumption increased marginally and then fell following the decline in oil revenues. This was accompanied by a much larger decline in public-sector fixed capital formation.

The impact of the decline in gross fixed capital formation, especially by the public-sector, was to reduce the value added in construction by half. This in turn led to a significant reduction in private-sector economic activity.

The fall in oil revenues caused a deterioration in the balance of payments and the fiscal budgets in both countries. The trade balances were still in surplus but greatly reduced. In Kuwait, the reduced trade surpluses were augmented by the invisible trade surpluses to produce current account surpluses. In Saudi Arabia, the reduced visible trade surpluses were outweighed by the invisible trade deficits, hence, resulting in current account deficits from 1983 onwards. The Saudi's current account deficits were financed by repatriating long-term financial assets. With regard to the fiscal balance deterioration, both countries used to finance their deficits by drawing down from their general reserves. Nevertheless, both countries have faced liquidity crisis in different degrees although Saudi Arabia could have utilised its investment income and/or had an access to its accumulated reserves.

With respect to employment in Saudi Arabia, the reduction in total employment has taken place through its impact on Non-Saudis working in the private sector.

It worth mentioning that Al-Yousuf's study covered the period till 1988. This implies that he did not analyse the dramatic changes taken place in the early 1990s. The liberation of Kuwait affected both economies severely. Furthermore, he did not elaborate the determinants of economic change leading to his findings, such as the magnitude of changes in real exchange rates, relative prices and structural changes.

Mabro (1985) discussed the causes of the collapse in oil demand in 1982. He attributed such collapse to three major factors. The first factor is the stagnation of the world economy during the early 1980s as well as to the reduction in the world energy consumption due to higher oil prices emerged in the early and late 1970s. The second factor is related to the change in the structure of energy supplies with coal, nuclear, and to a lesser extent, gas growing at the expense of oil. The final factor is the expansion of non-OPEC oil producers causing a reduction in the share of OPEC as a residual supplier in the oil market. Mabro termed the sharp decline in oil prices as the 'oil demand crisis'.

Mabro is mainly concerned with the implications of the fall in the demand for oil, which caused a significant reduction in oil revenues on the economic development of the Arab world. The economic effects of the decline in oil revenues induce positive and negative elements.

With regard to negative effects, Mabro used the rate of growth and capital accumulation as indicators of the impact of the fall of oil revenues. Firstly, the impact of the 'oil demand crisis' on the rates of growth tends, in different degrees, to be significant. Secondly, the impact is much more severe for countries with low absorptive capacities such as Kuwait, UAE, Libya, and

Saudi Arabia than for the high absorbers such as Iraq or Algeria. Thirdly, the impact is not significant on countries whose dependence on oil is either small or indirect such as Egypt and Syria. In addition, the 'oil demand crisis' may lead to weaken the role of Arab world on the international political scene.

On the other hand, the favourable implications of the fall in oil demand can seen through dealing with oil as a depletable resource and a reduction in the rate of extraction might treated as implicit investment in the long-term. This can enable the oil-exporting countries to conserve their natural resources and to bring extraction rate close to an optimum path. Moreover, the reduction in oil revenues which accrue directly to the government may encourage them to improve their economic management.

Ibrahim (1987) discussed how the decline in oil prices, to a large extent, affected the economies of the majority of Arab countries through its effects on export earnings, net remittances, income from factors of production, capital movement and interest rates. He attributed the sharp deterioration in the Arab countries GDP growth rates between 1980 to 1985, to the collapse of oil prices and thus oil revenues.

Hammoudeh and Al-Barazi (1987) provided an empirical analysis of the favourable and the adverse impacts of changes in oil exports earnings during the period 1970-85 on economic development and the foreign trade of Arab exporting countries. Their approach traces the impact of an oil export boom and slump through the Dutch disease model mechanism of the spending and resource movement effects. Their findings lend support to the symptoms of the Dutch disease and its reverse during the boom and slump periods.

El-Imam (1984) focused mainly on the process of draining away the wealth of the Arab region during the 1970s rather than investigating the impact of the decline in oil revenues on the domestic economies. However, El-Imam attributes the decline in Arab wealth during the boom to the depreciation of their financial assets (due to higher inflation rates) and to increased imports from industrial countries. However, all the studies mentioned above concentrate either on the effects of increased oil revenues or on declining revenues until 1986 where the major structural changes have not taken place yet.

Henry and Herbert (1986) concentrate in their study on the economic effect of a lower oil price on investment plans in the oil sector in the UK and its depletion policy. Supply-side changes may take place through changes in the relative prices (of oil relative to other fuels) and switches in profitability from the oil sector to other sectors in the economy. On the demand-side, changes may be regarded as responding to changes in the exchange rate and price levels.

Powell and Horton (1985) conducted the second type of study, which explained how a sustained fall in oil prices might be expected to affect aggregate demand and supply in the world economy in general, and those of a net oil exporter like the UK. This was discussed in terms of the expected degree of changes in lower inflation rate, lower price levels, lower interest rates and redistribution of income between oil-exporting and oil-importing countries.

Evan (1986) focused on the theory of what he coined as the typical reverse Dutch disease on the mineral exporters In the developing countries. He analyses some aspects of the trade policy and strategy facing Papua New Guinea, a typical mineral developing country facing reverse Dutch disease problems as follows: as a result of a fall in the availability of foreign exchange earnings, the economy will obtain fewer non-mineral tradables relative to non-tradables, leading to a rise in the relative price of non-mineral tradables to non-tradables, which can be achieved without a fall in the absolute price of non-tradables. This is equivalent to a depreciation of the real exchange rate.

Afolab and Bladen-Hovell (1990) conducted a comprehensive study in relation to the effects of a fall in the price of oil on an oil exporting economy. They investigate the two fold impacts of oil price reduction on the Nigerian economy. The first one corresponds to the direct effect of price slump on the domestic economy and relates primarily to change in both the balance of payments and government finances. In addition to the direct effect, however, an oil producer will also be influenced indirectly by the impact of a fall in oil prices on the level of world demand (redistribution of income) and the rate of inflation (reduction in world price levels) in the world economy.

Takagi and Yoshida (1999) investigated the response of prices of tradable industrial goods to exchange rate movements between Japan and its seven trading partners, namely, Indonesia, Malaysia, the Philippines, Singapore, Thailand, Germany and the United States. On the basis of estimating export and import price equations by using the monthly series of unit export and import values obtained from the period 1988-1998, they have found that changes in Japan's exchange rates affect exports much more than its imports. This implies that the Yen prices of Japan's imports do not fall (rise) very much when the Yen Appreciates (depreciates), whereas, the price of Japan's exports rise (fall) considerably in the buyers' currency. In terms of external adjustment in East Asia, the export pricing behaviour has been more effective than the import pricing behaviour.

2.6 Summary

The economic consequences of the natural resource export boom have largely drawn the attention of the international trade economists in the 1960s and 1970s. That was due to the discovery of the natural gas in the Netherlands in the 1960s and of the oil in the UK in the 1970s. The negative side-effect of the export boom is known in the economic literature as the 'Dutch disease' phenomenon. Since the mid-1800s, this phenomenon has been analysed in different terms such as oil-syndrome and de-industrialisation, and in different prospective such as foreign remittances, compensations, and a rise in bond prices, shares and interest rates.

Accordingly, with regard to the export boom in mineral resources (e.g., gold and diamond), oil, gas and agricultural commodities (e.g., coffee and cocoa), extensive theoretical and empirical studies have been conducted. On the other hand, the studies of the impact of the oil export slump, particularly are relatively few.

However, the predictions of most studies dealing with the 'Dutch disease' are summarised as follows: (i) a rise in the relative price of the nontraded goods with respect to the price of the traded goods; and (ii) a real appreciation in the exchange rate; (iii) an expansion in the production of the nontraded goods sector; (vi) a deterioration in the output of traded goods sector.

The predictions of the core Dutch disease model are based on assumptions, such as flexible exchange rate, full-employment, fixed labour supply, the significant role of the private sector and the size of the finacial market, which are better suited for the developed oil-exporting countries. However, these assumptions are less appropriate to the situation of Saudi

Arabia, and the model needs to be developed by taking into account some factors, such as fixed exchange rate, the existence of underemploymnet, the flexible labour supply, the limited industrial base and the signficant role of the government spending.

Since Saudi Arabia is one of the largest oil producers and exporters in the world oil market, the Saudi Arabian economy has experienced and still faces fluctuations in its oil export foreign exchange earnings. This outcome is derived from the fact that the oil export revenues constitute a high percentage of the total exports. In addition, the oil export revenues has a significat share of the overall GDP. Accordingly, one can expect that Saudi Arabia as oil-dependent economy, to suffer from the oil export boom adverse side-effect during the period between 1973 and 1981. On the other hand, it may also be subject to the 'reverse situation during the slump period in 1982 and its aftermath.

Chapter Three

The Saudi Arabian Economy

3.1 Introduction

The name of Saudi Arabia was adopted in 1932 from its ruler (i.e., Ibn-Saud). However, until 1938, when oil was discovered in commercial quantities, Saudi Arabia was typically a traditional society where little or no change had taken place for many years previously. Its distinguished international role was only due to the domicile of the Two Holy Mosques. These mosques attracted hundred of thousands of pilgrims providing the country with an important source of income but having little impact on the development of the country's economic base.

The dramatic oil price increases in the early 1970s have profoundly affected the country both internally and internationally. With regard to the former, the rise in oil price accelerated the domestic development and modernised the country in terms of economic and social standards. Regarding the latter, Saudi Arabia became a key strategic player in the world oil market due to its massive reserves and production capacity, as well as through its foreign investment and ownership of western assets.

The purpose of this chapter is to describe the Saudi Arabian economy giving firstly a brief historical and demographic background. The aim of this is to show how Saudi Arabia moved from a very limited economy to become one of the largest economies in the Middle East. Consequently, this chapter is organised as follows. Section 3.2 provides a brief historical and demographic background. A description of the public sector is given in section 3.3, while section 3.4 reviews the non-oil sector. In section 3.5, the foreign sector is described, and the oil-sector is presented in section 3.6. Concluding remarks are given in section 3.7.

3.2 Brief Historical and Demographic Background

Prior to 1932, there was no state in the Arabian Peninsula known as Saudi Arabia, but only the provinces of Hijaz and Najd and their dependencies. King Abd Alaziz Ibn-Saud, commonly known as Ibn-Saud, the head of these provinces, established his authority throughout the land boosting a national unity and formulating a state called Saudi Arabia. Accordingly, he changed his title from that of the king of Hijas and Najd and their dependencies to that of the king of Saudi Arabia. Saudi Arabia is located in Southwest Asia occupying about 2.125 million square kilometres (865,000 squared miles). It consists of about three-quarters of the entire area of the Arabian Peninsula with a population amounting to about 20 million including foreign workers. The new state was almost barren desert inhabited by nomads, with oases and a few walled towns. The main source of revenue was charges paid by the pilgrims to Mecca and Madina. According to Young (1983), this constituted about 50% of the total revenue and the government's yearly receipts totalled roughly five hundred thousand dollars. There were also minor sources of revenue: (i) customs charges which constituted about 37% of the total revenue; (ii) the rest of revenue which came from the Islamic constitution (the Zakat), whereby wealthy people annually paid two and half percent of their income to the government. Nevertheless, the government faced some financial problems due to the Great Depression in 1929-30, which was accompanied by a fall in the number of pilgrims (the figure dropped from 100,000 in 1929 to 40,000 in 1931). Customs receipts and imports fell accordingly. The British government started in

1917 to subsidise King Abd Alaziz with five thousand pounds per month. This practice was suspended in 1924, but during World War II, the British government resumed subsidising him irregularly (Young, A., 1983). One can conclude these sources of government revenues centred on pilgrim charges, customs and the Zakat. During the lean years, the country could be described as a traditional society with little change, taking place. At that time the country was poor and undeveloped, and the economy was weak. The economic activity was confined to livestock raising, primitive agriculture, and production of small tools by craftsmen who lived in small towns concentrated around sources of water (Johany, A, 1982). Dramatic change came as a result of the discovery of oil in commercial quantities in 1938. Standard Oil of California, SOCAL, was granted a concession for searching for oil in the eastern province of Saudi Arabia in 1933 as a result of the discovery of oil in Bahrain in 1932.

The discovery of oil in huge commercial quantities became the catalyst for progress and the engine for rapid development for the country and for the welfare of its people. The vast production and reserves of oil gave the young country a powerful influence and international importance.

Saudi Arabia can be characterised by three features: (i) it is the domicile of the two holy cities of Islam -Mecca and Madina; (ii) it is the largest oil exporter in the world as well as one of the world's largest oil producers; (iii) possesses the world's largest oil reserves which are estimated by OPEC at over 261 billion barrels. Taking into consideration these features, Saudi Arabia has been able to play a pioneering and leading role in Arab and Islamic countries and to have a major influence on the world economy, especially during and after the oil export boom in the 1970's and 1980's.

Furthermore, Saudi Arabia has its own geographical features: a huge land area but a small population, a shortage of water faces a surplus in oil and natural gas. In addition, it has strong Islamic traditions and extreme climatic conditions.

With respect to the Saudi population, there were no precise statistics for the Saudi Arabian population prior to 1974. The 1974 Saudi Arabian census estimated the total population to be seven million, while the International Monetary Fund (IMF) estimated it at 8.1 million in 1980. Those figures must be regarded with caution due to the lack of an accurate means of calculating the country's population. According to the public statistical survey which provided precise statistics calculated in 1993, the total population was 16.9 million, 72.7% of which were Saudis (12,3 million) and 27.3% were non-Saudis (4,6 million). The growth rate is about 3.7% per annum. This high rate is attributed to a higher mortality rate and lower death rate due to the development of medical care in the country.

As for the age groups, Saudi Arabian official statistics show that those people under 14 years old account for 41.75% of the total population, whereas those between 15-64 years of age constitute 55.75% of the country's population. Regarding the geographical distribution, Mecca, Riyadh, and Eastern Province are the most populated areas. These areas contain 59.3% of the total population with 22.6%, 21.2%, and 15.5% respectively.

The Saudis' manpower for 12 years old and over, Table 3.1 highlights how the total number of those employed increased from 2.4 million in 1979 to 2.6 million in 1984 with a change of 6.3 percent, whereas the increase during the Fifth-Development Plan (1990 to 1995) was only up by 0.7 percent, which was low in comparison to previous rates of employment growth.

Table 3.1 Changes in the Saudi Civilians Employment in the Third And Fifth-Development Plans

(In Thousands SR)

Economic Activity	Third Plan Employment			Fifth Plan Employment		
	1979	1984	%Change	1989	1994	% Change
Producing Sectors*	1,071.90	994.9	-7.2	2,018.60	2,157.50	1.3
Services Sectors**	1,363.30	1,585.20	16.3	3,706.40	3,781.10	0.2
Total Non-Oil Sector	2,435.20	2,580.20	16	5,725	5,937.60	0.7
Oil Sector	36	46	27.8	46.8	47.7	0.4
Total	2,471.20	2,626.20	6.3	5,771.80	5,985.30	0.7

* Includes Agriculture, Mining, and Manufacturing.
** Includes Trade, Communication, Finance, Government, and other services.
Sources: Ministry of Planning, Third and Fifth-Development Plans, P.100 and 121

Since the main purpose of this chapter is to highlight the economic sectors that constitute the national economy in order to show how the economy has operated in the past, it is necessary to focus on the public sector, the non-oil sector, the external sector and the oil sector as long as this is related to the main objective of the study through the government's attempts to reallocate resources in the national economy.

3.3 The Public Sector

Neo-classical economic theory assumes that the price system in a competitive market operates efficiently to achieve allocation of resources within the economy. In practice, it is not possible to reallocate either productive resources (i.e. capital and labour) or the output that is produced from their employment so as to increase the level of economic well-being unless there is an adjustment in demand and supply by using taxes and subsidies. Strategies used by the public sector to allocate resources may or may not be the same as strategies used in the market system. The role of government in economic relations has turned from being one in charge of justice, defence and security to one with the broad responsibilities of being heavily involved in economic activity. The World Great Depression in 1929 brought about the necessity of increased government intervention. Governments now intervene in economic affairs on an unprecedented scale. This can be attributed to the market failure to achieve efficient allocation of resources and to the objective of governments to correct rather to exacerbate the degree of allocation resources (Baily, 1995).

Saudi Arabia has displayed a similar trend with a different degree of intervention. This resulted from the major involvement and expansion of the public sector's activities in the economy. The rise in the scope of the government's intervention over the passage of time was due to its need to control the country firmly after its unification in the 1930s. In addition, being a newly established country, the private sector was inexperienced and small which required the government to operate on its behalf, at least temporarily. But the discovery of oil, which yielded massive wealth to the country, persuaded the government to involve itself more deeply in this trend. As a result, the large participation of the public sector is the most distinguishing feature of the Saudi economy in comparison with other developing countries.

3.3.1 The Budget

The analysis of the government's budget requires firstly a general look at mechanics and principles of the budgeting process. The Saudi budget is initially prepared by the government's agencies as a draft budget nine months ahead of declaring the approved budget. Accordingly, the Ministry of Finance and National Economy establishes the budget taking into account the aspects of spending and the availability of income. Thereafter, it has to be presented to the Council of Ministers for a final approval. If approved, the distribution of the budget will take place to all government agencies by the last day of December.

On the one hand, the budget determines the potential total revenues, which are gained largely from oil and to a lesser extent from non-oil sectors. On the other hand, it also contains a package of potential public expenditure plans. Public expenditures, as they appear in the budget, are represented by two broad categories of government activity. First, there are exhaustive public expenditures. These expenditures correspond to the government purchases of current goods and services (i,e. salaries, wages, and consumables) and capital goods and services (i.e, public investment in roads, communications, health, education, etc.). The second category of public expenditure is that of transfer payments (i.e, subsidies, social welfare, grants, aid, pensions etc.). The first category yields returns whilst the second one is a one-sided payment which aims to redistribute income. The magnitude of expenditures determines the private sector reactions regarding the level and nature of economic activities for the next year. For example, if there is an expansion in government investment expenditures, this is a green light for contractors and importers to plan for a relatively optimistic year and vice versa.

The legislative information contained in the budget gives an indication of government policy, and lays out the government's current economic priorities. It contains the government estimates of economic prospects for the coming year. The relative importance of the policy statement emerges from the fact that the actual revenues and expenditures can differ from the values determined in the budget (Johany, et al. 1986).

3.3.1.1 Government Revenues

Unlike most countries that obtained their revenues from various taxes on the private sector, Saudi Arabia derives the bulk of the government's revenues from oil and oil-related products. Saudi citizens and foreign workers in the country pay virtually no taxes. The contribution of the oil sector as a major source of revenue can be recognised easily by looking at table 3.2. This table depicts that the share of the oil sector ranging from 94.1% in 1974 to 57.2% of the total revenues in 1988.

Table 3.2 Total Oil Revenues, Other Revenues, and Total Expenditure
(Current Million SR)

Years	Oil Rev.	Other Rev.	Total Rev.	% Oil Rev.	Total Exp.	Balance
1969	5119	549	5668	90.3	6079	-411
1970	5862	764	6626	88.5	6307	319
1971	8146	1234	9380	86.8	7174	2206
1972	11616	1589	13205	88	9231	3974
1973	25134	2166	27300	92.1	14146	13154
1974	65911	4112	70023	94.1	26762	43261
1975	96624	8060	104684	92.3	59184	55500
1976	111288	12808	14096	89.7	97739	26357
1977	12098	16260	137218	88.2	127042	10176
1978	118006	16994	135000	87.4	146557	-11557
1979	164434	20305	184739	84	175071	9662
1980	279962	27101	307063	91.2	220763	86300
1981	335236	36896	372132	90.1	273321	98811
1982	236928	55297	292225	81.1	264272	27953
1983	161375	62825	224200	72	241411	-17211
1984	131640	54755	186395	70.6	227294	-40899
1985	98613	47677	146290	67.4	197031	-50741
1986	59699	42832	102531	58.2	174709	-72178
1987	67405	36406	103811	64.9	173526	-69715
1988	48400	36200	84600	57.2	134850	-50250
1989	75900	38700	114600	66.2	149500	-34900
1990	118142	36579	154721	76.4	210430	-55709
1991	128157	33722	161879	79.2	266370	-104491
1992	127027	38373	165400	76.8	232500	-67100
1993	106000	35500	141400	75	205500	-64100
1994	95500	33500	129000	74	163000	-34000
1995	105700	40800	145500	72.6	173900	-28400
1996	136000	43100	179100	76	198100	-19000
1997	160000	45515	205500	78	221272	-15772

Source: SAMA, Annual Reports, Various Years

The highest rate of participation was during the 1970s and early 1980s with an average of around 90% of the total revenues. This was due to the sharp increase in oil prices during the first and second oil shocks. The share of oil revenue in the total revenues started to slow down from 1982. This resulted from a decline in the price and production of oil. The share fell to its lowest limit after the government ceased to be a residual producer in OPEC in 1986. The reason for this choice was the behaviour of some OPEC members and non-OPEC countries whose increased their production at the expense of the Saudi quota. The remainder of the budget for that year was predominantly from investments and reserves, that is from oil sold in previous years (Johany et al. 1986).

Other sources of revenues are extremely small. Although, their share increased in 1988 to reach its highest level of 42.8%, this can be misleading. The rise in share was attributed to a decline in oil revenue at a rate that exceeded the fall in non-oil revenue. These sources can be classified into five categories: customs duties, fees and charges for government services, corporate and business income taxes, investment income, and miscellaneous revenues.

Current customs duties are quite low in spite of relatively higher tariffs imposed which range between 12% and 20% of purchasing values. Imported items competing with domestic products have recently been taxed higher than other goods. It is worth noting that a large number of commodities are exempted and some others, notably foodstuffs, were subsidised. Nevertheless, the customs charges' share in non-oil revenue accounted for about 7.5% in 1988 whereas it reached 7.2%, and 9.8%, 8.4% in 1989,1992, and 1993 respectively (IMF, Staff Report, 1994). Customs tariffs can generate a reasonable amount of income if and only if the government abolishes any exemptions and exceptions in yielding duties. This result can also be derived from the fact that Saudi citizens have a high propensity to import, as well as high tariffs imposed to protect the Saudi industries. Nevertheless, that will only be temporary until the country becomes a full member of World Trade Organisation (WTO).

Fees and charges are another source of the government's income. These are gained by the sale of services including charges for communications and post, water, air rights, landing fees, television advertisement fees, port fees, license fees, residence fees, and passport fees. The government receives some revenues from the sale of government properties (such as military and some government agencies' housing). The commercial government bodies such as the Saudi national airline and Petromin (which markets petroleum products domestically) are not included in the general budget. However, the revenues which are derived from this category is relatively small. They accounted for about 8.2%, 10.2%, 10.7%, 9.1% and 9.3% of total non-oil revenues in 1988, 1989, 1992, and 1993 respectively.

Income and corporate taxes are extremely low in comparison with other non-oil revenues. They accounted for only 0.9% in 1988 and reached their peak of 2.3% in 1992 (IMF, Staff Report, 1994). These negligible revenues are due to the fact that Saudi businesses and citizens are exempt from paying any taxes except those who came from Zakat. On the other hand, the foreign firms do pay not progressive income tax on their profits during an initial tax holiday aiming to encourage foreign investors to invest domestically. The revenues generated are expected to increase in the future with the expansion in foreign and joint ventures investments. Much of the hope for this relies on the trend of further expansion in petrochemical production in the industrial bases in Jubail and Yanbu.

The fourth category of non-oil revenues is that of investment income. These yields are collected by SAMA. Their share of in non-oil revenues was increasing until the Second-Gulf War took place. The share was around 15.1% in 1989, but it declined to 9%, 8.4%, and 6% in 1992, 1993, and 1994 respectively (IMF, Annual Report, 1994). This was because of lower oil prices and hence the huge government spending, causing a budget deficit during that period, which led to the government's withdrawal of some financial assets from their investments abroad.

The final source of the budget lists miscellaneous revenues. It includes the Zakat, government sales of property, fines, rental on government property, and other receipts. The Zakat is a small tax paid on one's net wealth. It is a religious duty rather than a tax because it is distributed to the needy people and is not included in the budget. The share of this revenue in total non-oil revenues is calculated at an average of 8.5%. It reached 7.6% and 8.9% in 1988 and 1989 respectively, while in 1992,1993 and 1994, the percentages were 9.1%, 7.7%, and 9.0% respectively.

Recently, the government has imposed some fines for the violation of commercial and work permit and visas' rules. It also raised some selected fees such as domestic prices of petroleum products, telephones, air travel fares, visa and work permits, electricity, and water, in order to restrict consumption and also to increase its income. The intention was to push up non-oil revenues by 12 billion Saudi Riyals, even though such an action may not lead to a remarkable rise in this category's revenue.

3.3.1.2 The Government Expenditures

The prediction of future government expenditure is a very difficult task, because this is linked highly with oil revenues. Forecasting the non-oil revenues is relatively easier than the prediction of the oil revenues due to the small size of the former as well as the fact that they are not subject to fluctuation as oil revenues are, and they constitute a low share in the total revenues. The difficulties in estimating the oil revenues emerge from the fluctuations on this single product in terms of prices and quantities. The price determinations are subject to daily-basis world market prices. Additionally, the world's oil price deals with sophisticated pricing systems in terms of different kinds of oil in the market (Arabian–Light, Brent, OPEC basket, etc.) and of the heavy-to-light crude ratio. The quantity set depends upon the OPEC quota, which varies in response to many factors including the price, non-OPEC oil producers, world reserves, weather conditions, and economic and political stability.

Nevertheless, this difficult task which determines the forecasts for government expenditure, has been undertaken through setting a potential oil price around $4 to $5 per barrel below the OPEC basket price. One can argue that the oil price may fall below this target, in which case the error will be very slight. For example, Saudi Arabia estimated its budgeted revenues and hence expenditures at $14 to $15 p/b, while the market price was around $18 p/b. The conservative bent of the Saudi budget planners has resulted in a tendency for actual revenues to exceed budgeted expenditures. However, this difficulty can be overcome since the duration of the budget is a short-term process.

Given the difficulty outlined above, the Ministry of Finance and National Economy divides the annual fiscal budget into four chapters. The first three chapters contain the recurrent expenditures, while the fourth chapter includes capital expenditures. The first chapter includes the financial provisions for salaries, wages, and allowances. To a large extent, this chapter's expenditure, unlike that of the other chapters, is not subject to any reduction, even during austerity periods. The second chapter covers general expenses, which rely on day-to-day operational spending. This includes spending on maintenance and spare parts, stationery, machinery and vehicles, travel expenses and ticketing, managerial needs, furniture, ration allowances, and miscellaneous items. Development funds, subsidies, supplies, and maintenance and operation are all included in chapter three, whereas, chapter four includes all development expenditures related to the capital goods spending within the government projects.

The salient feature of budgetary history since 1970 has been the government's efforts to accelerate the pace of development in the country. Thereby, the government began to establish a well-equipped infrastructure, as well as to enhance public services and to raise the Saudi standard of living. This tendency led the government to increase its expenditures through boosting both recurrent and project expenditures. Table 3.2 illustrates that the total government expenditures during the periods from 1969 to 1972 were slightly low in terms of value and growth rate. The total spending amounted to 5.9, 6.3, 7.2, and 14 billion Saudi Riyals (SR) over that period for each year respectively. This was due to the shortage of income sources to finance the budget. However, in 1973 and afterwards, an upward trend in government expenditure took place. The government spending rose from SR 26.7 billion in 1974 to reach its peak in 1981 at about SR 273 billion. These government expenditures were proportionally distributed between recurrent and project expenditures. The share of the latter in the total expenditures exceeded the former from 1973 to 1976. The reason behind that was the tendency of the government to improve and to establish the country's infrastructure. During this period, the economy was showing signs of overheating. The huge government spending created bottlenecks regarding the low absorptive capacity of the economy, which was associated with incompletion of infrastructure. As a result, the inflation rate increased dramatically to reach its highest level of 34.7 in 1975. This rate cannot be totally accurate due to the fact that its calculation is based on the cost of living index. Unlike the GDP deflator, which covers all prices, it considers only the incomes of middle-class families who were spending an average of 2000-7000 SR per month.

Nevertheless, the rise in imported consumer goods prices also pushed the domestic inflation up slightly. Consequently, the government attempted to reduce the high inflation rate by adopting a tightening of the fiscal policy in real terms as long as the nominal domestic exchange rate is fixed to the US dollar. The share of capital goods expenditures in the total spending was reduced in favour of recurrent spending. Increased subsidies and transfer payments were adopted in order to mitigate the effect of inflation on the citizens.

Hence, the share of recurrent expenditures increased from 50.4% in 1977 to 54% and 53.2 in 1978 and 1979 respectively. The inflation rate since then has been under control within an acceptable rate, as shown in Table 3.3. In 1978, the budget experienced a deficit for the first time since 1970 due to a decline in the total revenues. Fortunately, this was a short-term deficit followed by a budget surplus. The second oil shock which occurred in 1979, increased the production and price of oil. As a result, the total expenditures rose from SR 17.5 billion in 1979 to reach their peak of SR 27.3 billion in 1981. Again, the share of projects spending increased to 61.4 percent and 59 percent of the total spending in 1981 and 1982 respectively.

Table 3.3 Costs of Living and Inflation Rates (1988=100)

Year	Cost of Living Index (CLI)	Inflation	Year	CLI	Inflation
1970	32	----	1984	106.5	-1.5
1971	34.1	6.6	1985	102.9	-3.6
1972	35.6	4.4	1986	99.9	-3.0
1973	41.3	13.8	1987	99.0	-0.9
1974	50.1	17.6	1988	100	1.0
1975	67.5	34.7	1989	101.1	1.1
1976	88.7	31.4	1990	103.2	2.1
1977	98.8	11.4	1991	108.2	5.0
1978	97.3	-1.5	1992	108.1	-0.1
1979	99.1	1.8	1993	109.3	1.2
1980	103	3.9	1994	109.9	0.6
1981	105.6	2.5	1995	115.5	5.4
1982	106.8	1.2	1996	116.2	0.9
1983	107.8	0.8	1997	116.7	0.4

Source: SAMA, Annual Report, 1999

The golden era of having expenditures lagged behind revenues has gone because of the world recession among other factors, which began in 1982. This was associated with a deterioration in the oil demand in the world oil market, which reflected negatively on the national economy causing adverse effects in terms of spending and revenue. Thereafter, the government expenditure showed a steady downward trend through the following decade. The slight deficit of SR 1.7 billion revealed in 1983 could have been avoided by further reduction in spending to match the rate of reduction in revenues.

The Saudi officials preferred not to do so, expecting that the price of oil would increase shortly. Accordingly, Saudi Arabia agreed to be a flexible producer in OPEC in order to maintain the oil prices. Despite being a swing-producer, its quotas fell to one-half (less than three million barrels a day) and the price of oil remained low. Thereby, the economy suffered from a cumulative deficit during the period from 1983 to 1986 when it resumed producing its quota within OPEC. Nevertheless, regaining its quota was accompanied again with a world recession and oil price war between OPEC and non-OPEC producers, which led to a lower oil price.

The result was an unprecedented decline in government revenue from 1975 to reach a low of SR84.6 billion by 1988. The recovery in the world economy in the following year raised the oil revenue and helped the government to resume spending. Unfortunately, the invasion of Kuwait in 1990 caused dramatic changes in terms of a temporary increase in oil production and prices. The government's obligation toward Kuwaiti citizens and the state then pushed its expenditure to high levels. It aimed to stabilise the economic and political situation domestically, as well as to cover the military expenses resulting from the confrontation with Iraqi Forces. The budgets of 1990 and 1991 were consolidated in one budget. The cardinal aspect of this budget was the huge recurrent expenditure reaching its peak of SR 398.9 billion with a share of 87% of total government spending, as shown in table 3.4.

The general conclusions about the government budget can be summarised as follows:

1- the bulk of the government revenues are obtained by oil revenues. Other revenues are fairly small despite all efforts adopted to diversify sources of income.

2- depending on a single exporting product as a mean of income creates instability in the national economy due to fluctuations in the international market. This outcome may be a caution for foreign and domestic private investment in relation to risks and uncertainty in the business environment. The salient example, which is shown in the tables, was the chronic deficit since 1982.

Table 3.4 Components of the Budget Expenditures
(Current Million SR)

Years	Recurrent	%	Capital	%	Total Exp.
1969	3787	63.8	2151	36.2	5938
1970	4020	63.7	2287	36.3	6307
1971	4399	61.3	2775	38.7	7174
1972	5283	57.2	3948	42.8	9231
1973	7054	49.9	7092	50.1	14146
1974	11840	44.2	14922	55.8	26762
1975	27162	45.9	32022	54.1	59184
1976	46973	48	50766	52	97739
1977	63992	50.4	63050	49.6	127042
1978	79230	54	67327	46	146357
1979	93190	53.2	81887	46.8	175077
1980	91079	42.3	129684	58.7	220763
1981	105604	38.6	167717	61.4	273321
1982	108411	41	155861	59	264272
1983	121467	50.3	119944	49.7	241411
1984	126438	55.6	100856	44.4	227294
1985	124000	73	73031	37	197031
1986	122905	70.3	51804	29.7	174709
1987	126726	70	46800	30	173526
1988	102332	64.9	32518	24.1	134850
1989	122700	81.8	27300	18.2	149500
1990-91	398900	87	58600	13	457500
1992	179000	84.7	32300	15.3	211300
1993	142000	69.1	63500	30.9	205500
1994	124500	76	39300	24	163800
1995	131700	75.7	42200	24.3	173900
1996	147600	74.5	50500	25.5	198100
1997	162800	73.6	58400	26.4	221272

Source: SAMA, Annual Report, 1999.
:IMF, Staff Report, 1994.
:EIU, Country Report, 1994

3- the fluctuation in oil revenues reflects directly on the scope and magnitude of the government expenditure. During high oil prices, the budget runs at a surplus and capital goods have a larger share than in an oil slump. In contrast, during a budgetary deficit, the recurrent expenditure share rises at the expense of project expenditure. This is attributed to the fact that it consists of salaries and transfer payments, which cannot easily be subject to any reduction. The decline in that category is mainly related to a gradual reduction of subsidies, which are not a major component of recurrent expenditure.

4- the government determines the fiscal policy by controlling government expenditure only rather than through tax changes. The private sector, to some extent, is still incapable of participating in economic activities effectively, and also depends mainly on government spending and support.

5- other non-oil revenues are still low and may continue in this trend, particularly after the decline of the government investment abroad in the wake of the oil revenues' deterioration in the 1980s. One solution is the establishment of a taxation system, which could be implemented fairly, but this might have unpredictable consequences politically and economically.

3.4 The Non-oil Sector

The government places much emphasis on its attempts to diversify the economy through growth in the non-oil economy. This effort has been shown from the outset of the Third Development Plan in 1980-85. Therefore, the best way to analyse the non-oil economy is to look at the total output produced by all sectors concerned in some way with the non-oil components.

3.4.1 Non-oil Gross Domestic Product:

The share of the non-oil sector in the real GDP has grown at a higher rate since 1978 as table 3.5 shows to reach its highest contribution of 79.7% of total GDP in 1985. Since then, it has continued to have a higher share than the oil sector. In contrast to the oil sector, the non-oil sector is much less volatile, therefore, its share of real GDP has been around 65% since 1982 and afterwards. This structural transformation of the economy was due to the decline of the oil share resulting from oil revenue which declined at that time and also due to the relatively successful achievement of emphasising a lessening of dependence on oil.

Table 3.5 Oil and non-Oil Contribution in the Real GDP (1970=100)
(Million SR)

Year	Real GDP	Non-oil Sector	%Change	Oil Sector	%Change
1969	17152	7586	44.2	9566	55.8
1970	19582	8040	41	11542	59
1971	22621	8607	38	14014	62
1972	27133	9720	34.8	17413	64.2
1973	31246	11183	34.8	20063	64.2
1974	31539	12636	40	18903	60
1975	34250	15138	44.2	19112	55.8
1976	39318	17692	45	21626	55
1977	41765	20252	48.5	21513	51.5
1978	44521	22522	50.6	21999	49.4
1979	49053	25184	51.3	23869	48.7
1980	52971	28318	53.5	24653	46.5
1981	53886	31503	58.5	22383	41.5
1982	48030	33721	70.2	14309	29.8
1983	47995	34962	72.8	13033	27.2
1984	45842	35389	74.5	11453	24.5
1985	44936	35650	79.7	9286	20.7
1986	47511	34479	72.6	13032	27.4
1987	46830	35306	74.4	11524	24.6
1988	49923	35992	72	13931	28
1989	50167	36538	72.8	13629	27.2
1990	55565	38894	70	16671	30
1991	60284	39666	65.8	20618	34.2
1992	61917	39886	64.4	22031	35.6
1993	61511	40253	64.4	21258	34.6
1994	61841	40542	64.6	21299	34.4
1995	62003	40647	64.6	21356	34.4
1996	63449	41631	64.6	21818	34.4
1997	64592	42488	65.8	22104	34.2

Sources; SAMA Annual Report, Various Years
Ministry of Planning, Achievements of the Development Plans,1990-1995

Table 3.6 indicates the values and percentages of the major components of the non-oil GDP measured in constant prices based on figures for 1970. The relative importance of each sector emerges as we consider the period under concern. For example, the most striking gains were in the construction and trade sectors during the mid-1970s till early 1990s, while others vary to different degrees despite their relative importance. Brief emphasis will be placed on construction, agriculture, and the manufacturing sectors regarding their importance in non-oil GDP in terms of attempts at diversification.

Table 3.6 Values and Percentages of Manufacturing, Construction, and Agricultural Sectors in the Non-oil Real GDP (1970=100)

(Million SR)

Year	Non-oil GDP	Manufacture	%Change	Construction	%Change	Agriculture	%Change
1969	17152	1672	9.7	934	5.4	984	5.7
1970	19582	1839	9.4	957	4.9	1018	5.2
1971	22621	1847	8.2	1053	4.6	1050	4.6
1972	27133	1977	7.3	1396	5.1	1089	4.0
1973	31246	2082	6.7	1737	5.6	1130	3.6
1974	31539	2021	4.6	2461	7.8	1147	3.6
1975	34250	2187	6.4	3309	9.7	1221	3.6
1976	39318	2479	6.3	4146	10.5	1282	3.3
1977	41765	2694	6.5	4582	11	1483	3.5
1978	44521	2965	6.6	4700	10.6	1550	3.5
1979	49053	3226	6.6	5128	10.5	1640	3.3
1980	52971	3456	6.5	5654	10.7	1735	3.3
1981	53886	3699	6.9	6225	11.6	1839	3.4
1982	48030	4047	8.4	5837	12.2	2023	4.2
1983	47995	4578	9.5	5329	11.1	2286	4.8
1984	45842	4864	10.4	5129	11	2707	5.8
1985	44936	5454	12	4259	9.4	3193	7.1
1986	47511	5466	11.5	3722	7.9	3673	7.7
1987	46830	6166	13.2	3627	7.7	4275	9.1
1988	49923	6737	13.5	3446	6.9	4736	9.5
1989	50167	6555	13	3428	6.8	5068	10.1
1990	55565	6917	12.5	3428	6.2	5422	9.8
1991	60284	8485	14	3532	5.8	5304	8.8
1992	61917	8909	14.4	3595	5.5	5399	8.7
1993	61511	8750	14.2	3649	5.9	5466	8.9
1994	61841	8817	14.3	3682	6	5504	8.9
1995	62003	8712	14	3697	6	5521	8.9
1996	63449	9142	14.4	3752	5.9	5604	8.8
1997	64592	9334	14.5	3854	6.0	5713	8.8

Sources: Ministry of Planning, Achievements of Development Plans,1996
SAMA, Annual Report, 1999

3.4.2 Construction

The construction industry is made up of diverse units, varying in size from large local and foreign companies to small-organised builders constructing houses and minor works. The construction industry is to a large extent in the private sector. A surge in oil revenues in the early seventies caused some bottlenecks in the economy, particularly in seaports, roads, housing, airports and many other areas the of physical and human infrastructures. As a prerequisite to development, the government has encouraged that the construction sector to play a vital role in order to match the rapid pace of development and diversification of the economic base. Its importance rests on its contribution to infrastructure development and fixed capital formation as well as its wide-ranging linkages with other sectors in the economy. Therefore, it experienced the highest growth rate within the real non-oil GDP during the period from 1974 to 1978.

Table 3.6 shows that the construction contribution amounted to SR 934 million in 1969 then increased drastically to reach its highest share totalled at SR 6,225 million in 1981. The growth rate of the construction sector in the entire real GDP ranged between 7.8% and 12.2 from the mid-1970s to the mid-1980s. The establishment of new commercial and housing development, recreation areas, and the large capacity expansion of the oil and petrochemical industries, has stabilised its growth at an around 6% from 1986 up to 1996. This decline in rate is attributed to the completion of most of the country's infrastructure. Measuring changes in the construction sector in terms of employment involved in it may clarify the variation in its contribution to GDP. The construction sector in 1974-75 employed total of 172,000, while in 1979-89 the labour force totalled

330,000 employees. The percentages for each period were 10% and 13% respectively of the total labour forces in the country.

The final conclusion about the growth rate of the construction sector can be summarised by considering the share of this sector in the overall real GDP. During the first two five-year development plans, this was 18.57% and 17.78% of the total real GDP respectively. During the Third and Fifth Five-year plans, the growth rate declined dramatically to -2.8% and 0.0% respectively of the total real GDP, due to the causes mentioned above.

3.4.3 Agriculture

The importance of agriculture to the country comes not only from its contribution to the national output in order to match or/and exceeds the growth rate of the population, also from its contribution to the diversification of the economy and the reduced dependence on oil as the major source of national income. In addition, agriculture stimulates growth and employment in other sectors via its forward and backward linkages. The first one comprises such activities as meat processing, the manufacturing of dairy products, the preservation and packing of fruits and vegetables, and the manufacturing of oil and fat, while the second one involves activities such as local manufacturing of fertilisers, pesticides, and agricultural implements. In spite of this, unfortunately, the agricultural sector's contribution to the real GDP has not been encouraging. Looking at Table 3.6 gives an indication of how low in the share of agriculture is, compared with other sectors in non-oil GDP. Excluding the years before the oil revenue influx, the growth rate of the agricultural sector in the total output of GDP in real terms has been relatively small. It ranged around an average of 3.4% from 1974 to 1981.

Nevertheless, the output of the agriculture sector gradually increased whether measured in real or nominal figures, but its contribution is low because it is weighted by the share of oil and other sectors, which has the ability to rise rapidly. In previous years, manufacturing, construction, and transportation, among others, have been developed at the expense of the agricultural sector, particularly in terms of employment and government recurrent expenditure.

Lately, the government has concentrated on encouraging the agricultural sector to expand. The government provided attractive incentives to encourage people and businesses to become involved in agricultural investments across the country. The Ministry of Agriculture and Water (MOAW), the Saudi Arabian Agricultural Bank (SAAB), and the Grain Silos and Flour Mills Organisation (GSFML) are all government agencies responsible for accelerating the growth of the agricultural sector. They provide interest-free loans, free reclamation lands, production inputs, machinery and equipment subsidies (Tables 3.7 and 3.8 present all the type of government support).

In addition to that, the government agencies purchase wheat and animal feeds from farmers at guaranteed prices, and construct flour mills and storage facilities of Grain Silos (Presely, 1986). Moreover, agricultural researches, crop selection, seed development, dam building, and irrigation schemes, are all provided for the benefit of the farmers in order to reduce costs and increase productivity. The total amount of wheat and barley subsidies was about SR 45 million in 1979 and increased gradually to reach SR 6 billion in 1991, and thereafter, declined in 1994 to SR 5.08 billion. The subsidies started at SR 43.3 million in 1974 then exceeded SR 1.44 billion in 1984 and declined to 379 million in 1994. The new arable lands allocated to the farmers totalled 6,977 hectares (one hectare equals 2.471 acres) in 1970 and reached 2.4 million hectares in 1994. The number of beneficiares increased in the same period of time from 1,124 to 96,509 (Achievements Plan, 1995). As a result, there has been a substantial growth of output in this sector. The contribution of the agricultural sector in real GDP increased continuously from 3.4% in 1981 to reach its peak of 10.1% in 1989 and stabilised at an average of 8.8% until 1996.

Table 3.7 Incentives for Agricultural Production

Type	Amount	Source
Production Inputs:		
Fertiliser	50% of cost	MOAW
Animal feed	50% of cost	SAAB
Potato seed	5 tons free; SR 1000/ton Thereafter up to 15 tons.	MOAW
Machinery and equipment:		
Poultry equipment	30% of cost	SAAB
Dairy equipment	30% of cost	SAAB
Engines and pumps	50% of cost	SAAB
Fish trawlers	Variables	SAAB
Transportation:		
Air transportation of cows	100% of cost	SAAB
Output:		
Wheat	SR 2/kg*	GSFMO
Rice	SR 0.30/kg	MOAW
Corn	SR 0.25/kg	MOAW
Millet/barley	SR 0.15/kg	MOAW
Dates	SR 0.25/kg	MOAW
Date palms planted	SR 50/tree	MOAW
Agricultural credit:		
All types	Variable conditions	SAAB
Agro-industrial credit:		
All types	Variable conditions	SIDF
Land acquisition:		
Land distribution	Free	MOAW

*Purchase price for years 1985 to 1988: from 1979 and 1984 purchase price was SR3.5/kg
Source: Saudi Arabia, Ministry of Planning, Fourth Development Plan, p.182.

It is worth noting, that the increased growth rate of the agricultural sector has been associated with a decline in the labour employed in this sector. The labour force totalling 695,000 in 1974-75 declined to 598,800 and 528,800 in 1980 and 1985 respectively. The expansion in output of this sector with its declining employment can be due to large-scale mechanisation implemented in the agricultural sector.

Table 3.8 Government Agricultural Disbursed Subsidies
(Million SR)

Year	Wheat and Barley	Poultry	Other Agricultural Products
1974	-	--	43.3
1979	45.1	--	703.3
1984	2774.5	-	1448.8
1988	4828.9	666	304.2
1989	4255.5	283.2	281.6
1990	5087.3	212.3	199
1991	6005	210	82
1994	5079.3	138.5	376.7

Sources: Ministry of Planning, Achievement for the Development Plans, 1995, p. 241

3.4.4 Manufacture

In Saudi Arabia before and during the early periods of oil exploitation, notably till the outset of 1970s, there was no modern industry except the oil refining industry and cement production. The cement production was as low as about 90,000 and 666,900 tons in 1960 and 1970 respectively, when the first production satisfied just 24.9 percent and the latter 56.1 percent of the country's needs. During that period, one could say that the country had little tradition of modern industrial development outside oil refining. The early stage of developing, the manufacturing sector was launched with the increase in oil revenues in the early 1970s. To give a clear idea of the manufacturing sector, one can divide this sector into two categories: non-oil based manufacturing activities and hydrocarbon based (oil and refining are excluded). The aim of such a division is to differentiate, to some extent, between the role of the private sector in the former and the strong governmental involvement in the latter. The concentration on hydrocarbon based manufacturing will be made in relation to the diversification of the economy by considering the comparative advantage of having the source of natural gas in huge quantities.

3.4.4.1 Non-oil Manufacturing

The non-oil manufacturing sector is a very small fraction of the Saudi Arabian economy. Its contribution to the GDP and the non-oil GDP during the 1970s was small and fairly constant, either measured in real or nominal values. Its share of the overall GDP reached its peak of 2.1 percent in 1979 in current prices and 2.8 percent in constant prices based on figures for 1970. On the other hand, its proportion of non-oil GDP ranged around an average of 5 percent measured either in real or nominal prices. Although, the share of non-oil manufacturing sector in non-oil GDP is low, it could have been lower than 5 percent if the cement production was excluded from the share of the non-oil manufacturing sector. The reasons behind that rest on the investors' intention not to be involved in such investments were: firstly, the overvaluation of the Saudi Riyal during the boom period, which made the imported goods much cheaper than those domestically produced; and secondly, alternative profitable investments associated with short-term investment, high returns and low-risks were more attractive. The most obvious examples of these investments were trading, real estates, house building and services.

As a result, the government recognised difficulties facing the manufacturing sector, and thereafter it worked to stimulate and establish a new manufacturing base. The base was established through the Statute for Protection and Encouragement of National Industries. Provision for industry incentives, was made; and basic infrastructure and, in particular, industrial zones were created at major cities. This policy aimed to allow the private sector to share in the development and growth process with regard to the private sector's ability to exploit local resources in a more efficient way than the government. Therefore, the encouragement and incentives for the private sector, were and still are provided by government agencies. The incentives provided include loans with zero-interest on favourable terms, tariff exemption on imported equipment and materials, selective tariff protection from imported products, provision of low cost of utilities and fuels, provision of infrastructure including industrial zones, and adoption of government procurement policies giving preference to the local products (Table 3.9 presents some example of loans, which were extended by the Saudi Industrial Development Fund (SIDF). Loans were first provided in 1974 at SR 16 million and increased gradually until

Table 3.9 Loans Provided to Manufacturing Sector by SIDF

(Million SR)

Year	Loans	Year	Loans
1974	16	1986	542
1975	860	1987	442
1976	2061	1988	828
1977	3954	1989	664
1978	6301	1990-91	1032
1979	6831	1992	1170
1980	5967	1993	1055
1981	5338	1994	1341
1982	5351	1995	2005
1983	3227	1996	2002
1984	1292	1997	2012
1985	634		

Sources: Ministry of Planning, Achievements for Development Plan, 1995
SAMA, Annual Report, 1999.

1978 when they reached about SR 6.3 billion; they rose at a fairly constant rate to peak in 1980 at about SR 6.8 billion. The decline in oil revenues in the mid-80s has adversely influenced the provision of loans which declined drastically in 1985 and afterwards, reaching their lowest level since the start of the programme at SR 440 million in 1988. Following that year, the provision of loans increased again to almost double that of previous year and continued increasing rate until 1996 to around SR 2 billion. Such loans are available on a case by case basis. Moreover, these loans are granted if certain requirements are met, such as obtaining a prior license from the Ministry of Industry and Electricity in order to avoid undesired duplication. Projects funded must be capital-intensive and economically feasible, and provide employment and training for Saudi citizens. Preferential treatment is given to local enterprises in order to obtain government projects. This kind of treatment to be provided is subject to two conditions. The first is that the price of the local bidder must not be 10 percent higher than the foreign bid. The second condition is that the quality of the local product is no more than 10 percent below the foreign bidder. The government implemented such a policy in order to protect "infant industries" from foreign competition. A tariff of up to 20 percent was imposed over similar foreign products.

This protection of domestic products is conditioned by the judgement of the viability of local enterprise under three prerequisite requirements. The first requirement is that its production must be able to meet at least 50 percent of the domestic market demand; the second is that the product must be at good quality and at a reasonable price; the third is that time period of the tariff imposition in favour of that product does not exceed a five-year period. Those incentives and others such as cheap fuel, and exemption of some manufacturing inputs from import duties has led to an expansion and growth in the manufacturing sector. The number of factories operating has increased as table 3.10, shows, as has the amount of capital invested. About 199 plants opened in 1970 and this number increased significantly to 1,422, 2,000 and 2,476 in 1980, 1991, and 1996 respectively. In terms of capital invested and manpower employed, the figure for the total capital in the same years mentioned above are respectively SR 2,787, million, 58,136 million, 137,818 and SR 163, 290 million. The labour force increased from 13,865 workers to 89,127, 172,848 and 225,000 in the years concerned.

Table 3.10 Number of Factories in Operation, their Capitals and Manpower

(Accumulated Million SR)

Year	Number of Factories	% change	Capital	Man-power-
1970	199		2787	13865
1971	232	16.6	3448	15678
1972	266	14.7	4262	18632
1973	292	9.8	4492	20464
1974	375	22.3	6320	27970
1975	460	28.9	11528	39423
1976	626	36.1	16042	51094
1977	841	34.3	23828	66421
1978	1071	20.9	26360	76533
1979	1206	18.6	34202	89129
1980	1422	17.9	58136	104845
1981	1629	14.6	81748	117189
1982	1741	6.9	83610	122772
1983	1845	6	90397	128475
1984	1929	4.6	93189	134547
1985	1983	2.8	94003	137372
1986	2017	1.7	94353	138784
1987	2061	2.2	94805	140620
1988	2132	3.4	95449	142934
1989	2193	2.9	96085	144932
1990	2251	2.6	136621	168159
1991	2000	1.1	137818	172848
1992	2036	1.8	138462	174617
1993	2109	3.6	139616	178735
1994	2234	5.9	151200	196022
1995	2355	5.4	157400	210000
1996	2476	5.1	163290	225000

After 1990, the factories producing bakery, ice, and cement-related products were transferred to the Ministry of Petroleum.

Source: Ministry of Planning, Achievement of the Development Plans, 1990-1995

Nevertheless, the growth rate of the non-oil manufacturing sector is still low compared to that in developed countries such as the US and the UK, and in some developing countries such as India, where manufacturing accounts for 25 percent of its GDP. The average overall contribution of the manufacturing sector has not exceeded 14.4 percent of the total GDP. Table 3.11 includes numbers of factories established for detailed commodities' production and their capital in selected years in the national economy. The most important single fraction in this group was of construction materials, which accounted for more than on third of the total number of establishments (34.5%) and about one half of the total capital (49%) in 1983. However, in 1990, chemical, rubber, and plastic capital increased to constitute 55.6 percent of the total capital followed by food and beverages at 17 percent and construction at 13.6 percent with the rest of the group remaining quite small. The higher contribution of construction in the early 1980s is no surprise because of the rapid demand for infrastructure and private house building, even though, most of the entire growth rate came mainly from the participation of the hydrocarbon industries, which will be discussed latter.

Table 3.11 Accumulated Number of Industries and their capital invested

(Current Million SR)

Catogery	1979		1983		1990		1996	
	No.of Inds.	Capital	No.of Inds.	Capital	No.of Inds.	Capital	No.of Inds.	Capital
Food & beverages	124	1428.3	264	4101	289	6663	391	11,294
Textiles and Clothing	12	56.2	28	437	35	1001	108	2,592.5
Leather products	2	9.9	7	52	13	150	109	1,495.6
Wood products	31	127.6	51	458	72	714	163	4,599.1
Paper product	60	268	95	935	126	2200	463	100,785
Chemical & Rubber & Plastic	109	1563.1	211	6834	293	59,096	464	21,169
Ceramic and Glass	2	43.4	6	406	57	2822	15	4372
Construction materials	289	4,562.20	458	15,734	354	14,463	685	15,458.6
Machanary & Metal equip.	198	1143	430	9,262	532	18,106	59	933.7
Total	**838**	**9,314**	**1564**	**38,418**	**1852**	**106,330**	**2,457**	**162,789**

Source: Ministry of Planning, Achievement of the Development Plans, 1995-1999

3.4.4.2 Hydrocarbon Manufacturing

Saudi Arabia has the comparative advantage of being the largest oil exporting country with huge reserves and a significant quantity of natural gas. Therefore, a hydrocarbon's manufacturing base might be the most suitable strategy to adopt in order to lessen dependence on crude oil production. In international trade, Saudi Arabia enjoys a comparative advantage in intensive hydrocarbon based manufacturing. The issue of comparative advantage is the cornerstone of how far oil downstream can be highly profitable.

The local private sector in Saudi Arabia is incapable of being involved in investment in hydrocarbon heavy industries with regard to its scope and ability financially and managerially. Large-scale capital and highly skilled management and labour are required for this sort of investment, which, to a large extent, are not available in the local private sector. In addition, the manufacturing of hydrocarbon was a matter of political as well as economic interests, which were beyond private sector objectives. Despite the key role assigned to the private sector in manufacturing base development, the government felt it was necessary to be involved in the creation of heavy industry, through inviting foreign companies to invest in this industry. The direct government involvement in heavy industry was undertaken for many reasons: (i) this industry needs intensive capital and other resource requirements; (ii) it requires a long-term period from its establishment to the profitable operation of industry projects; (iii) it has a great link with hydrocarbon policies and projects.

Accordingly, Saudi Arabia created a government agency named "Petromin" in 1962 through which to undertake investment in key basic petrochemical and metal industries. It is a worth noting that Petromin besides its new task, was responsible for exploration and marketing of oil products in the local market. The new task started with an exploitation of natural gas, which was mainly associated with oil extraction. Due to some marketing difficulties, most of the gas produced in the country was flared and could not be used for the benefit of the country. For instance, of the 200 million cubic feet produced between 1959 and 1966 only 6.1 percent went to domestic uses, 31.1 percent was re-injected into the oil field, and 61.8 percent was flared (OPEC, Statistical Bulletine, 1975). In addition, the world demand for natural gas as fuel or input has increased sharply. The foundation of Petromin had to take into consideration what was mentioned above, including the increase in the natural gas proven reserves, in order to start setting up a hydrocarbon industrial base. Table 3.12 shows the total reserves, marketed production, and total production divided into flared, re-injection, and shrinkage categories.

Table 3.12 Proven and Total Production of Natural Gas
(Thousand Million Standard Cubic Meters)

Year	Saudi Reserves	Marketed Production	Total Production		
			Flared	Re-injected	Shrinkage
1976	1986	4434			
1977	2478	5565			
1978	1230	7297			
1979	1711	9167			
1980	3183	11431			
1981	3346	22245	25583	1411	3143
1982	3432	8950	21373	1651	1590
1983	3544	4380	16320	1300	4900
1984	3608	18200	4220	1800	8220
1985	3687	18800	3000	1300	7500
1991	5221	32810	13100	4400	15200
1992	5249	34000	11520	5180	15400
1993	5244	35900	9900	5800	15700
1994	5260	37700	10200	6400	15900
1995	5545	38040	12700	7030	16200
1996	5693	41340	12450	7500	16360
1997	5882	43400	12450	7650	165400

Sources: OPEC, Annual Statistical Bulletin, 1985-1997

The total reserve increased from 1,986 billion standard cubic metres in 1976 to 5,693 in 1996, while the marketed production increased from 4,434 million standard cubic metres in 1976 to 41,340 in 1996.

Petromin began the process of developing hydrocarbon-based industries through key basic petrochemical and metal industries, particularly after the completion of the Master Gas System (MGS). During the period from 1967 to 1970, two factories came into operation with a small scale of production: A steel mill with a capacity of 45,000 ton/year at Jeddah in 1967, and a 35,000 ton capacity urea plant built by the Saudi Arabian Fertiliser Company (SAFCO) near Dammam in 1970. The production of these plants was operated through a technical agreement between Petromin and foreign petroleum companies for the latter to provide the technical supervision for the construction and operation. The expansion in petrochemical production has led the government to differentiate between the major task of Petromin as the oil-refined distributor and its new task of developing hydrocarbon-based industries. Consequently, the control of SAFCO was transferred to the Ministry of Industry and Electricity (MIE), and a huge new company was established, owned mainly by the government under the name of the Saudi Basic industry Corporation (SABIC). The first company (SAFCO) under the new arrangement operated successfully and its output increased from 17 tons per year in 1970 to almost 300 tons in 1979, 97 percent of which were for export. The second company, SABIC, was established in 1976 with an initial capital of SR10 billion, 90 percent of which, is owned by the government, and the rest being sold to the public. It was established for the implementation of a basic industry programme in conjunction with suitable overseas venture partners. Therefore, it took over from Petromin the responsibility of the Steel Mill and all other basic industries. The major task of SABIC was to utilise the natural gas, which is associated with the production of oil. The utilisation of gas was through its uses as an input or fuel for petrochemical and energy intensive industries. This added value directly to the country's national resource, and increased foreign exchange earnings without being subject to the fluctuations of the price and production of crude oil. This company is classified as a high technology and capital-intensive company. By the end of 1994, SABIC had completed 15 basic downstream and support industries. The annual production capacities had reached 19.5 million metric tons of petrochemical, plastics, fertilisers, metals, industrial gases, steel rolling, and iron and steel.

The production of SABIC industries in 1994 included 11 million ton of chemicals and petrochemicals, 4.3 million tons of fertilisers, 2 million tons of plastics, 2.6 million tons of metal, and 1.1 million tons of other products. In terms of employment, the total manpower employed by this company and its affiliated companies stood at 11,539 employees, of whom Saudi nationals were 63 percent in 1994, while in 1989, the total manpower employed were 8,938 of whom Saudi nationals constituted 59.5 percent.

Finally, one can conclude that there was a successful effort in the pace of development and growth in the manufacturing sector in general and in hydrocarbon-based manufacturing in particular. Taking exports as an economic indicator for measuring the government plan, shows that industrial exports, with the exclusion of oil products were around SR 15.6 billion in 1994. This was about thirteen times more than the value of exports in 1984. Petrochemical exports of SABIC, amounted to about SR10.2 billion, thus contributing 65 percent of the total value of industrial exports. Exports of other manufacturing industries stood at about SR5.4 billion, accounting for about 35 percent of the total industrial exports (Ministry of Planning, Facts and Figures, 1995). If the overall performance of the industrial sector is measured in terms of its contribution to the real GDP, that shows the growing contribution of the non-oil GDP (see Table 3 6). During the period from 1991 to 1996, if the oil share is excluded, the share of the manufacturing sector was the highest among other components of the overall real GDP with an average share of about 14.3 percent.

3.5 The Foreign Sector

The relatively large size of the foreign sector and thus foreign trade is one of the most distinguished features of the Kingdom's economy. This outcome is derived from the higher contribution of export and import values in the total GDP (more than 90%) of the national economy. Moreover, the significance of foreign trade is evident in that Saudi Arabia is the largest oil exporter in the world and was also ranked as one of the ten largest exporters in the 1970s. In terms of imports its relative weight in world trade was the 35^{th} in 1975 to become 11^{th} by the end of 1978 (Third Development Plan). Beyond the importance of the country's exports and imports, there are two crucial features which confirm its interactive ties with the world: the first is the Saudi accumulation of foreign exchange reserves, which accounted for $19,273 million in 1979 and jumped to peaked at $25,004 million in 1985 and then started fluctuating in response to the country's oil revenues (Tanzi, 1990); the second feature is the huge foreign workers' remittance which increased from $6,510 million in 1988 to reach its highest level of $18,102 million in 1994 (Balance of Payment Statistical Year book, IMF, 1994).

To understand the vital importance of the foreign sector in the Saudi

Arabian economy, it is necessary to shed light on some aspects of foreign trade, starting with imports, and including its contribution to the overall GDP, its composition, and the country's major foreign partners. This will be followed by a focus on exports which will be broken down into three parts: crude oil; refined and petrochemicals; and other exports with an indication of their destinations. There will then be an overview of the Saudi Arabian balance of payments.

3.5.1 Imports

Saudi Arabia imports have grown rapidly as table 3.13 shows, with the absolute value of imports increasing at an accelerated rate from SR 2,578 million in 1969 to reach SR 14,823m in 1975. The reason behind this is the need for tradable and non-tradable goods to meet the high level of demand emerging from the influx of oil revenues. As the basic infrastructure was not completed during that period, a shortage of domestic goods production, a rise in income, and a high propensity to import, caused imports to increase dramatically by 107 and 68.3 percent in 1976 and 1977 respectively. The imports measured in absolute values reached a peak in 1982 amounting to SR 139,335 million followed by a declining trend of 2.8, 12.3, 27.9 and 17.3 percent in the following four years before recovering to establish a positive growth rate. The reason for such fluctuations derived from changes in oil export revenues that financed the vast development projects and thus government spending which, in turn, reflected directly or indirectly the value of imports. Therefore, prosperity of oil prices and oil production including the Kuwait invasion period in 1990, brought about a rise in imports to SR 124,606 million in 1992 with a 14.4 percent increase. Again, the fall in oil price, resulting from the world recession afterwards, led to a decline in imports in terms of values and percentages. The crucial role of imports in the country can be seen clearly through their contribution to the overall GDP. This was around one fifth of the total nominal GDP in 1969, and for the following two years, it was around 13.9 and 13 percent respectively. The high contribution of imports during this period, reflected the small proportion of the oil export revenues and thus the entire GDP, rather than an increase in volume of imports. Hence, when the country enjoyed massive oil wealth, the import contribution in the overall GDP fell to 7.4 and 7.3 percent during 1973 and 1974 respectively.

Table 3.13 Export and Import Values and Percentage Changes

Current Million SR

Year	Export*	%Change	Import**	%Change	Trade Balance
1969	9496	4.2	3378	31	6118
1970	10907	14.9	3197	-5.4	7710
1971	17303	58.5	3668	14.7	13635
1972	22761	31.5	4708	28.4	18053
1973	33309	46.3	7310	55.3	25999
1974	126223	278.9	10149	38.8	116084
1975	104412	-17.3	14823	46.1	89589
1976	135154	29.4	30691	107	104463
1977	153209	-17.3	51662	68.3	101547
1978	138243	-9.8	69180	33.9	69063
1979	213183	54.2	82223	18.9	130960
1980	362885	70.2	100350	22	262535
1981	405481	11.7	119298	18.9	286183
1982	271090	-33.1	139335	16.8	131755
1983	158444	-41.6	135417	-2.8	23027
1984	132299	-16.5	118737	-12.3	13562
1985	99536	-24.8	85564	-27.9	13972
1986	74377	-25.3	70780	-17.3	3597
1987	86880	16.8	75313	6.4	11567
1988	91288	5.1	81583	8.3	9700
1989	106295	16.4	79219	-2.9	27076
1990	166339	56.5	90283	14	76056
1991	178624	7.4	108934	20.7	69690
1992	188325	5.4	124606	14.4	63719
1993	158770	-15.7	105616	-15.3	53154
1994	159590	0.5	87449	-17.2	72141
1995	187403	17.4	105187	20.3	82216
1996	212625	13.5	103980	-1.1	108645
1997	227443	6.9	107643	3.5	119800

* Exports FOB, ** Imports CIF

Sources : Economic Intelligence Unit, Country Annual Report, 1997

:SAMA, Annual Report, Various Years.

:Ministry of Planning, Achievements of Development Plans, 1996

Notwithstanding, the pace of the development process and the increase in per capita income, imports exceeded one third of the GDP in 1983 and 1984. Afterwards, as shown in Table 3.16, the imports contribution in the GDP settled at around one fourth until 1996 with the exception of 1992 and 1994: in 1992, the increase was largely due to a rise in government project-related imports and only partly to the private sector activity; whilst, in 1994, the decline in imports reflected a growing reliance on domestically produced goods and services as well as because of the austere fiscal policy undertaken by the government. In addition, the reduction of government expenditure has reduced the purchasing power of the Saudi citizens as the GDP per head declined from $16,650 in 1981 to $ 5,500 by the end of 1980s (EIU, Country Profile, 1995-96). In 1996, this figure increased to $7,458 in 1996 and ranked fourth within the GCC members (Annual OPEC Statistical Bulletin, 1996).

The composition of imports rests on four major items: machinery, mechanical, and electrical equipment; foodstuffs and beverages; transportation; and basic metals and metal articles. Table 3.14 shows the large contribution of foodstuffs and beverages ranging from 31.6 to 19.9 percent during the period preceding 1975. This was due to the higher demand for such products, which were not satisfied by domestic production. During the same period, the machinery, transportation and basic metals were the highest share following foodstuffs and beverages. The emphasis development, in the wake of the oil price rises, changed their shares in favour of machinery, mechanical and electrical equipment. It is no surprise that the share of this latter item has continued to dominate the large share of total imports for about thirteen years with an average of one fourth of the whole imports. The period from 1990 onwards, has witnessed a higher contribution of motor vehicles' imports reflecting a buoyant consumer market. The exception to this trend occurred in 1995-96, when the demand for vehicles dampened in favour of the machinery, electrical, and mechanical equipment which had the largest share of total imports of 21,9 and 21 percent respectively, followed by vehicles, foodstuffs and basic metals in that order.

Table 3.14 Composition of Exports and Imports (percentage)

Year	Export Components		Import components				
	Crude Oil	Oil-Related	Metal	Food & Beverages	Transports	Mech. & Mac.	Others
1970	83.2	16.5	9.4	31.6	13.4	18.5	27.2
1971	88.2	11.7	10.4	29.9	11.5	18.5	30.3
1972	90.5	9.2	10.1	25.9	15.1	20.7	28.2
1973	92.3	7.4	10.7	23.4	14.2	21	31.7
1974	94.3	5.5	10.6	19.9	16.7	19.7	33
1975	92.8	6.5	9.3	15.5	20.7	19.4	35
1976	93.9	5.8	11.7	11.5	18.4	24.3	34
1977	94.9	4.8	14.8	10.4	12.8	27	35
1978	94.2	5	13.9	11.3	13.1	28.7	33
1979	93.9	5.2	15.6	12.8	12.6	27.6	32.5
1980	94.5	4.7	14.5	14.1	13.9	24.4	33
1981	94.8	4.4	14.6	14.5	14.5	25.4	31
1982	92.7	6	14.9	13	17.2	25.5	29.6
1983	89.7	8	14.1	12.2	14.1	26.7	32.9
1984	86.6	10	11.9	15.8	13.4	23.9	35
1985	76	18.4	12	15.1	14.1	20.9	37.9
1986	73	17	9.2	16.8	13.3	20.7	40
1987	63.5	24.5	8.4	17.1	13.5	19.1	41.8
1988	60.3	22.6	10	16.1	14.6	19	40.3
1989	66.5	18.4	8.2	15.9	18.5	18.4	39
1990	74.1	16.2	8.7	14	20.5	16.4	40.4
1991	78.3	13.4	9.1	13	21	19.4	37.5
1992	78.8	10.2	9	10.6	24	21.1	35.3
1993	75.5	15.6	10.1	10.8	20.8	21.3	37
1994	77.8	11.2	9.3	12.9	20.7	20.7	36.4
1995	71	20.2	10.3	12.5	14.4	21.9	40.9
1996	72.2	16.4	9.9	12.2	15.3	21	41.6
1997	87.6	12.4	9.0	9.4	15.5	20	46

Sources: SAMA Annual Report, Various years
:Ministry of Planning, Achievements Development Plans, 1996

Parallel to the changes in the composition of the Kingdom's imports, there was a geographical shift towards Japan and Western Europe, whose shares in 1972 increased for the former from 14.3 percent and for the latter from 28.6 percent to become 20 and 43.7 percent respectively in 1984.

Nevertheless, as Table 3.15 indicates, the US was the major single import partner until 1984, when Japan became the leading import single supplier from 1984 until 1988 with the exception of 1986. The strength of the US dollar has encouraged Saudi importers to shift to Japan.

Table 3.15 Share of Major Saudi Import Partners (Percentage)

Year	US	Japan	UK	Germany	Italy	W. Europe
1972	19.5	14.3	7.3	6.2	4.1	28.6
1973	19.6	15.7	6.5	6.4	2.7	28.9
1974	22.6	18.3	7.6	7.8	3.6	29.4
1975	23.1	20.7	6.7	8.7	4.9	29.2
1976	18.7	12.2	5.9	8.3	4.9	35.3
1977	18.6	11.6	6.2	8.4	6.1	37.6
1979	20.7	16.2	8.1	10.3	8	44.8
1980	20	17.9	6.4	9.0	7.3	43.1
1981	21.6	17.2	6.8	8.1	6.7	37.7
1982	21	19	7	11	6	39
1983	19	19	6	10	8	43.2
1984	17	20	6	8.0	7	43.7
1985	17	19	6	9.0	7	39
1986	17	16	7	8.0	7	38
1987	15	17	8	8.0	7	38
1988	16.2	16	7.3	7.2	6.5	40
1989	18.2	14.2	10.2	6.3	5.7	41.7
1990	16.7	15.3	11.3	7.4	4.6	44
1991	22.2	13.7	11.3	7.8	4.6	43
1992	22.5	14.2	10.8	7.4	5	40.7
1993	20.6	12.6	11	7.0	5.1	39.5
1994	21.3	11.7	8.5	8.3	4.7	39
1995	22	9	8	8.0	4	40.2
1996	22	9.1	11.9	7.7	5.6	39.4
1997	22.2	6.6	10.5	5.4	4.6	39.5

Sources: IMF, Staff Report, 1994, p.48
EIU, Country Profile, 1994, p.64

The US was and still is the major single import partner, One can argue that the reason for this is the existence of massive the American companies and expertise working in the country and also the influence of American's style of life on the majority of the Saudis graduating from US educational institutions. Moreover, one cannot ignore the political influence and relations that have led Saudi Arabia to select American products at the expense of the others.

3.5.2 Exports

Table 3.16 indicates how the absolute value of exports rises in response to any changes in either oil prices or production or both. In this respect, the export value increased by 279 percent from SR 33,309 million in 1973 to reach SR 126,223m in the following year, in 1981 they reached SR 405,481 million. This drastic rise in export absolute values was attributed to the first and second oil shocks resulting from the Arab-Israeli war and the Iranian revolution respectively. The world recession took place in the early 1980s causing a fall in oil prices, which reflected negatively on the Saudi export receipts declining by 33.1 percent in 1982. The downward trend in total exports continued, reaching SR 74,377 million in 1986, the lowest export volume since 1973. As mentioned earlier, the cause of this sharp decline was due to the Kingdom's abundance of being a swing producer in the world oil market.

Historically, oil export receipts have accounted for the bulk of total export revenues despite government endeavours to diversify the country's export base. The crude oil exports consisted of more than 90 percent of the total exports from the early 1970s to the early 1980s. Table 3.14 presents the crude oil exports domination, which peaked in 1977 and 1981 at 94.9 percent and 94.8 percent respectively. In more recent years, petrochemicals in particular and other manufacturing products reduced the crude oil dominance and their shares reached their highest in 1987 and 1988 when their contribution rose 24.5 percent for petrochemicals in 1987and 17.1 percent for other manufacturing products in 1988. This shift is attributed to two factors: the first and most important is the relative success of the government's attempts to diversify the economy towards a non-oil manufacturing base, whereas the second factor is the fall of the oil export revenues, particularly from the mid-1980s till 1990.

In terms of the oil exports contribution to the GDP, table 3.16 shows that the average share was about 55 percent of the overall GDP until the early 1980s with the exception of the years following the oil-shocks in the early eighties and mid-seventies when the oil export revenues jumped leading to higher participation of exports in the GDP. From the outset of the Iraqi-Kuwait conflict until 1996, there was a steady contribution of exports ranging from the highest of 42.4 percent in 1990 to the lowest of 35.5 percent of the total GDP in 1994.

Table 3.16 The Contribution of Export and Imports in the GDP

Year	Nominal GDP	Share of Exports	Share of Imports
1969	17399	54.6	19.4
1970	22921	47.6	13.9
1971	28258	61.2	13
1972	40603	56	11.6
1973	99314	33.5	7.4
1974	139599	90.4	7.3
1975	164526	63.5	14.2
1976	205056	66	15
1977	225401	68	23
1978	249539	55.4	27.7
1979	385807	55.3	21.3
1980	520585	69.7	19.3
1981	524720	77.2	22.7
1982	415234	65.3	33.6
1983	372023	42.6	36
1984	351397	37.6	33.8
1985	313942	31.6	27.3
1986	271091	27.4	26.1
1987	275453	31.5	27.3
1988	285145	32	28.6
1989	310823	34.2	25.5
1990	391994	42.4	23
1991	442037	40.4	24.6
1992	461398	40.8	27
1993	443842	358	23.8
1994	450065	35.5	19.4
1995	469121	40	22.4
1996	509284	41.7	20.4
1997	513520	42.8	20.3

Source: Ministry of Planning, Achievements for Development Plans, 1990-1995.
:SAMA, Annual Report, 1999.

The geographical distribution of the Saudi exports confirms that the major importers were Japan, Italy, France, Netherlands, and the United Kingdom during the period from 1971 to 1974. The contribution of these countries in the Saudi exports changed slightly due to the oil sanction undertaken by some Arab oil exporters during the Arab-Israeli war and Japan continued to be the leader of the Saudi export partners until 1988. In the following until 1995, the US became the major partner importing from Saudi

Arabia with an average share of one fifth of the total Saudi exports. Table 3.17 shows how some Far-Eastern countries, particularly Singapore and South Korea have increased their purchasing

Table 3.17 Geographical Destinations of Exports (Percentage)

Year	Japan	W.Europe	France	Italy	Holland	Germany	UK	Asia*	Korea	Singapore	US
1971	16.1	48.5	9.6	10.2	9.1	3.4	8.7	9.4	Na	Na	3
1972	15.1	55.5	9.3	11.2	11.9	3.2	8.1	9.2	1.8	Na	5
1973	14.8	52.4	9.2	10	9.3	3.3	8	10	2.6	Na	5
1974	16	51.6	11.5	10.3	2.6	4.4	9.3	9.2	2.6	1.9	4
1975	19.6	43.5	10.8	7.6	5.1	3.5	6	10.2	2.1	2.5	4
1976	20	41.1	11.5	6.4	5.1	3.1	4.9	10.4	1.9	3.4	5
1977	19	39.5	9.6	7.3	5.3	2.9	4.2	11.8	2.5	3.7	10
1978	20.2	37.3	10.7	6.8	4.4	2.7	3.4	13.8	Na	Na	16
1979	17.3	40.3	8.4	8.1	5.5	2.8	3.3	12.8	Na	Na	17
1980	17.4	41.5	9.2	6.1	6.8	3	3.5	12.8	3.2	3.8	15
1981	17.2	41.6	9.5	7.1	5.6	4.2	3.4	13.3	3	4.8	13
1982	23.8	35	9	5	4.8	4.3	2.9	20	3.9	5.3	8
1983	na	na	na	na	na	na	na	na	na	na	na
1984	32.5	20	4.3	4.6	1.8	1.8	1.5	20.3	3.3	5.4	7
1985	30	24	5	3.8	5.8	2.1	1.9	14.8	2	3	6
1986	20.4	32.2	5.6	7.6	4.9	3	2.8	11.2	2	2.7	17
1987	22.7	22.1	2.6	4.1	6.2	1.4	2.2	16.4	3.2	5	20
1988	16.9	23.3	5	3.2	5.4	2.3	1.5	16.8	1.9	5	22
1989	17.4	21.5	7.4	4	4.5	0.9	1.6	16.3	3.8	5.4	26
1990	19	18.4	4.8	3.6	4.7	0.6	2	17.3	5.6	5	24
1991	16	21.3	4.6	4.3	6.1	0.6	2	17.7	6.8	5.2	23
1992	16.4	22	4.4	4.1	5.3	1	2	19.6	7.5	4.9	21
1993	16.9	23	4.4	5	4.3	1.2	3.3	20.9	7.9	7.9	18
1994	16.7	22.8	5.5	2.9	3.3	1.2	2	29.8	9.8	5.3	17
1995	16.2	22.4	3.9	3.9	4.6	1.2	1.5	25.6	10.6	7.9	17
1996	16.9	20.3	4.5	3	3.2	1.3	0.8	21.3	11.1	6.4	15
1997	17.3	19.2	4.7	3.8	3.5	1.2	0.9	28.1	10.2	6.9	15.2

*Excluding Japan and the Middle East
Sources: SAMA, Annual Report, Various Years.
:Economic Intelligence Unit, Country Report,1994

Singapore is share rose in 1974 from 1.9 percent to its peak of 7.9 percent of the Kingdom's total exports in 1996, while South Korea also increased its share of purchasing Saudi exports, with the exception of 1988, from 1.8 percent in 1972 to 10.6 percent in 1996. Finally, one can expect a growth in the country's exports when Saudi Arabia becomes a member of the TWO and the 125 members lift all constraints imposed on petrochemical products.

3.5.3 Balance of Payments

Saudi Arabia has enjoyed a positive balance of trade every year since the present statistical series began in 1961. The predominant influence on the trade balance has been the trend in oil earnings, which historically have accounted for the bulk of export receipts. It is no surprise that the country has experienced a massive trade surplus during the two oil shocks. Table 3.18 shows how the trade balance in 1974 rose from $30,068 million, which was more than seven times than that in 1973. Moreover, it peaked in 1981 at $81,941million. In the following year, due to a decline in oil revenues, the trade balance began to decline dramatically to reach its lowest positive balance of $3,060 million in 1986. However, in later years, an improvement in oil price took place bringing about a gradual upward growth in the surplus to reach its peak since 1981 of $31,196 million. In the 1990s, the rise in the trade surplus is explained principally by the growth of oil demand resulting from the UN embargo on Iraq, which encouraged the Saudi to increase their production of oil from 5.064 million barrels per day (mb/d) in 1989 to 8.118 mb/d in 1991 and again to 8.331 mb/d in the following year. Thereby, the Kingdom's visible trade surplus succeeded in offsetting the services and transfers deficits until 1983, with the exception of 1978 when the visible trade surplus declined to $19,598 million from $28,137 million in 1977. However, the decade of the 1980s witnessed adverse development in the world oil market which directly affected the receipts side of the current account, and at the same time the disbursement rose due to government commitments towards the financing of its development as well as to the expansion of the private sector by the purchase of consumer and capital goods.

Table 3.18 Balance of Payments
(Current Million $)

Year	Balance of Trade	Services and Transfers	Payments	Capital Account and Reserves
1965	748	-632	-775	-116
1970	1353	-1250	-1543	-104
1971	1844	-870	-1215	-974
1972	2876	-787	-1258	-2089
1973	4075	-1545	-2324	-2530
1974	30068	-6973	-9575	-23095
1975	23628	-9319	-12520	-14309
1976	28386	-14104	-18671	-14282
1977	28137	-16231	-22242	-11906
1978	19598	-21813	-28280	2215
1979	37101	-25075	-32792	-12026
1980	75156	-32398	-43665	-42758
1981	81941	40813	-56834	-41128
1982	39439	-31966	-50821	-7573
1983	12441	-29291	-49511	16850
1984	8868	-27269	-44867	18401
1985	7028	-19963	-36025	12935
1986	3060	-14855	-28798	11795
1987	4855	-14630	-27742	9775
1988	4511	-11852	-24658	7341
1989	9067	-18619	-31636	9552
1990	22723	-26876	-39275	4153
1991	21581	-49218	-60973	27637
1992	19908	-37647	-48623	17739
1993	16406	-33675	-43282	17269
1994	21175	-31662	-39155	10487
1995	24259	-29585	-38183	5326
1996	35207	-34527	-42589	-680
1997	33373	-33120	-43497	-253

(-) indicates payment in the current account items, and outflow in the capital account items.
Sources: SAMA, Annual Report, 1998

Accordingly, the country's visible trade surplus since 1983 failed to offset deficits resulting from debited payments and services. In nominal terms the current account deficit was on a steadily downward trend until 1991 when it reached the highest ever peak of $27,637 million, due to the huge government spending related to the Gulf conflict. The sharp increase in the invisible deficit coincided with the invasion of Kuwait and can be attributed to many factors: the most influential factor was the big rise in government expenditure with regard to the conflict, on providing more services and more foreign assistance for supporting Kuwait; the second factor was the private sector and the individual outflows either through the Saudi citizens or through remittances transferred by expatriate workers in the country; the third factor was the fall in government investment abroad resulting from the low interest rates and reduction of official assets held abroad. On the other side, the only other significant services inflow were the earnings from Muslims coming to the holy mosques. Such an exceptional case caused the deficit to rise sharply. Despite that, the invisible trade deficit began to decline steadily, except in 1996 when the deficit increased slightly due mainly to an increase in import services.

Generally speaking, causes of the permanent deficit of the current account of the balance of payments including the deterioration in oil prices and consequently oil revenues, are attributed mainly to the outflow of capital to pay for services like military spending (included in the services' section in the current account) and to foreign remittances. The deficit must be funded either by drawing on official assets or, instead, through private capital inflows that have been a major source of financing the current account deficit. The latter alternative was recently undertaken when private capital inflows funded about 80 percent or more of the deficit (EIU, 1996-97).

One can conclude that the external sector is the key factor in the structure of the country's economy. The high need for, and dependency on, oil receipts have enabled Saudi Arabia, as one of the largest oil producers and exporters in the world oil market, to have a vital role in the world economy. Having such a role in the world economy derived from its oil finance and gained through oil exports, has also facilitated the growth of imports needed for its development process. This has made the country one of the major trading partners of the industrialised countries. The massive increase in foreign-exchange reserves has put the country in a position to extend its foreign aid to other countries and to take part in the operation of some international and regional funds. The country's increased influence in the world economy occurred particularly in the 1970s and 1980s.

3.6 The Oil Sector

The crucial and important role of the oil sector in the structure of the kingdom's economy has been presented in the preceding sections through a focus on its contribution and influence on the overall GDP, government revenues and expenditures, the foreign sector, and on all aspects of the country's development process. Therefore, in this chapter, less attention is paid to the oil sector's impact on the rest of the sectors in the economy. On the other hand, there is greater concentration on the oil sector in terms of production, prices, reserves, and the stages of the oil industry's historical improvement. It is worth highlighting the major features of the oil sector before dealing with other aspects of it.

Obviously, characteristics of the oil sector are somewhat different from those of other sectors in the Saudi Arabian economy. It is a capital-intensive sector with highly skilled labour. By its nature, the oil industry is a highly localised industry; it is located exclusively in the Eastern Province of the country with the exception of the quantities of small super oil Arabian-Light discovered, lately in the Middle Province. The oil sector is labelled as an enclave sector regarding its partial isolation from the rest of sectors in terms of labour and capital mobility. The only link the oil sector has, is the financial surplus and cheap energy, which have supported and built the other sectors in the economy.

3.6.1- Oil discovery

The history of petroleum in Saudi Arabia started in 1923, when the King granted the British company, General Eastern Petroleum Company, a concession for the exploration of oil with an area of 36,000 miles in the Eastern Province of the country. The failure to find oil after four years led the company and the government to cancel the granted concession and the company to discontinue payments to the Saudi government

The declining number of pilgrims, as the major source of government income, during the Great Depression led to a desperate financial position which reflected adversely on the economy of the newly-established country. Therefore, King Abd Alaziz encouraged American oil companies to start searching for oil on the mainland of the country. The discovery of oil in Bahrain, which is near Saudi Arabia, in June 1932, by Standard Oil of California (SOCAL), gave the oil company a ray of hope to explore the oil in Saudi Arabia. Accordingly, the King granted this company a concession to launch its operations in 1932. Nevertheless, neither the Saudi officials nor the oil companies were optimistic about finding commercial quantities in the desert. The search for oil was strained in the violently hot desert and the oil was not easy to find. However, four and a half years of intensive work came up with unbelievably positive results. After six disappointing attempts, oil was found on the seventh successful attempt with the lucky Seven Well in the Dammam Dome in 1938. The dream became a reality when they realised that they had found the world's richest oil field beneath the desert (Young, 1983).

SOCAL formed a subsidiary company called the California Arabian Standard Oil Company (CASOC) to conduct operations in Saudi Arabia, but the name was latter changed, in 1944, to the Arabian American Company (ARAMCO) with a concession period of sixty years.

The discovery of oil was accompanied by the beginning of World War II, which interfered with the flow of supply and shipment to the oil market. Nevertheless, the exploration continued and an oil refinery was built. Shortly before the war's end, a refinery with a capacity of 50,000 barrels a day was on stream in September 1945 (Young, 1983).

Moreover, in 1949, Saudi Arabia has granted a sixty-year petroleum concession to the Getty Oil Company to explore oil in the neutral zone where Saudi Arabia shared rights equally with Kuwait. This concession included the company's right to explore and produce oil in territorial waters for a distance of six miles. The agreement included better advantages for the government than ARAMCO's did. These benefits included 25 percent of profit tax and 55 cents as a royalty for each barrel produced, whilst ARAMCO did not pay taxes and agreed only 21 cents for each barrel produced. Getty's production began with 11.6 million barrels in 1957 and rose to 28.7 million barrels in 1970 (Mansour, 1973). Later, another concession was granted to the Arabian Oil Company, a subsidiary of the Japan Petroleum Trading Company, for forty years. The drilling, in the offshore area of the neutral zone between Saudi Arabia and Kuwait, started in 1959 and oil was discovered in 1960. The production increased from 3.7 million barrels in 1961 to reach 62.7 million barrels in 1970 because of the demand for oil in Japan. On the other side of the country, in 1965, the Saudi government signed an agreement with the French-owned Societe Auxiliare de la Regie Autonomes des Petroles (AUXIRAP) to explore for petroleum in the Red Sea (Al-Farsy, 1982). Oil was not found, but instead gas and liquid gas were discovered. However, the dominant oil-company was and still is ARAMCO in terms of production, refineries, concession areas, employment, and exports. The involvement of Getty and the Arabian Oil Company in the oil industry in comparison to ARAMCO is minimal. Finally, this dominating oil company was bought by the Saudi Arabian government in 1980.

3.6.2 *Oil Production and Reserves*

As mentioned earlier, the daily assessments of crude oil prices and of oil quantity produced from each country were firmly controlled by the major oil companies. These companies determined the volume of production and the oil prices unilaterally without consulting the host oil producing country. As a result of this, among other factors, OPEC took on this controlling role at the end of the 1970s after tough negotiations and contentions with these companies. This will be discussed later.

Saudi Arabia has become the largest crude oil producer in the world since 1993 when its oil quota reached about 8.048 mb/d in comparison to Russia and the US with 7.856 mb/d and 6.847 mb/d respectively (OPEC bulletin, 1996, Table 3.19). The importance of ARAMCO stems from its domination over the crude and refined oil produced in the country. Table 3.20 illustrates an example of the contributions of the three companies, which are involved in producing crude oil in the total production. On the other hand, if any reduction is undertaken, the leading company is sacrificed in favour of the other two. In 1985, ARAMCO reduced its contribution to the lowest ever from 1,435 million barrels in 1984 to 1,110 million, whereas Getty had no changes and the Arabian Oil Company reduced its production from 55.9 million to 47 million barrels. The highest contribution for the latter companies was about 6.6 percent of the total production in 1970, while the lowest share of these companies occurred in 1991 with as low a percentage as 1.2. Recently, the leading company has dominated the crude oil production with a share of 98 percent.

Table 3.19 Crude Oil Production by Oil Companies Operating in the Country

(In Million US Barrel)

Year	Aramco	Getty	Arabian Oil	% Aramco	% Getty
1974	2996	29.8	68.7	96.8	0.96
1975	2492	31.1	59.5	96.5	2.3
1976	3054	29.7	55.7	97.3	0,8
1977	3291	32	34.8	98	0.95
1978	2944	29.5	56.3	97.2	0.9
1979	3377	30.1	72.7	97	1
1980	3505	28.5	69.9	99.3	0.8
1981	3513	27.1	40.1	98.1	0.8
1982	2309	23.6	33.4	97.6	1
1983	1597	19.9	51	95.7	1.3
1984	1435	24.8	55.9	94.7	1.6
1985	1110	24.8	47	93.9	2.1
1986	1712	24	45	96.6	0.9
1987	1457	24	48	95.3	1.6
1988	1804	25	34	96.8	1.4
1989	1775	24.5	49.5	96	1.3
1990	2284	13.5	42.6	97.6	0.6
1991	2904	37.5	23.5	98	0.4

Source: Ministry of Planning, Achievements for Development Plans, 1995.

By taking a general look at the country's crude oil production since the oil was discovered, one can recognise that the oil production followed an upward trend until the beginning of 1981, with the exception of 1975 when the production declined by 16.6 percent. The establishment of OPEC, the nationalism which evolved in the 1960s, and the military conflicts effectively contributed to dictate to the oil host countries, to some extent, to participate in oil companies benefits and share in the oil policy determination decisions. This caused a rise in the price and production of oil. Such an effort and its reactions in the oil market will be discussed later.

However, the Saudi share of the total world oil production started to decline from 1981 because of the world recession taking place as well as the conservation of energy adopted by the industrialised countries. The slump in oil production was more painful to the Saudis when they agreed to be a swing producer to the world oil market in 1982. Their daily production declined sharply from 9.809 mb/d. in 1980 to 6.483 mb/d. The reason behind that was that the independent oil producers as well as the OPEC members increased their production at the expense of the Saudi share in the oil market. Being a victim of such a situation, particularly when the oil production reached 3.175 mb/d, would hurt the people and the Saudi Arabian economy at the same time. Saudi Arabia ceased to be a swing producer in 1986, when it regained its normal quota within OPEC. The decision to quit led to a drastic deterioration of oil prices. OPEC members took a collective decision to reduce each member's quota to varying degrees, and therefore, the Saudi production declined again. However, the recovery of the oil market took place causing the quota to rise gradually.

The invasion of Kuwait by Iraqi military forces in 1990 caused a shortage in oil supply and thus a rise in oil prices. As a result, the United Nation requested that the Saudi government offset the halt in Kuwaiti and Iraqi exports and increased their production from 5.090 mb/d in 1989 to 6.412 mb/d and 8.118 mb/d in 1990 and 1991 respectively. This episode led the Kingdom's annual oil production to rise more than 62 percent between 1989 and 1991. Since then, the determined production volume has varied slightly but the prices have fluctuated in response to the daily-basis supply and demand mechanism, the Saudi government policy and the constraint collective decision taken within OPEC. The production of oil, with respect to OPEC and the total world production is significantly influential due to the volume produced or the capacity of oil production that allows the production of more than 10 mb/d. The daily average production of 9.808 mb/d in 1981 gave the country its highest contribution ever within OPEC at 43.6 percent, which was 17.5 percent of the total world oil production. Table 3.20 shows the Saudi daily average production since the commencement of oil production in 1938 and the share of this production within OPEC and the world since 1975.

Table 3.20 Saudi Arabian Oil production Since the Oil Discovery
(Thousands of Barrels)

Year	Daily Average	% change	Year	Daily Average	% change
1938	1.4		1968	3,042.90	8.5
1939	10.8	671.4	1969	3,216.20	5.7
1940	13.9	28.7	1970	3,799.10	18.1
1941	11.8	-15.1	1971	4,768.90	25.5
1942	12.4	5.1	1972	6,016.30	26.2
1943	13.3	7.3	1973	7,596.20	26.3
1944	21.3	60.2	1974	8,479.70	11.6
1945	58.4	174.2	1975	7,075.40	-16.6
1946	164.2	181.2	1976	8,577.20	21.2
1947	246.2	49.9	1977	9,199.90	7.3
1948	390.3	58.5	1978	8,301.10	-9.8
1949	476.7	22.1	1979	9,532.60	14.8
1950	546.7	14.7	1980	9,900.50	3.9
1951	761.5	39.3	1981	9,808.00	-0.9
1952	824.8	8.3	1982	6,483.00	-33.9
1953	844.6	2.4	1983	4,539.40	-30
1954	961.8	13.9	1984	4,079.10	-10.1
1955	976.6	1.5	1985	3,175.00	-22.2
1956	1,002.80	2.7	1986	4,784.20	50.7
1957	1,030.80	2.8	1987	3,975.20	-16.9
1958	1,058.50	2.7	1988	5,152.40	28.1
1959	1,152.70	8.9	1989	5,064.50	-0.5
1960	1,313.50	13.9	1990	6,412.50	26.6
1961	1,480.10	12.7	1991	8,117.80	26.6
1962	1,642.90	11	1992	8,331.70	2.6
1963	1,786.00	8.7	1993	8,047.70	-3.4
1964	1,896.50	6.2	1994	8,049.00	0.0
1965	2,205.30	16.3	1995	8,023.40	-0.3
1966	2,601.80	18	1996	8,102.30	1
			1997	8,102.30	0.0

Sources :OPEC Annual Statistical Bulletin,1996
:SAMA, Annual Report, 1997

The role and importance of Saudi Arabia comes not from its current position as the largest producer and exporter of oil in the world, but from the enormity of the remaining oil reserves, as shown in table 3.21, Proven announced reserves of 261,444 million barrels of crude oil are approximately 32 times the size of the 1996 production. At this level of production, the life-span of reserves is about 88 years. Undoubtedly, the total reserves are expected to be more than what is indicated. In 1996, Saudi Arabia possessed and still does about 25% of the world proven reserves, which accounted for 1,047 billion barrels, and 32.6% of the OPEC reserves. Petroleum Intelligence Weekly has suggested that Saudi proven and presumed reserves could reach about 600 billion barrels (BMI, Saudi Arabia, annual report, 1994).

Table 3.21 Proven Oil Reserves in Saudi Arabia, the World, and OPEC Shares in World Reserves
(Million Barrels)

Year	Saudi Reserves	World Reserves	Share of OPEC
1970	138700	549735	73.2
1971	138260	569827	75.6
1972	137070	579868	73.5
1973	136830	580496	72.5
1974	141040	654103	74.5
1975	170567	624577	71.9
1976	167428	633758	71.6
1977	164070	636164	70.4
1978	168940	626764	70.7
1979	166480	635594	68.5
1980	168030	656187	66.2
1981	167850	670017	65.4
1982	165482	697931	67
1983	168848	706779	67.2
1984	171710	742082	68.7
1985	171490	767898	69.8
1986	169744	870191	73.9
1987	169585	899662	74.9
1988	254989	991286	76.7
1989	260050	997683	77.2
1990	260342	998580	76.7
1991	260936	1003725	77
1992	261203	1010197	76.6
1993	261203	1009821	76.7
1994	261374	1019563	76.2
1995	261450	1030212	76.2
1996	261444	1047200	76.6
1997	261541	1057078	76.9

Sources: OPEC, Statistical Bulletin, 1985-1997
OAPEC, Statistical Report, 1979-80

Due to the kingdom's large oil reserves and its moderate stance on oil price increases, it has been used during the past three decades to fill the gap emerging from any shortfalls of other oil producers as happened during the

Iranian Revolution in 1979 and finally in the last Gulf crisis in 1990-91. The high correlation between the production and the market price or price system requires that we look at oil prices from previous years as well as at present. This will be discussed on the following pages.

3.6.3 Oil prices

Since the crude oil pricing was not and still is not determined endogenously by oil-producing countries, one has to consider the development of the pricing system in the oil market. In the 1930s and 1940s, it was obvious that the major oil companies named the "Seven Sisters" (Exxon, BP, Shell, Mobil, Gulf, Texaco, and Socal) were unilaterally controlling not only the price of crude oil but also exploration, production, refining, transportation, and marketing of almost all of the oil resources in the non-communist world. Therefore, it is no surprise that these Seven Sisters were dominating about 98.3 percent of the international oil trade in 1950 (Griffin and Teece, 1982). Accordingly, the price of oil was administratively determined and changed by these integrated companies regardless of whether the price was equal to the marginal cost and regardless of the mechanism of supply and demand.

According to Griffin and Teece, in 1950, the difference between the market price of $1.80 per barrel (p/b) and the payment accrued to the host country of $0.60 p/b left a margin of about $1.20 p/b, including production cost and profits. These large profits had tempted some private and state-owned oil companies to enter the oil market to explore the oil in areas not included in the major oil companies' original concessions.

Nevertheless, oil prices reached their highest level in 1957 when the price for Arabian-Light was $2.08 p/b. Over the following three years, the price declined to $1.80 p/b in August 1960 (Skeet, Ian, 1988). This decline was traced to the US's imposition of oil import quotas and the expansion of the Soviet Union's oil exports. The former caused large supplies from independent companies resulting in a price discount in an effort to increase their share in the crude oil market, whilst the latter was caused by the USSR's needs for foreign exchange as well as its attempt to break the domination of the major oil companies (Sampson, 1975). Therefore, this factor coupled with a rise in the production in the non-communist world led to an oil market price's fall during the period concerned. It is worth noting that the major oil companies were determining tax and royalty payments to the host countries according to the posted price rather than the realised price. Since the posted price was relatively stable, the oil exporting countries were not influenced by fluctuations in their incomes. If the actual price exceeded the posted price, that benefited the oil companies interest at the expense of the oil exporting countries. On the other hand, as the actual price declined, the gap between actual and posted prices widened. To shift some of the burden of falling prices to the exporting countries, the major oil companies reduced the posted prices without any consultation with the governments of the oil-exporting countries. As a result of this, the major oil companies reduced the posted prices in 1959 and 1960 by 10 and 7.5 percent respectively (Al-Sultan, 1990). The rising of the nationalism in the Arab World together with massive support from some of the oil exporting countries, notably Venezuela and Iran, led to action to protect their countries from the major oil companies' exploitations.

Five oil-exporting countries (Iraq, Iran, Kuwait, Saudi Arabia, and Venezuela) who represented 90 percent of the crude oil trade in the international market, met in Baghdad in 1960 and decided to establish the Oil

Petroleum Exporting Countries (OPEC). This organisation admitted other oil exporting countries such as Qatar in 1961, Libya in 1962, Indonesia in 1962, Abu Dhabi in 1967, Algeria in 1969, Nigeria in 1971, Ecuador in 1973,and Gabon in 1975 (Skeet, 1988). The immediate aim of such an organisation in 1960 was to stop any further reduction of oil prices, while further objectives could be summarised as: (i) unification of the oil policies between the members and safeguarding their interests individually and collectively; (ii) stabilising the oil prices in international markets and eliminating any harmful and unnecessary fluctuations; (iii) providing an efficient, economical, and regular supply of oil to consumer countries coupled with a fair return on the members' capital for investments in the oil industry (Al-Farsy, 1982). The ultimate and longer-term aim was to gain the entire independence of the oil sector in the economy.

As a result, OPEC demanded that the major oil companies restore the posted price to what it was prior to reduction, but the majors oil companies ignored them and insisted on negotiating with OPEC members individually rather than collectively. Table 3.22 indicates that OPEC failed to raise the oil market prices but also failed to prevent the price from declining during the 1960s. This failure could be traced to the limited influence on the oil market resulting from the oversupply of oil by independent companies as well as the intention of each member of OPEC to maximise its output. The success of OPEC over the domination of the oil-companies started in 1970 when Libya put pressure on them to increase the posted price of 30 cents p/b and to set the tax rate at 58 percent. The success of Libya was attributed to its high quality oil and to its closure to the West as well as the fact the companies working there were mainly independent companies (Al-Sultan, 1990). The oil companies agreed to carry out these demands and thus other OPEC members adopted a resolution calling for a minimum of 55 percent tax rate and an increase in the posted price.

Table 3.22 Oil Posted and Market price for Arabian Light (API 34)
(in US Dollar)

Year	Posted Price	Market Price
1960	1.80	1.50
1965	1.80	1.27
1970	1.80	1.60
1971	2.18	1.65
1972	2.45	1.85
1973	13.65	4.10
1974	10.40	10.30
1975	10.46	10.46
1976	11.51	11.90
1977	12.70	12.68
1978	12.70	13.50
1979	22.84	38.17
1980	31.22	38.63
1981	34.16	33.73
1982	33.80	31.00
1983	28.75	28.38
1984	28.75	28.81
1985	28.00	27.86
1986	27.83	13.55
1987	17.59	17.10
1988	17.44	11.52
1989	17.44	17.15
1990	17.61	29.32
1991	17.61	18.93
1992	17.61	18.56
1993	15.68	15.68
1994	15.39	15.39
1995	16.73	16.73
1996	19.91	19.91
1997	18.71	18.71

Sources: Ministry of Planning, Achievements for Developments Plan, 1990-1995.
Al-Kholi, Oil Economics, 1992, p. 353.

Accordingly, negotiations with oil companies in Teheran and Tripoli in 1971 led the tax rate for the Persian Gulf states to rise to 55 percent and to a 30 cents increase in the posted price to $2.18 p/b, whereas the Mediterranean nations success was to raise the posted price to $3.447 p/b. These price settlements were subject to change due to inflation rate and the American dollar exchange rate. Due to the devaluation of the US dollar in 1972 and 1973 resulting from the removal of US dollar convertibility into gold, the posted price was raised by 8.5 percent and 12 percent respectively (Al-Roomy, 1987).

The posted crude price was determined by OPEC rather than by the oil companies during the period from 1973 to 1986. This could be traced to many major economic, political and military events taking place during that period. The first crucial event was the outbreak of the Arab-Israeli war in 1973, when the Arab nation used oil as a weapon and boycotted oil to the US and Netherlands causing the prices to jump to $12.7 p/b in 1978. The dramatic change followed was the Iranian nationals' strike in 1978 causing a cut in their production from 6 mb/d. to 2.3 mb/d. This cut and the success of the Iranian revolution created a panic in the oil market causing a sharp increase in oil price to $23.5 p/b in 1979. At the same time the Iraq-Iran war in September 1980, and OECD strategies to raise their reserves, contributed to dramatic market price jump to about $41 p/b in December 1980 (Al-Sultan, 1990).

In the mid-1980s, the world demand for oil dropped due to many factors: the first and most important was the increase of non-OPEC countries at the expense of the OPEC share in the market. Table 3.23 shows that the share of OPEC started to decline gradually during the period from 1979 to 1985, when their share dropped from 29.898 mb/d to 17.315 mb/d respectively.

Table 3.23 World, OPEC and Some Non-OPEC Countries' Oil Production
(Thousand Barrels Per Day)

Year	World	OPEC	Russia	US	China	Mexico
1977	59.863	31.253	10.99	9.9	Na	Na
1978	60.395	29.805	11.428	8.680	1.917	1207
1980	59.826	26.879	12.000	8.581	2.119	1.936
1981	56.028	22.599	12.176	8.555	2.022	2.312
1982	53.739	18.992	12.251	8.060	2.040	2.312
1983	52.685	16.992	12.530	10.245	2.125	2.950.
1984	53.199	16.347	12.450	10.505	2.300	3.015
1985	53.464	15.554	12.150	10.545	3.515	3.015
1986	60.190	19.440	12.515	10.335	2.630	2.745
1987	55.434	17.325	12.466	8.349	2.671	2.541
1988	58.002	19.619	12.480	8.129	2.726	2.514
1989	58.743	21.128	12.178	7.631	2.752	2.513
1990	66.900	25.100	11.500	9.00	2.800	Na

Source : OPEC, Statistical Bulletin, 1985 and 1996.

The major non-OPEC countries contributing to the increase were notably the USSR, the US, China, Mexico, the UK, China, and Norway. The other reasons were the conservation policies adopted in industrialised countries after 1973, and the economic recession, which spread throughout the world economy during the 1980s. The oil market became more competitive than it had been in the mid-1970s.

Moreover, the decline in their oil share of the market created competition among the OPEC members to exceed their quotas. The price of oil dropped to $29p/b in 1983 and was followed by another decline to $28 in 1985. OPEC declared a price war against non-OPEC producers in 1985 in order to protect their fair market share. Nevertheless, the price decreased to $20 p/b due to its failure to control the oil prices. The price collapsed to less than $10 p/b in 1986 and remained around $11 to $13 in 1988. Peter Ellis Jones has suggested some reasons behind the failure of OPEC in 1985. The first was that OPEC thought that a reduction in posted prices would stimulate the demand for oil without taking into consideration that the nature of the oil demand was less elastic and its response to the price decline would be less effective. The second reason was the OPEC's overestimation of the price decrease on the production of the non-OPEC countries. Since the actual production cost is minimal, this would not preclude the sales at the current price level. The third one was the unwillingness of non-OPEC countries to co-operate with OPEC in terms of pricing and production (Al-Sultan, 1990).

The suspension of oil supplies from Iraq and Kuwait resulting from the Kuwait invasion in 1990 led to a rise in the price oil again. Although Saudi Arabia increased its production to offset the shortage in the oil market, the price of oil reached $22.26 p/b and declined later when the market absorbed the shock, remaining at an average of $16.5 p/b until 1995, and remained around $18 p/b until the Asian Crisis took place (OPEC Statistical Bulletin, 1995, p.122)

3.7 Concluding Remarks

The economy of Saudi Arabia, broadly speaking, can be divided historically into four major stages. The first stage, which began in 1902 when King Abd Alaziz regained power over the Riyadh region, lasted until the discovery of oil in commercial quantities in 1938. During this period, economic activity outside Hejaz, where the Holy Cities are located, was confined to livestock-raising by nomads, primitive agriculture and production of simple tools by craftsmen, who lived in small towns around sources of water. The main source of income for the government came from the annual influx of pilgrims who arrived each year on their trek to Mecca. Other minor sources of income included the customs charges and the two and half percent of income paid annually by wealthy people to the government as Zakat. However, the limited annual income had no impact whatsoever on the country's development base.

The second stage began with the discovery of oil on March 16, 1938. This coincided with the beginning of World War II, which prevented the government from fully developing the oil resources of the country and benefiting from the inflow of money. By 1948, and for the first time, Saudi Arabia had some, albeit limited, capital to invest in national development. Then, the government started to organise and lead the process of economic development. Consequently, from 1952 to 1970, the government managed to sustain steady national development and economic growth at impressive rates. The GDP grew by an average rate of 10.6 percent in current prices, physical infrastructure was developed relatively rapidly; the educational and health services, were to some extent, expanded. By 1970, the key structural characteristics of the expanding Saudi Arabian economy could be clearly identified by two factors: the first was the inadequacy of infrastructural facilities and the shortage of manpower and the second was the financial constraints (due to the control of oil marketing by major oil companies) which dictated caution in setting the pace of future growth. Hence, the government of Saudi Arabia introduced the technique of national development planning, with the First Development Plan in the period 1970-75. The most outstanding feature of the first plan comprised two elements. The first was its success in raising the Kingdom's proportion of oil revenues, partly through increasing the government's share of the ownership of the oil sector. The second was the historic action taken by OPEC and OAPEC, which led not only to an increase in the price of oil but also to changes in the system of determining prices.

However, changes in the country's revenues were mainly affected by oil earnings, reflecting daily crude oil production and international oil prices. This high dependence on oil was the cause of most of the substantial economic difficulties as the country underwent some extraordinary cycles of booms and slumps. From 1973, the Saudi Arabian economy was subject to the third stage, which ended in 1981, after two substantial oil boom shocks had taken place: the first oil boom shock was caused, among other factors, by the Arab-Israeli War in late 1973, while the second oil shock began with the Iranian Revolution in 1979 and ended with the oil price increases in 1981. During this period, all major economic sectors grew rapidly, with the construction sector showing the largest expansion, and the agricultural sector the smallest. In addition, the real GDP showed remarkable growth at an average of 9 percent a year. The GDP was determined principally by government spending which in turn, was determined by budgetary developments. The aim of massive government spending was to establish a viable modern economy at almost any cost. Since the Saudi currency was fixed to the US dollar, the rise in government spending was accompanied by high rates of inflation, especially during the beginning years of the oil boom period (1974-75).

In summary, Saudi Arabia succeeded in achieving its main development objectives, detailed more fully in the Second Development Plan (1975-80). These objectives included: (1) defending the country and maintaining internal economic and social stability; (2) raising the people's living standard and welfare through a high rate of balanced economic growth; (3) reducing dependence on oil as a source of national income; (4) developing indigenous human resources through education and health care; (5) building the physical infrastructure required for the attainment of these goals. The oil boom period was reversed by the decline in oil prices starting in 1982.

The fourth stage experienced by the Saudi Arabian economy began with the decline in oil price and production from 1982 followed by the collapse of the oil price in 1986. The causes of such a reverse were due to several factors: namely the world recession, which followed the sharp increases in the oil price; the conservation polices adopted, particularly by industrial countries; new oil discoveries, particularly in the North Sea and Mexico and the expansion in the non-OPEC countries' production. As a result, Saudi Arabia was severely affected by such an oil price decline since it was the largest producer among OPEC members. This was reflected in its GDP per head, which fell back from $17,000 in 1981 to $5,500 before the invasion of Kuwait and rose nearly $7,000 from 1994 onwards. The rise in the Saudi population accompanied by a reduction in subsidies led to emerging unemployment and a decline in national welfare. The objective of internal and external stability was only achieved in part, inflation rate was kept under control during the entire period after the first oil boom, but the national budget and the balance of payments recorded significant deficits from 1983.

However, the positive economic consequences of the oil slump were as follows: government spending was rationalised and reduced; serious attempts were made to diversify the economy; and successful policies were adopted to hold down domestic prices.

Chapter Four

The Theoretical Framework

4.1- Introduction

This study is concerned mainly with the theories of international trade and open economy macroeconomics as they relate to the impact of a natural resource boom and slump on the resource allocation in an economy. These two fields provide economic models for analysing the impact of resource-earning changes on an economy and examining policies which can be adopted by governments to eliminate or to moderate the adverse side-effects of such changes. These economic models depict the relationship between resource revenue fluctuations and domestic absorption (consumption and investment), the real exchange rates variability - or change in the relative prices- and the external and internal balances. However, The purpose of this chapter is to provide the theoretical effects of an export boom and slump in a small open economy with a fixed exchange rate through achieving the following four objectives: firstly, to investigate the extent to which a boom in a particular export sector (i.e., oil) affects the supply of the non-traded goods sector at the expense of the supply of the traded goods sector; secondly, in contrast to the first objective, to investigate the extent to which a slump in an export sector can reallocate the domestic resources in favour of the traded goods sector; thirdly, to show that a boom and slump in an economy are associated with changes in the price of the non-traded goods sector relative to the price of the traded goods sector and thus in the real exchange rates (appreciation or depreciation); finally, from a policy point of view, to discuss government policy responses to fluctuations in a export sector with particular attention to the Saudi Arabian case.

In sum, the overall goal of this chapter is to incorporate an examination of both downward and upward theoretical effects on the domestic economy. To achieve this, Corden and Neary's (1982) theoretical model has been adopted, with some limitations, taking into account both the economic literature and the local circumstances of Saudi Arabia. The outline of this chapter is as follows. Section 4.2 provides a brief review of previous studies and oil revenue movements during the last three decades, while Section 4.3 presents a discussion of the theoretical impact of the natural resource boom, based on Corden and Neary's (1982) theoretical framework. The impact of the natural resource slump is examined in section 4.4. Section 4.5 identifies the model constructed and looks at its structure. In section 4.6, the macroeconomic effects of the external resource change are provided, while the policy response is reviewed in section 4.7. Conclusion is provided in section 4.8.

4.2 Previous Studies and Oil Revenues Movements

4.2.1 Previous Studies

Extensive studies have been conducted in order to examine the impact of a resource boom on a small open economy. There is much historical evidence of sectoral boom implications for the domestic economy. Forsyth and Nicholas (1983) have pointed out that the flow of gold from the American colonies to Spain in the sixteenth century caused negative consequences for the Spanish industries (Corden, 1984). However, the development of direct studies related to the impact of a rise in a country's revenues on a domestic economy date from 1857. According to Gelb (1988), Cairnes analysed the effects of the Australian gold discovery on other sectors of the economy. He pointed out that the discovery of gold in 1851 brought about an increase in gold prices, which transmitted to the rest of the economy. Such a rise in all domestic prices led to a change in the country's comparative advantage from producer of pastoral products to gold production. Consequently, Australia switched from being a net exporter to a net importer of agricultural products (Gelb, 1988). Moreover, the impact of German reparation payments for damages in World War 1 on some economies was examined by Keynes in 1920 (Ul Haque, 1982).

Decades later, extensive studies had followed and a comprehensive theoretical framework formulated, emphasising on the effects of a sectoral boom on the rest of a domestic economy. These studies are largely related to macroeconomic effects in developed countries. Examples of these studies are those of Snape (1977), Barker and Braibusky (1981), Corden (1981,1984), Corden and Neary (1982), Eastwood and Venables (1982), Enders and Harberger (1983), Long (1983), Edwards and Aoki (1983), Neary and Wijinbergen (1986) among others. The majority of these studies concentrate mainly on the impact of the discovery of oil and natural gas on the economies of the UK, Netherlands, and Norway.

Some theoretical models used in previous studies, have been developed to be implemented, in the developing countries with slight assumption alterations. These assumptions have taken into account the characteristics of the developing countries such as unemployment, openness, the role of the private sector and the size of the financial market. Studies conducted into the cases for developing countries focus mainly on the adverse side-effects either of a commodity price boom such as that of coffee, tea, and cocoa in Columbia and Tanzania, or of a natural resource boom such as that of oil, natural gas and minerals in Indonesia, Kuwait, Nigeria, Venezuela, Ecuador and Saudi Arabia. Examples of these theoretical and empirical studies are these of Corden and Warr (1981), Wijnbergen (1984), Kamas (1986), Roemer (1985), Al-Sabah (1988), Looney (1990), Al-Gaeed, (1991), and Fardmanesh (1991) among others[1]

On the other side of the coin, there is by now a growing literature, both theoretical and empirical, on the study of the effects of a sectoral economic slump on the rest of the economy. Although the impact of the boom periods, has attracted a much greater literature. However, there are few theoretical and empirical researches that have been conducted with regard to the economic consequences of an oil price fall. The scarcity of these studies can be attributed either to treating the impact of oil price decline as the same as the impact of oil price increase but in reverse (the reverse Dutch disease), or to the potential business cycles of the temporary oil boom. Moreover, the decline in oil price may have few negative effects; indeed they are more likely to be positive on oil-importing countries. Nevertheless, the studies related to the economic consequences of a lower oil price can be divided into two categories. The first one is related to the impact of oil fall on oil-exporting developed countries, notably the UK, such as those of Henry and Herbert (1986) and Powell and Horton (1985). The second is related to the impact of such declines on the economies of oil-exporting developing countries, such as those of Mabro (1985), Evan (1986), Ibrahim (1987), Hammoudeh and Al-

Barazi (1987), Afolab and Bladen-Hovell (1990) and Al-Yousuf (1990) among others.

However, all the studies mentioned above concentrate either on the effects of increased oil revenues or on declining revenues.

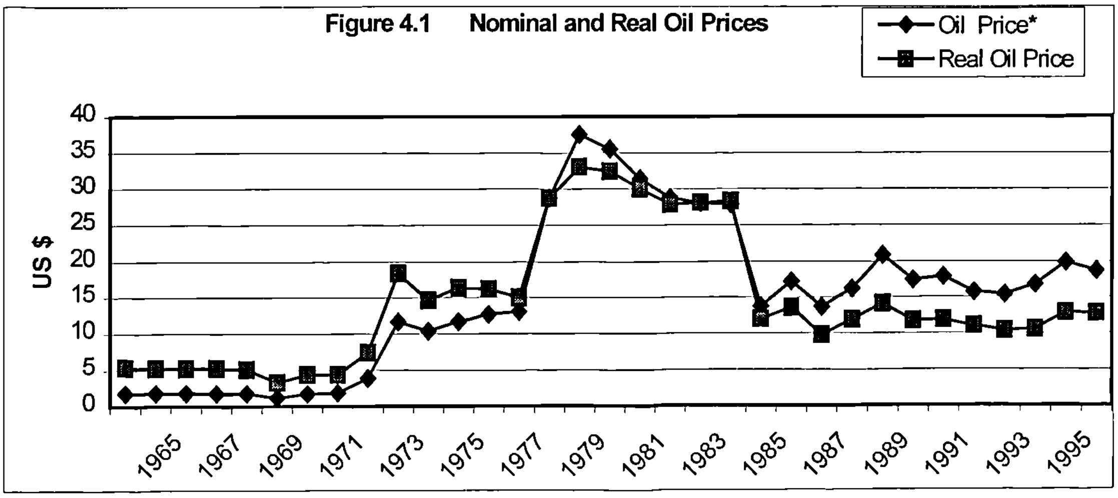
4.2.2 Oil Revenues Movements

Prior to the 1970s, there was no cohesive long-term national or global energy policy. The major oil companies which had an oligopolistic hold over world markets to a considerable extent determined pricing and production levels. Despite the birth of OPEC in 1960, these companies continued to control and manage almost all oil extraction, refining and marketing in the western world. Hence, there were little practical differences between domestic and foreign oil markets (Amuzegar, 1983). Thus, the posted oil price remained around 1.8 dollar per barrel for the Arabian Light (API, 34 as an indicator for the oil pricing).

In the early 1970s, the role of OPEC increased and the relationship between oil-exporting countries and the major oil companies underwent drastic changes. These changes affected not only the process of oil price determination but also the whole operation of the oil market. The sharp increases in crude oil price between 1973 and 1980 led to a massive increase in oil revenues of oil-exporting countries, particularly countries with higher production capacity and higher oil reserves. However, the causes of such a rise have been subject to debate among energy economists. Four major theories (the property right theory, the target revenue theory, the cartel theory and the market theory) explain the causes of such increase in oil prices, which have been indicated in an earlier chapter[2]. On the other hand, the decline in oil prices started in 1982, bringing about a fall in oil-exporting countries' oil revenues. The causes of this can be attributed to many factors, the most important of which, are oversupply among both OPEC members and non-OPEC oil-exporting countries, successful energy-conserving efforts, and the encouragement for new oil discoveries as well as improvements and exploitation of alternative resources. Declining demand for oil led OPEC for the first time to assign production quotas to its members.

When OPEC started to gain control over the volume of production and price determination, Its strength was severely tested, as it had hitherto been amenable to substantial fluctuations in the world demand for oil. As a result of fluctuations in oil prices, oil revenues had proved to be highly volatile, which induced sharp external shocks and thus exceptionally large oscillations in the national income. Figure 4.1 demonstrates how oil prices fluctuated over the 1965-1997 period.

Figure 4.1 Nominal and Real Oil Prices



This reflected directly on oil revenues and thus on the whole economy. Export instability can be considered as a vital source of macroeconomic uncertainty in developing countries. In Saudi Arabia in particular, the oil sector is the engine of the national economy and hence when oil revenues fluctuate, this reflects directly on its foreign exchange earnings. The measures that are commonly used to assess the level of dependence on oil exports are illustrated in Table 4.1. These measures include the ratio of oil exports to total exports[3] oil exports to the GDP and the oil exports to overall budget revenues. The fraction of oil exports constitutes an average of 90 percent of total exports during the period from 1970 to 1990. However, oil exports as a proportion of the GDP fluctuated sharply during the boom and slump periods. In 1974 and 1980 following the boom, the ratio of oil export to GDP reached its highest level of 99.9 and 74 percent respectively. On the other hand, the ratio of oil exports to GDP fell to around 25 percent in the lowest slump year in 1986 and so did the contribution to total revenues.

Such fluctuations have triggered significant economic structural changes. The price increases in the middle and late seventies provided Saudi Arabia with abundant financial resources, which were used to make substantial investments. Yet, adverse effects outside the oil sector, which served to lessen its benefits, often paralleled the oil boom. The patterns of the government and consumers' spending during the prosperity period led to a contraction of the traded sector in favour of the non-traded sector. On the other hand, when Saudi Arabia was hit by the consequences of the slump of oil revenues in the early eighties, the economy was skewed and structurally unbalanced. Therefore, the emergence of the new downward trend was similar to the earlier trend but in reverse, i.e., an expansion of the manufacturing and agricultural sector at the expense of the services and other non-traded sectors.

Finally, to trace the various consequences of the fluctuations of the natural resource foreign exchange receipts on a domestic economy, it is necessary to examine the macroeconomic implication of the boom and slump separately in a static framework.

Table 4.1 The Role of Oil in the Saudi Arabian Domestic Economy, 1970-1990
(In Saudi million current Riyals)

Year	Oil Exports OX	Total Exports TX	OX/TX (%)	OX/GDP (%)	Oil Revenues* (%)	Other Revenues* (%)
1970	10879	10907	99.7	56	88.5	11.5
1971	17065	17092	99.8	68	86.8	13.2
1972	22701	22761	99.7	72	88.0	12.0
1973	33197	33309	99.7	50	92.1	7.90
1974	125939	126233	99.8	99.9	94.1	5.90
1975	103374	104412	99.3	66	92.3	7.70
1976	134695	135152	99.7	71	89.7	10.3
1977	152665	153209	99.6	69	88.2	11.8
1978	137112	138242	99.2	56	87.4	12.6
1979	211244	213183	99.1	65	89.0	11.0
1980	359865	362886	99.2	74	91.2	8.80
1981	402511	405481	99.3	72	90.1	9.90
1982	267806	271090	98.8	59	81.1	18.9
1983	154879	158444	97.3	42	72.0	28.0
1984	127860	132299	96.6	37	70.6	29.4
1985	93947	99536	94.4	30	67.4	32.6
1986	66887	74377	89.9	25	58.2	41.8
1987	76499	86880	88.1	28	64.9	35.1
1988	75667	91288	82.3	27	63.6	36.4
1989	90235	106294	81.5	30	66.2	33.8
1990	150226	166339	83.8	30	76.4	23.6
1991	162764	178624	91.1	37	76.4	23.6
1992	173752	188425	92.2	38	76.8	23.2
1993	144202	158770	90.8	32	74.9	25.1
1994	142401	159590	89.2	32	74.0	26.0
1995	162593	187403	86.8	34	72.2	27.8
1996	202638	227428	89.1	38	75.9	24.1
1997	199172	227443	87.6	36	77.9	22.1

*Percentage Distribution of Government Revenues.
Source: Ministry of Planning, Saudi Arabia, Achievements of the Development Plans (1970-1993)
:SAMA, Annual Report, 1999.

4.3 The Theoretical Impact of a Natural Resource Boom

Corden (1984) considers three causes leading to a sectoral boom: (i) a once-and for-all technical improvement that causes a reduction in production cost in that sector: Ireland, Japan and Switzerland are examples of such;(ii) discovery of new resources that leads to a boom in that sector: natural gas in the Netherlands and oil in the UK are good examples; (iii) a rise in a price of a product in high demand in world markets relative to importable prices: the striking example here is the increase in energy in the 1970s as well as the increase in some primary commodity prices such as coffee in the 1970s. Roemer (1985) has included capital inflows as another cause of sectoral booms. Capital inflows can cause this via: (a) the remittances from overseas migrants as happens in Bangladesh, Turkey, Yemen, and Egypt; (b) high interest rate attracting flow of capital in as happened in the US in 1982-84 and: (c) large reparations such as occurred in the 1920s when Germany compensated France for damage in World War I (Roemer, 1985). One can argue that the capital inflows in Roemer's examples cannot have the same major impacts as new oil or gas discoveries can in relation to the size of the foreign exchange obtained and the period of the continuity involved.

Broadly speaking, a boom represents, on the one hand, a significant rise in the national income and thus opportunities for an accelerated development of domestic economy and a rising standard of living for the people. On the other hand, economic structural changes may take place through changes in the relative price and thus the real exchange rates. This outcome affects the output of the traditional traded sector (agricultural and manufacturing sectors) negatively and the output of the non-traded sector (services) positively. As mentioned in Chapter two, the adverse side-effect of the boom is referred to as a Dutch disease problem as this emerged after the Slochtern gas field discovery in the Netherlands in the 1960s. Increased energy prices and a strong Guilder followed. Despite the welfare gains resulting from the significant increases in Holland's national income as well as an improvement in the balance of payments, there were major problems associated with the beneficial effects. Edwards and Aoki defined this phenomenon as follows:

An increase in the price or production of a commodity export results in a real appreciation of the exchange rate, and in a loss of competitiveness of the traditional (non-oil) tradable goods sector. This phenomenon has also referred to as de-industrialisation or tradable-squeeze effects (Edwards and Aoki, 1983, p.220).

Most analytical approaches dealing with this phenomenon are either through the Australian or the Scandinavian models. The Australian model is based on the "dependent economy" model, which has its origins in the writings of Salter (1959) and Swan (1960) in the Australian trade literature. Such a model assumes that the economy is a price-taker in the world market for exportables and importables and thus the terms of trade are exogenously determined. Further, it distinguishes between tradables and non-tradables with wage and price flexibility in order to ensure fullemployment in the economy. On the other hand, the Scandinavian model developed by Aukrust (1977) captures the essential aspects of the price adjustment mechanism in relation to external shocks (Dornbusch, 1980). It is a model of inflation distinguishing between sheltered (non-tradables) and exposed (tradables) industries on the basis of a production function, which depends only on the level of employment of labour with constant returns to scale. The approach used in this study is of an open dependent economy. It is an extension of the two-sector economy in the Australian tradition when labour is assumed to be the only input while capital is fixed in addition to factor specific to each sector.

4.3.1 The Static Effects of a Resource Boom

The simplest general equilibrium model in which the static effects of a resource boom can be analysed based on the basic model developed by Corden and Neary (1982). Since a natural resource boom is considered to be sizeable and temporary, the analysis will be of a short-run nature. This implies a negligence of the depletion policy and thus the cost of extraction. Moreover, the economy is assumed to be small and open. It has three sectors: the booming traded sector (B), the non-booming traded sector (T) and the non-traded sector (N). Tradables consist of all exportables and importables, whose prices are determined exogenously in international markets, while non-tradables prices are determined endogenously through interactions between domestic supply and demand. However, all goods in the three sectors are assumed to be normal goods and produced according to a neo-classical production function with two factors of production: labour and capital. This can be expressed as:

$$Y = F(L, K)$$

Where Y, L and K represent total output (GNP), labour and capital respectively. Each sector in the economy is restricted by a factor specific to that sector and by labour. The labour factor is assumed to move freely between the three sectors, while capital is immobile between them.

The pre-boom equilibrium condition in such an economy is assumed through the labour and commodity markets' equilibrium conditions. This implies that the economy operates under internal and external balance. The external balance requires a balance in the balance of payments current account where the value of export (X) is identical to those of imports (M):

$$X = M$$

Internal balance means that resources are fully employed. Hence, the potential output ($Y*$) is equal to actual output (Y):

$$Y* = Y$$

One can also state that income must coincide with domestic expenditure:

$$Y = C$$

On the income side, the national income can be expressed as the sum of total outputs of all sectors as follows:

$$Y = PnYn + PtYt + PoYo$$

where Pn, Pt and Po are prices of non-tradables, tradables and oil goods respectively, while, Yn, Yt and Yo are outputs of non-tradables, tradables and oil respectively. On the other hand, the expenditure side includes spending in the non-tradable and tradable goods. Spending in oil will be excluded due to the assumption of confining oil for exports rather than for home consumption. This can be expressed as:

$$C = PnCn + PtCt$$

Where Cn and Ct represent the consumption of nontradable and tradable goods respectively.

A rise in oil price or production, under a fixed exchange rate, leads to an increase in oil export foreign exchange earnings, as transfers from abroad cause the national income to rise. If the extra income is saved or invested abroad, no structural adjustments in the economy are needed as long as the economy is experiencing equilibrium. Such an outcome can be attributed to the continuity of internal balances (so far as there is no change in non-traded goods` output) as well as in external balances (the surplus on the current account is matched by a deficit on the capital account). In other words, the income elasticity is equal to zero and the slope of the relative price remains unchanged. Practically, this choice cannot easily be adopted due to economic (development requirements) and social (sharing benefits of the oil windfall) needs. Alternatively, the extra income that resulted from the oil boom should be transmitted to the domestic economy partially or entirely. As mostly happens, the extra income spent domestically will be followed by structural adjustments in the domestic economy in order to accommodate a higher real income obtained. These adjustments can be observed through the role of spending and resource movement effects in the economy.

1-The Spending Effect of the Resource Boom

Initially, the pre-boom equilibrium condition in the economy is assumed. In addition, the market for non-traded goods clears instantly, where non-traded goods domestic output is required to be equal to the non-traded goods consumption. This equilibrium condition can be written as:

$$Yn\ (Pn/Pt) = Cn\ (Pn/Pt,\ Y)$$

where $\delta Yn/\delta Pn/Pt > 0$ and $\delta Cn/\delta Pn/Pt < 0$, $\delta Cn/\delta Y > 0$

Here, Pn/Pt represents the relative price of non-traded to traded goods. The output of non-traded goods depends positively on the relative price, while the demand for non-traded goods depends negatively on the relative price and positively on the real income measured in terms of tradables. Therefore, equilibrium in the commodity market is brought about by adjustment of the relative price of non-traded to traded goods. Hence, the relative price and thus the real exchange rate is a key variable in this economy.

Under a fixed exchange rate, the increment in income warranted by a higher price or production of a natural resource (such as oil) will cause domestic spending and thus aggregate demand to rise for both sectors. As a consequence, the short-run response to higher demand for non-traded goods has to be satisfied by an increase in its output. Otherwise, with a constant relative price, the domestic economy will experience a disequilibrium condition since the consumption of non-traded goods is greater than its production. To restore equilibrium, the excess demand will be dampened by an increase in the price of non-traded goods. As a corollary of a higher price of non-traded goods, an appreciation of exchange rate takes place. Such an outcome leads to an expansion in the non-traded goods sector. In the traded goods sector, it is the higher demand for tradables that brings about an increase in its output as the relative price remains unchanged. As might be expected to restore the balance in the economy, the higher relative price of non-traded goods will create an appreciation of exchange rate and make the domestic products more expensive than those produced abroad. As a result, imports rise and the output of traded goods shrink owing to the spending effect.

The implications of such changes for the patterns of output and relative price in the economy can be illustrated by using Salter's (1959) diagram. In Figure 4.2a, all traded goods' output (booming and non-booming traded sectors) is measured on the vertical axis, while the non-traded goods output is measured on the horizontal axis. Domestic resources are fully utilised along the production possibility curve PPC, denoted by TN. The domestic economy experiences equilibrium at point A, where: (i) producers maximise their profits by setting the marginal rate of the transformation curve equals to the slope of relative prices (Po). The relative price line (Po) shows at which the tradables and tradables can be exchanged; (ii) the utility maximisation requires that the slope of collective indifference curve (Uo) is equal to the slope of relative prices (Po). The income-expansion path, denoted by Do curve, shows the combination of tradables and non-tradables demanded as income increases. This curve is assumed to be positive due to the normality of all goods in the economy. In addition, it has a decreasing slope to denote the higher income elasticity of demand for non-traded than for traded goods (although some empirical studies reveal a small difference between the two elasticities (Morely, 1989). Hence, the economy, without oil price increases, enjoys equilibrium at point A, where the quantity demanded and produced for all composite goods are equal, denoted by 0No for non-traded and 0To for traded goods sectors. A rise in natural resource foreign exchange earnings, given the relative price, will shift the PPC vertically upwards from NT to NT1. The windfall is equivalent to the TT1 assuming that the output of non-traded goods in the short-run is unchanged. This is attributable to the fact that the natural resource, particularly the petroleum industry, is assumed not to use any domestic inputs (Neary and Wijnbergen, 1986).

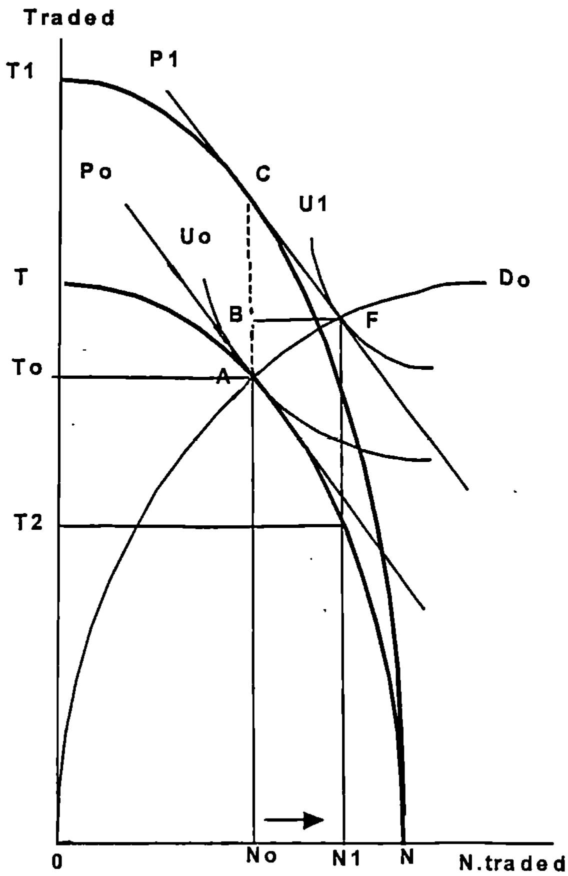


Figure 4.2 (a)

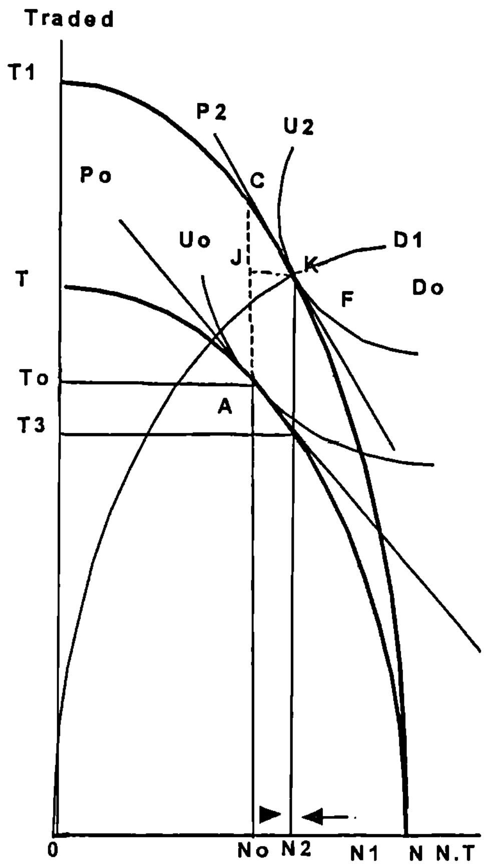


Figure 4.2 (b)

The Impact of the Spending Effect of a Boom on the Commodity Market

However, when oil revenues is spent partially or entirely in the domestic economy, the equilibrium point, assuming a fixed relative price of non-tradables versus tradables (Pn/Pt), moves from point A to point C.

Since the relative price is held constant and in turn the slope of the price line (P1) at point C, is equal to the slope of the relative price line (Po) at point A, the desired consumption is determined at point F, where the new indifference curve (U1) is tangent to the relative price (P1) and to the income-expansion path. Hence, the domestic economy at point C would be in a disequilibrium condition, because, at point F, there is an excess demand for non-traded goods, denoted by BF exceeding its production of 0No. Whereas the excess demand for tradables, denoted by AB, is an excess of its production at To (BC represents the surplus in the current account). Consequently, in traded goods sector, the excess demand for tradables is satisfied by increased imports since the price of tradables is determined exogenously and hence its price will not change. On the other hand, with respect to the fullemployment assumption, the excess demand for nontradables leads to raise its prices. This induces the relative price of non-traded to traded goods (Pn/Pt) to go up and thus the exchange rate of the domestic currency appreciates.

An increase of the Pn/Pt leads to three consequences: (a) on the supply side, an expansion in the production of nontradables due to the higher profitability obtained from a rise in its price; (b) on the demand side, a higher relative price dampens the demand for nontradables; (c) the slope of the Pn/Pt becomes steeper than it has been before. A degree of change in the slope depends mainly upon the strength of the income and substitution effects affecting the nontradable sector. Thereby, the impact of substitution and income effects is replaced by Corden and Neary (1986) by using a terminology of the spending and the resource movement effects. However, the rise in the Pn/Pt eliminates the excess demand for nontradables and excess supply of tradables. In Figure 4.2b, the initial income-expansion path, Do, moves upward to D1 (resulting from higher income), and the most profitable production blend moves clockwise along the upper PPC. The equilibrium condition is restored at a point located between F (excess demand for nontradables) and point C (excess supply of tradable by AB) and where the slope of relative price P2 is tangent to the upper PPC and intersects with the demand curve D1 at point K. The location of point K is determined by size of the income and substitution effects[4]. As shown in Figure 4.2b, the impact of the spending effect on the commodity market can identified by: (a) an expansion of the production of the nontradables from its initial position of No to N2 and (b) a deterioration of the domestic tradable production from To to T3. Hence, de-industrialisation (or increased in imports) results from the impact of the spending effect causing an appreciation of the real exchange rate rather than from resource movement within the economy.

Having discussed changes in the commodity market, one should depict what would happen in the labour market. In Figure 4.3, the vertical line measures the wage in terms of tradable goods, while the horizontal line SM measures the labour input for producing non-tradable and manufacturing goods` outputs. The output of non-traded goods is measured from the left to the right, whereas the manufacturing is measured from the right to left. The traded goods sector is divided into booming and manufacturing industries in order to examine the spending and

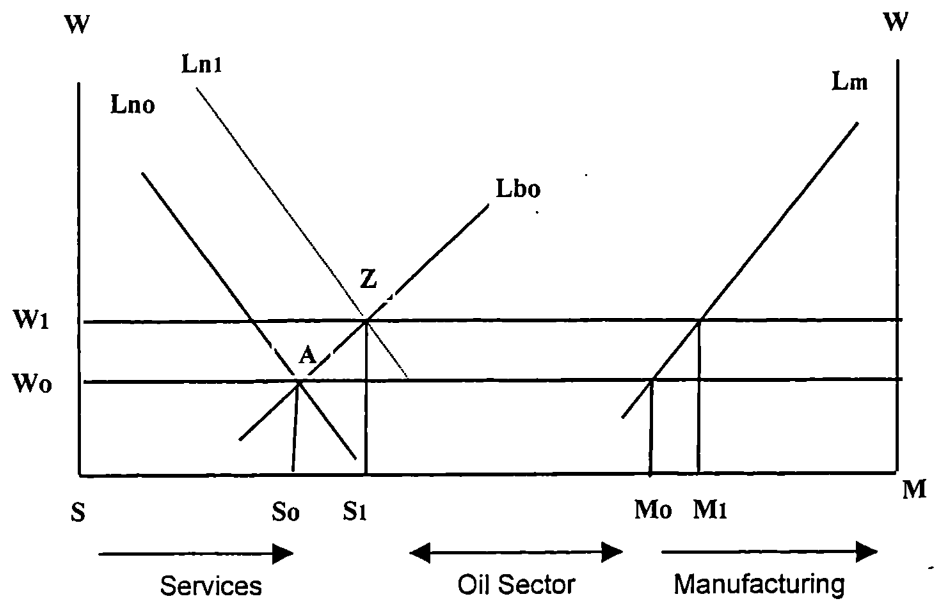


Figure 4.3 The Impact of Spending Effect on the Labour Market

resource movement effects resulting from a boom in the manufacturing industry. Lb, Lm and Ln represent the demand curves for booming, manufacturing and non-traded goods respectively. These are downward sloping curves depicting the inverse relationship between the wage and the demand for labour.

The equilibrium condition is at point A, where the output of non-traded and manufacturing sectors is SSo and MMo respectively. When a boom takes place, the price of non-traded goods rises and the demand for labour will increases causing the demand curve for labour to shift upwards to Ln1. The final equilibrium will be at point Z. As a result, the wage rises to W1, which reduces the manufacturing output from Mo to M1 and increases the output of non-traded goods from So to S1. This leads to a deterioration in the manufacturing sector at the expense of an expansion in the non-traded sector. This is owing to a real appreciation of real exchange rate resulting from the spending effect.

2-The Resource Movement Effect of the Resource Boom

The previous analysis deals with an enclave type of economy, which implies that no resource movement is involved as a result of a natural resource boom. To examine what would happen when the booming sector is expected not to be an enclave, it is worth noting that each sector is assumed to have its own single specific factor in additional to the labour, which is intersectorally mobile. With such specifications, the equilibrium condition of the spending effect can be rearranged in the commodity market as[5].

$$Yn = Yn\,(q/W) = Cn\,(q, Y) \quad \text{and} \quad Yt = Yt(W) = Ct\,(q, Y)$$

Where $\partial Yn/\partial(q/W) > 0$, $\partial Cn/\partial q < 0$, and $\partial Cn/\partial Y > 0$, $\partial Yt/\partial W < 0$, $\partial Ct/\partial q < 0$, and $\partial Ct//\partial Y > 0$

q represents the relative price of non-traded to traded goods, while W denotes the wage rate measured in terms of traded goods. In these two equations, there are two endogenous variables, q and W. In the non-traded goods sector, the output depends positively on the ratio of the relative price to the wage rate in terms of traded goods, whereas the traded goods output depends negatively on the wage rate. The equilibrium condition emerging from the labour-market clearing

$$L = Ln(q/W) + Lt\ (W) + Lb\ (W)$$

Here L is the total labour supply, which is assumed to be fixed, while Ln, Lt and Lb are the labour demand functions for non-traded, non-booming traded and booming sectors respectively.

A rise in the natural resource export price, at a constant wage, will raise the profitability in the booming sector and thus the demand for labour. Such an outcome induces a movement of labour out of both the traded and non-traded sectors towards the booming sector. This effect reveals two directions of labour mobility:

(a) The movement of labour out of non-booming traded goods towards the booming sector, resulting from a higher wages, will induce a contraction in the output of the traded goods sector. Corden (1984) terms this result "the direct de-industrialisation effect". However, the fall in the non-booming traded sector (manufacturing and agricultural sectors) does not involve any connection with the non-traded market. Moreover, that does not require any changes in the relative prices and the real exchange rate. Figure 4.4, shows that the equilibrium is at point A, where the wage is represented by Wo, and demand for labour traded and nontraded sectors are at points So and Mo. The increase in the wage of the booming sector tends to attract more labour from the traded to its own sector. This can be seen by shifting the labour demand curve for the booming sector upwards to Lb1, causing the wage to go up to W1 and in turn contracting the output of the manufacturing sector from MMo to MM1. However, the slope of Lb, Ln and Lm determines the quantity changes in their sectors.

(b) The movement of labour out of the non-traded goods sector towards the booming sector, at constant relative prices, will dampen its production from SSo to SS1, since the non-traded market is subject to the interaction between the domestic supply and demand.

Figure 4.4 shows that the non-traded production declined below its initial labour market equilibrium point at So. As resource movements cause a fall in non-traded supply below its balanced position, this requires that the nominal wage resulting from the excess demand will rise to W2, and so will the price of non-traded goods. The outcome is that the real wage (W/Pn) rises, attracting more labour to that sector causing Lno to shift upward to Ln1, and output will expand to S2, where the equilibrium point becomes at B, when the rise in nominal wage exceeds the increase in its own price. If otherwise, the production, will fall. However, the rise in the relative price of non-traded goods will lead to appreciation bringing about additional movement of labour out of traded goods to the non-traded goods sector. This deterioration in the production of traded goods causes further de-industrialisation, where M1 moves to M2. This is called "indirect industrialisation" (Corden, 1984, p. 361).

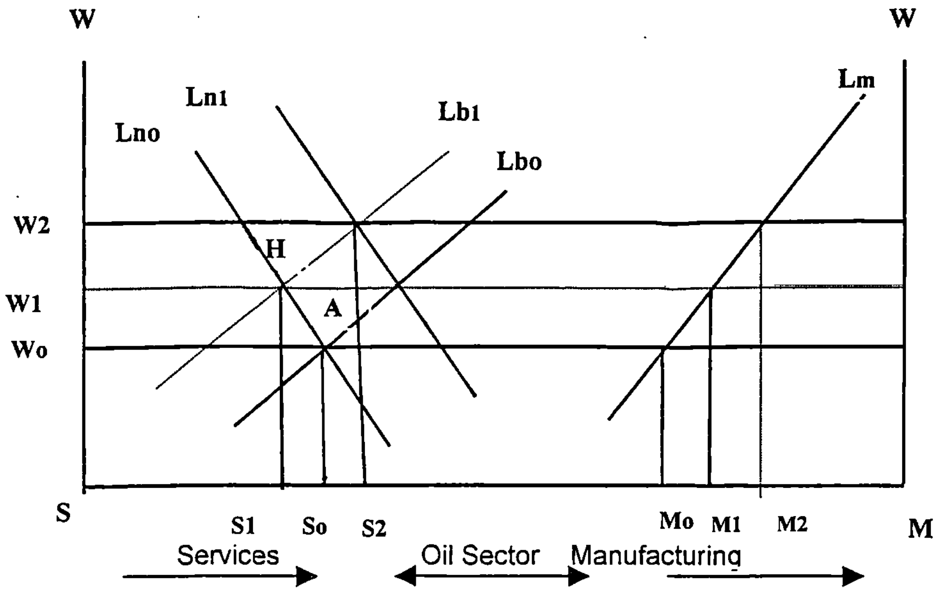


Figure 4.4 The Impact of the Resource Movement Effect on the Labour Market

Combining the spending and resource movement effects, one can observe from Figure 4.5 that relative price (Pn/Pt) denoted by q is measured on the vertical axis, while the horizontal axis represents the output of demand for non-traded goods measured from left to right, and the non-booming traded sector output is measured from right to left.

To sum up, the impact of the two effects resulting from the resource boom on the domestic economy will have the following consequences: (i) the two effects, resource movement and spending effects, tend to reduce the employment and output of non-booming traded sectors. The spending effect raises the relative price of non-traded goods and thus generates appreciation in the exchange rate. This is illustrated by the upward shifting of the demand curve for non-tradables from Dno to Dn1, leading to contraction of the manufacturing sector from Mo to M1, while the resource movement has two directions to affect the production of tradables. The expansion in the booming sector draws labour out of tradables and the rise in the

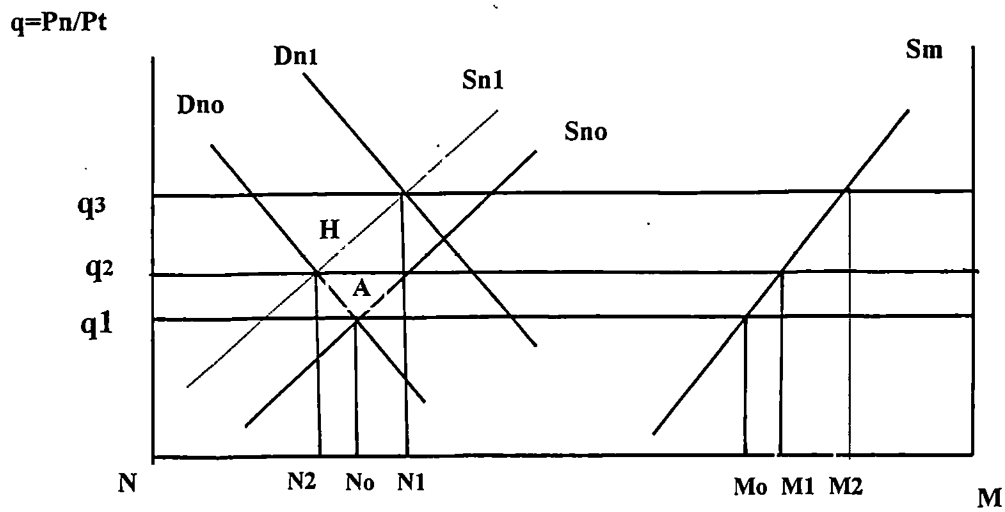


Figure 4.5 The Combined Spending and Resource Movement Effects

price of non-tradables results from a lack of supply due to labour movement to the booming sector; (ii) the resource movement tends to raise employment and output of the booming sector, while the spending effect tends to do the reverse; (iii) the two effects implication on the non-traded goods, however, have opposite impacts. The spending effect raises the output of non-traded goods from No to N1 (as Pn/Pt rises), while the resource movement tends to lower it from No to N2 (as labour moves out to the booming sector). The net effect depends on which of the two effects are stronger. If the compensated own-price and income elasticity of demand is stronger than the resource movement impact, the output of non-traded goods expands. If otherwise, the production will shrink.

With regard to oil as a capital-intensive sector, which employs a negligible fraction of labour, this implies that a concentration will be mainly on the spending effect only. Consequently, the key variable in the domestic economy will be the mechanism of the relative prices of the non-traded to the traded goods sector.

Assuming the relative price adjusts to clear the non-traded market, the relative price can be written as:

$$Pn = Pn\ (W, Pt; OR)$$

where $\partial Pn/\partial W$, $\partial Pn/\partial Pt$ and $\partial Pn/\partial OR > 0$

OR represents oil revenues. The increase in the money wage (W), given the price of traded goods, will generate an excess demand for non-traded goods. However, the increase in the demand for labour, which raises the money wage, will in turn affect the relative price positively. On the other hand, higher oil revenues raise the money supply as well as the expenditures in non-traded goods. This will affect the relative price positively. Moreover, the output of traded goods can be written as follows:

$$Yt = Yt\ (W, Pt; OR)$$

Where $\partial Yt/\partial W < 0$, $\partial Yt/\partial Pt > 0$, and $\partial Yt/\partial OR < 0$

The increase in the money wage is expected, *ceteris paribus*, to lower the demand for labour resulting from a reduction in the real output of tradables. An increase in the price of traded goods has a negative effect on the output of the traded sector. Assuming there is no government subsidy, oil revenues have a negative impact on the traded sector. As expenditures rise, the relative price of non-traded goods, and thus the marginal revenue product in the non-traded sector, stimulates the labour migration from the traded sector to the non-traded sector. With the absence of government subsidy, the firms cannot pay higher wages, which raise its production cost since its price is linked with the international market rather than with the domestic market. Finally, the output of the non-traded sector can be written as follows:

$$Yn = Yn\ (W/Pi,\ Pn;\ OR)$$

Where W/Pi represents the real wage with regard to the price of i sector.

$$\partial Yn/\partial W/Pi > \text{or} < 0, \quad \partial Yn/\partial Pn > 0, \quad \text{and} \quad \partial Yn/\partial OR > 0$$

The output of non-traded goods varies regarding how the real wage is measured. If the wage is deflated by the price of traded goods, the increase in the nominal wage, given the price of traded goods, will reduce the output of non-traded goods as the real wage increases. However, if the wage is measured in terms of non-traded goods price, the output may rise as the relative price increases. This outcome is due to a decline in real wage (W/Pn as Pn rises), which stimulates the production of non-traded goods and thus increases the labour employed in this sector. Regarding the price of non-traded goods and oil revenues, both variables affect the production of non-traded goods positively. Consequently, the spending effect causes the output of the non-traded goods sector to expand (as Pn rises), while both effects are undetermined as explained earlier.

4.4- The Theoretical Impact of a Natural Resource Slump

Almost all major oil-exporting countries have two major features in common. First, their oil and non-oil incomes are taxed at different rates. Second, the change in their oil revenues has an immediate impact on the balance of payments current account (Persaran, 1984, p.254). Hence, it is to be expected that a decline in commodity prices will have its impact, to different degrees, on an economy, particularly on countries with the least diversified production structure. This is due to the fact that these countries depend on primary commodities for the bulk of exports earnings. In oil-exporting countries such as Saudi Arabia the decline of oil export revenues has affected the domestic economy severely. The negative effects of the oil price collapse are strong and widespread. Therefore, the decline in oil receipts has resulted in austerity budgets, which in turn has had a substantial negative impact on government spending. Allocations for all the major sectors have been cut sharply, with the largest reduction observed for the infrastructure and municipal services (Sid-Ahmed, 1990, p.31). On the other hand, the drastic decline in oil prices may have some positive implications for the economy, with less concentration on the oil and non-tradable sectors.

Taking into consideration all assumptions implemented above in the resource boom analysis, and under a fixed exchange rate, a decline in the natural resource (denoted oil) price or production causes a fall in foreign exchange yields obtained as transfer from abroad. Therefore, a downtrend of national will be accompanied by a decline in oil revenues. If borrowing from abroad and/or drawing out some of their international reserves are chosen in order to compensate for the shortfall in oil earnings, no adjustments are needed since the economy maintains an internal and external economic balance. Internal balance implies that there are no changes in the non-traded goods market (the price level remains unchanged). External balance is achieved as the deficit in the current account is matched by a surplus in the capital account. Therefore, the income elasticity is zero and the slope of the new relative price (P1) remains unchanged from the old one (Po). In contrast, if the deterioration in oil revenues is allowed to transmit to the domestic economy, the economy faces structural changes causing a disequilibrium condition. Such an outcome requires adjustments to be implemented in order to obtain equilibrium. These adjustments resulting from changes in the relative prices can be put into practice via the role of spending and resource movement effects on the domestic economy.

1- The Spending Effect of the Natural Resource Slump

The mechanism of the relative price of non-traded goods has a prominent role in the economy that experiences fluctuations in its external sector (oil). Given the assumption that the market for non-traded goods clears instantly, the pre-slump equilibrium condition requires that non-traded supply must be equal to its demand. This result can be written as:

$$Yn\ (q) = Cn\ (q,Y)$$

Where $\delta Yn/\delta q > 0$, $\delta Cn/\delta\ q < 0$, and $\delta Cn/\delta Y > 0$

While, in the traded goods' market $Yt\ (q) = Ct\ (q,Y)$

Where $\delta Yt/\delta q < 0$, $\delta Ct/\delta\ q < 0$, and $\delta Ct/\delta Y > 0$

These two equations can be rearranged as follows:

$$\hat{Y}n = \lambda\ q \qquad \hat{C}n = -\lambda q + \alpha\hat{Y}$$

$$\hat{Y}t = -\lambda\ q \qquad \hat{C}t = -\lambda q + \alpha\hat{Y}$$

Where (^) denotes proportional rate of change of variable i, such as $\hat{Y}n = dy/y$[6], while λ represents the relative price elasticity. The output of non-traded goods depends positively on the relative price, while demand for non-traded goods depends on the relative price negatively and positively on the real income measured in term of tradables.

The downtrend of oil revenues under a fixed rate, affects the national income by reducing expenditures on the domestic economy. As a result, the demand for non-traded goods declines according to the effect of the income elasticity of demand. If the relative price remains unchanged, the lack of demand will generate disequilibrium in the economy so far as the output of non-traded goods exceeds the counterpart demand. To come up with equilibrium, the excess supply will be retrenched by a decline in the relative price of non-traded goods. Accordingly, a depreciation of the real exchange rate exists accompanied by a contraction in the output of the non-traded goods sector. However, the output of the traded goods sector responds positively by raising its production since the domestic products become cheaper relative to those imported from abroad (the country's position is more competitive). One can conclude that the spending effect, resulting from the deterioration in oil revenues, will reallocate the domestic resources through expansion in the traded goods output at the expense of the non-traded goods output. The magnitude of the spending effect depends on the income elasticity for demand for non-traded goods and on the relative price elasticity too.

By using the preceding Salter's diagram as well as its notations, Figure 4.6a demonstrates that the decline in foreign exchange earnings, treated as transfer, shifts the upper PPC vertically downward from NT to NT1. The shortfall in earnings is equivalent to TT1. The equilibrium point remains at point A so long as the slope of the relative price (P1) is equal to that of Po. Furthermore, the new equilibrium condition can be achieved at point C, if and only if the decline in foreign exchange receipts are compensated either by borrowing from abroad and/or withdrawing from the country's foreign reserves. In such a case, the economy experiences an

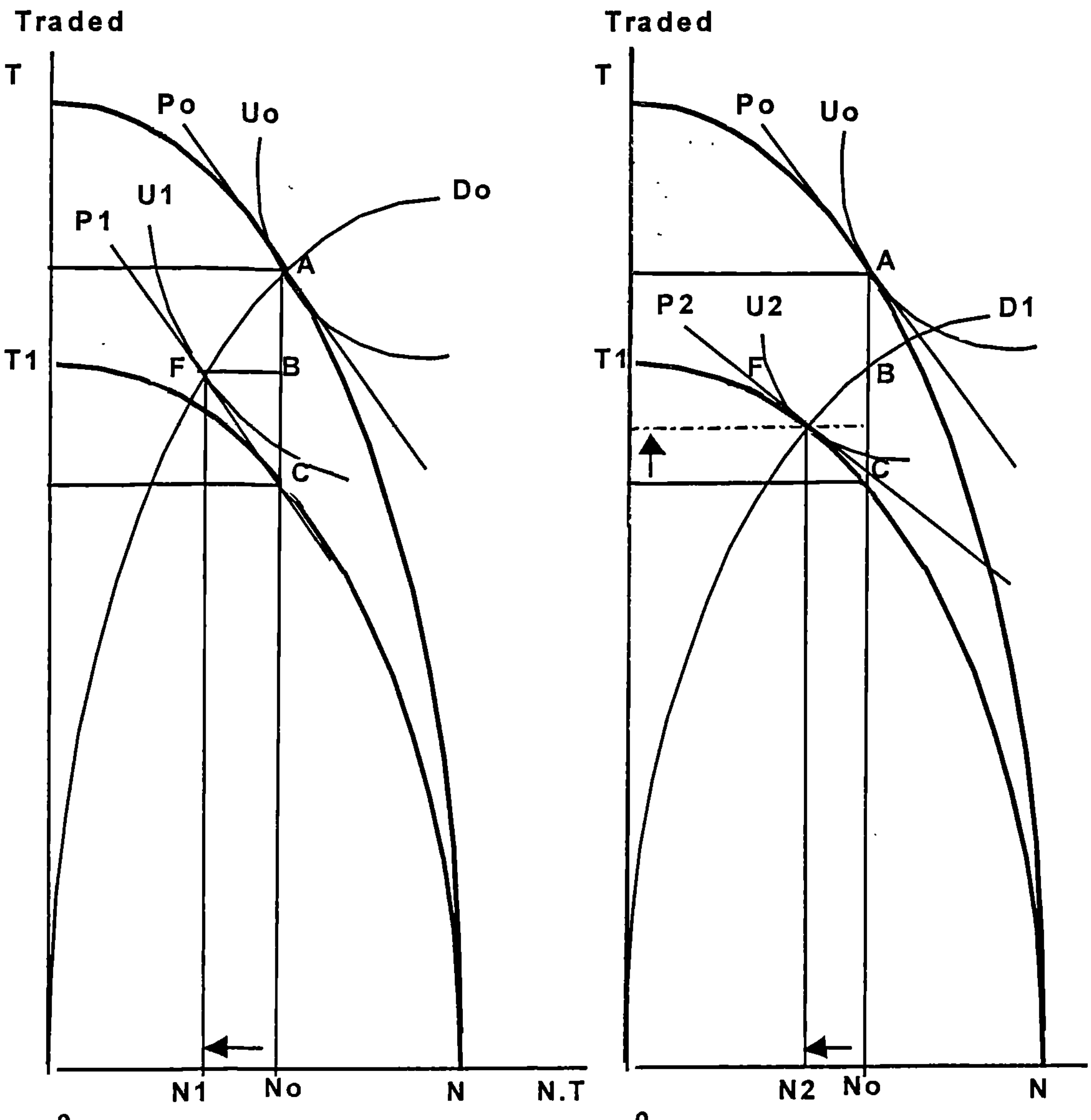


Figure 4.6a **Figure 4.6b**

The Impact of the Spending Effect of the Slump on the Commodity Market

internal balance (as output of non-tradable remains unchanged) as well as having an external balance (the deficit on the current account is matched by a surplus on the capital account). In practice, a drop in the country's revenues (obtained as rent), transmitted into the domestic economy. The outcome expected is the economy would experience a disequilibrium. Accordingly, three consequences emerge:

(i) There is no change in the production of non-traded goods owing to the assumption that the oil sector does not use any inputs from the other sectors in the economy; (ii) the desired demand for non-tradable sector lags behind its production by BF; (iii) an excess supply of non-oil-traded goods by BC (AB represents a deficit on the current account). It is worth mentioning that price of tradables are not subject to any changes since it is determined by world market, However, the emergence of an unbalanced economy appears in Figure 4.6a where the new relative price (P1) intersects the income-expansion path (Do) at point F. To restore equilibrium, a decline in the price of non-traded goods is necessary in order to achieve balanced economy by (a) reducing the profitability of non-tradables, which induces an elimination of the excess supply of non-traded goods and; (b) a depreciating of the exchange rate of the local currency makes the exportable goods cheaper and importable goods more expensive than those of domestic ones.

If the country is not export-oriented, the demand for importable goods decline as their prices go up; (c) the slope of the relative price of nontradables to tradables (P2) declines to become flatter than the slope of the relative price (P1). Changes of P2 depends upon the strength degree of the spending effect (income effect). As a result of the relative price mechanism resulting from spending effect, Figure 4.6b shows the income-expansion path moves downward from Do to D1 and the most profitable production point C move counter-clockwise along lower PPC, while the most utilised consumption point F moves clockwise until all becoming tangent to the lower PPC at point K. This point is located between F and C and its location determined by role of the elasticities of demand and supply of non-traded goods. However, the restoration of equilibrium causes reallocation of resources through a contraction of the non-traded production from No to N1 and an expansion of the traded good production from T2 to T3. This analysis emphasises on the impact of spending effect on the commodity market during the slump period, but to get a clear picture, one should point out the effect of slump through spending effect on the labour market as well.

Figure 4.6b shows the pre-slump equilibrium condition in the labour market is achieved at point A. The wage is represented by Wo, and S So and M Mo indicate the labour employed in non-tradables and tradable respectively. The deterioration in income takes place and the spending in both goods, with a fixed labour supply, declines. Since the output of non-traded goods remains unchanged, the output of tradables falls. While the demand for the non-traded goods sector declines, it rises for tradables and while the price of non-tradables falls, the price of tradables increases.

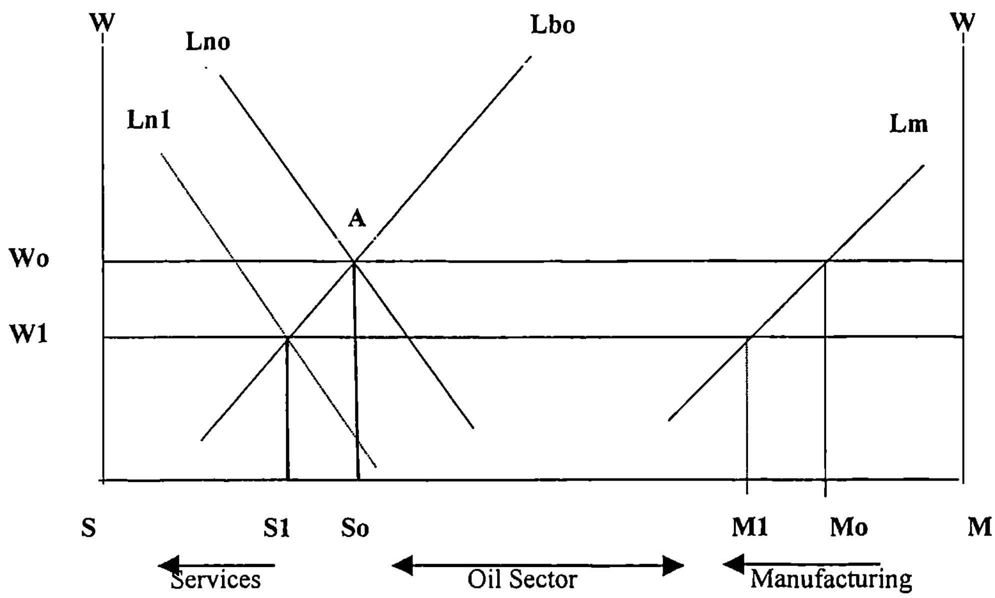


Figure 4.7 The Impact of Spending in the Slump on the Labour Market

The fall in the relative price leads to a depreciation of the exchange rate, which will cause the labour demand curve for non-tradables Ln to shift downward to Ln1. The rate of the wage declines to W1 and the output of non-tradables, resulting from the decline in labour employed, shifts from So to S1. In terms of tradables, their output rises from Mo to M1. Summing up, in the labour market, a depreciation of the exchange rate leads to an expansion of the traded goods sector and contraction of the non-traded goods sector.

2- The Resource Movement of the Natural Resource Slump

Most theoretical analysis seems to treat the oil sector as though there is no participation of the factors of productions in the other sectors of the economy. This might be acceptable due to the fact that oil is a highly capital-intensive advanced technology, and highly skilled-labour sector. Nevertheless, one can examine what would happen when the oil sector shares some factors of production with other sectors in the domestic economy. Therefore, it is assumed again that each sector has its own specific factor in addition to labour and that labour is expected to move freely between all sectors.

With these specifications, the equilibrium condition of the spending effect can be rearranged in the commodity market as:

$$Yn = Yn\,(q/W) = Cn\,(q, Y) \qquad \text{(non-traded market)}$$

where $\partial Yn/\partial(q/W) > 0$, $\partial Cn/\partial q < 0$, and $\partial Cn/\partial Y > 0$

$$Yt = Yt(W) = Ct\,(q, Y) \qquad \text{(traded market)}$$

where $\partial Yt/\partial W < 0$, $\partial Ct/\partial q < 0$ and $\partial Ct//\partial Y > 0$

In these equations, there are two endogenous variables, q and W. In the non-traded goods sector, the output depends positively on the ratio of the relative price to the wage rate in terms of traded goods, whereas the traded goods output depends negatively on the wage rate. The additional equilibrium condition emerging from the labour-market clearing is as follows:

$$L = Ln(q/W) + Lt\ (W) + Lb\ (W)$$

Here L is the total labour supply, which is assumed to be fixed, while Ln, Lt, and Lb are the labour demand functions for the non-traded, the non-booming traded, and the booming sectors respectively. A fall in oil prices and/or production, at a constant wage rate, will reduce the oil sector's profitability and thus the demand for labour as the wage rate declines. Consequently, labour moves out of the oil sector towards the traded and non-traded sectors affecting their outputs in terms of labour employment and wage rate. First, in the traded sector, the labour movement into the traded goods sector induces an expansion in output of this sector. This causes what can be called a "re-industrialisation" or "induced-industrialisation". However, the rise in the traded goods sector is attributable to the increased labour employed rather than any involvement of the non-traded sector via its relative price and depreciation of the exchange rate. Figure 4.8 illustrates how the oil price decline affects the demand for labour exchange rate. Figure 4.8 illustrates how the oil price decline affects the demand for labour in the oil sector and hence its curve shifts downward from Lbo to Lb1. The distance M1Mo indicates such expansion in the traded goods sector. Second, the movement of labour out of the oil sector towards the non-traded sector, at a constant wage rate, causes an increase in the output of the non-traded sector from So to S2. Figure 4.8 shows that there is an excess supply since the point S2 lies to the right of the initial point of equilibrium (So).

This implies that the decline in the price of non-traded goods is expected as well as a decline in the production. The real wage measured in terms of non-

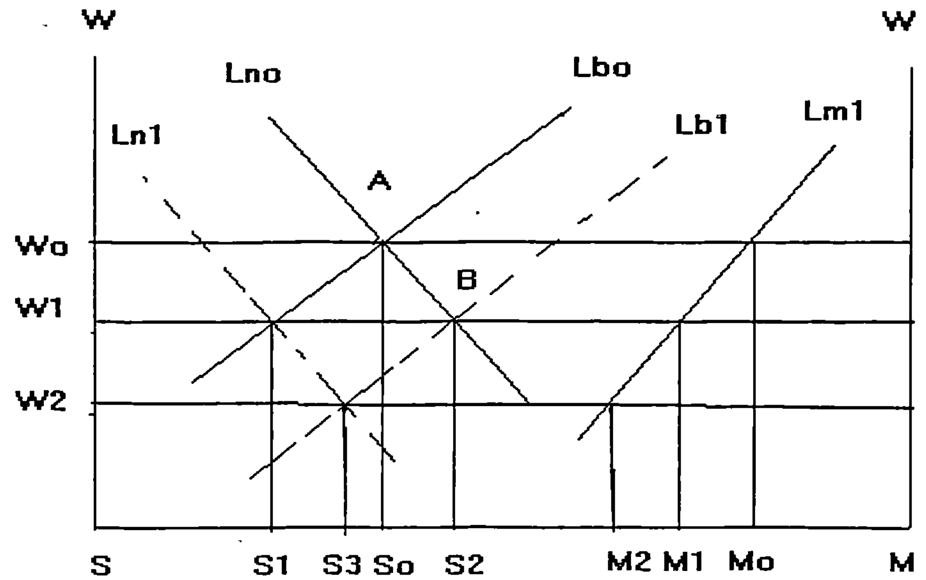


Figure 4.8 The Impact of Resource Movement on the Oil Slump

traded sector causing an expansion of traded goods' output from M1 to M2. This is due to the downturn of the relative price of non-traded goods, which, brings about the depreciation in the exchange rate that leads the domestic products to be cheaper than those from abroad. Consequently, additional movement of labour to the traded goods sector generates what is so called the "indirect re-industrialisation". On the other hand, the output of non-traded goods can expand or contract. If the decline in the relative price is larger than the nominal wage, this will cause a decline in his sector as at (S3), and vice versa.

Combining the spending and resource movement effects, it can be observed from Figure 4.9 that the impact of the two effects resulting from the oil slump on the domestic economy will have the following consequences: (i) the two effects, resource movement and spending effects, tend to raise the employment and output of non-booming traded sectors. The spending effect reduces the relative price of non-traded goods and thus generates a depreciation in the exchange rate.

This is illustrated by the shifting of the demand curve for non-tradables downward from Do to D1, leading to an expansion of the manufacturing sector from Mo to M1, while the resource movement operates through the decline in the oil sector, which draws labour out of the oil sector toward the traded sector causing an increase in its production; (ii) the resource movement tends to reduce the employment and output of the oil sector (due to labour movement), while the spending effect tends to do the reverse (due to depreciation);(iii) the two effects on non-traded goods, however, have opposite impacts. The spending effect reduces the output of non-traded goods from No to N1 (as Pn/Pt declines), while the resource movement tends to raise it from No to N2 (as labour move from the oil sector). The net effect depends on which of the two effects are stronger. If the compensated own-price and income elasticity of demand is stronger than the resource movement impact, the output of non-traded goods deteriorates below its initial point. However, if the resource movement is stronger than the spending effect, the output may rise above the initial point. It is worth mentioning that the relative price in both effects causes an expansion of traded goods from Mo to M1 and M2. Structural changes in the domestic economy resulting from oil revenue fluctuations entail that policies need to be adopted to reallocate domestic resources.

Having discussed the theoretical implication of the natural resource fluctuations of the domestic economy, it is appropriate to focus on the impact of the external shock on the Saudi Arabian economy. Hence, the theoretical model of Corden (1984) has to be amended by taking into account the local circumstances of Saudi Arabia.

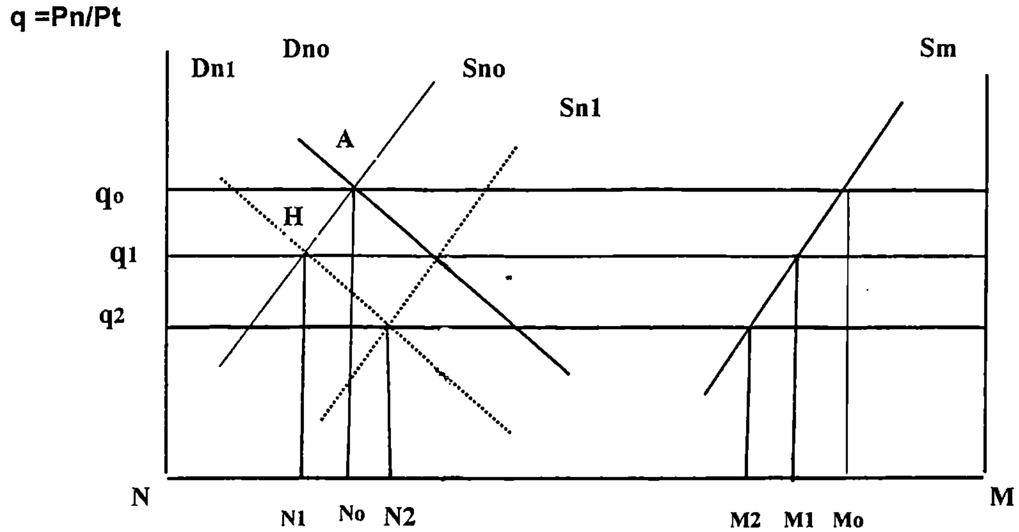


Figure 4.9 The Impact of the Two Combining Effects on the Oil Slump

4.5- Limitations of the Theoretical Model

Corden and Neary's three-sector analysis is a helpful theoretical framework for increasing our understanding of the adverse side-effects of oil windfalls in developing countries. However, there are a number of factors, which make its application in the situation of Saudi Arabia less appropriate.

Firstly, the model rests on the assumption that the economy is a full employment economy while in Saudi Arabia, there is substantial underemployment. Prior to the influx of oil revenues, many Saudis were engaged in low-productivity subsistence agriculture and/or were under-employed urban job seekers. As a result, one might expect that those workers would have been absorbed into the traded and non-traded sectors, moderating the impact of spending and resource movement effects. The movement of underdeveloped labour to increased supply industries might dampen the relative price of non-traded goods and thus the appreciation in the real exchange rate.

Secondly and more importantly, the model assumed a fixed labour supply. This assumption in the case of Saudi Arabia has been relaxed due to the government policy adopted after the oil wealth gains. This policy encouraged recruitment of a large number of foreign workers to compensate for the shortage in skilled labour needed for expanding the economy. In 1974, the non-Saudis were about 0.791 million compared to the Saudis of about 7.0 million at that time. The last population survey, calculated in 1993, indicated a total Saudi Arabian population of 16.9 million, with non-Saudis representing around 4.6 million (27.4 percent) of the total population. The growth rate of the Saudi and non-Saudi population over the 19-year period was 98 percent and 486.3 percent respectively[7]. The impact of the dramatic influx of expatriates is reflected in both the outputs of traded and non-traded goods. With the supply of traded goods, the infusion of foreign labour helped to mitigate the resource movement effect and led to little loss in traded goods production. On the other hand, the increases in the price of non-traded goods resulting from the spending effect attracted more foreign labour to this sector. Therefore, the production of the non-traded goods sector may increase and is accompanied by moderating price increases so long as wages are concerned. The appreciation in real exchange might be limited as a result of hindering the resource movement effect. In additional to that, the labour immigrants, to some extent, remit income home or consume imported goods. This leads to a dampening in spending effect and a reduction in the real exchange rate appreciation. Additionally, when an oil revenues' slump exists, the employment of expatriates would be reduced as the demand for non-traded goods declines and some can move out into traded goods. This would lead to a slight change in the labour cost of traded goods, but prices would not be expected to go up as Corden's model predicts, while the demand for non-traded goods can smoothly rise as a result of the reduction in the non-tradable production. The resource movement and spending effect could be moderated and the real exchange rate might not depreciate as strongly as expected.

Thirdly, the model assumed the existence of de-industrialisation emerging from new oil discoveries (equivalent to an increase in oil prices). In the case of the Saudi Arabian economy prior to 1973, the manufacturing sector was limited and less likely to be adversely affected than the agricultural sector. De-agriculuralisation, rather than de-industrialisation, would have been more likely to happen as the Dutch disease literature predicts. Some economists (such as Timmer, 1982, and Roemer, 1986) define de-industrialisation as slower-than-normal growth or one where the growth rate lags behind the service sector, rather than absolute decline. Both of the former definitions seem to be more appropriate to the case of the Saudi Arabian economy. This outcome emerged from the fact that the number of Saudi Arabian agricultural villages declined sharply from 7,805 in 1970 to 3,084 by 1975. This is reflected in a decline in the contribution of the Saudis engaged in the agricultural sector, declining from 40 percent to 28 percent of output from 1970 to 1975 (Looney, 1990). Furthermore, Table 4.2 demonstrates that the growth rate in the output of the actual agricultural sector in the first five-year development plan was 3.6 percent, which was slightly below the targeted rate of 4.6 percent. This implies that de-agriculuralisation existed at least till the mid-1970s. On the other hand, the following three development plans led to a rise in the agricultural production exceeding its planned targets, due to the introduction of subsidies starting from the third development plan. In terms of the manufacturing sector, the actual growth rates usually lagged behind the target growth except in the second development plan. Nevertheless, the growth rate of the manufacturing sector was expanding to such a degree as to be inconsistent with Corden and Neary's theoretical framework.

Fourthly, the model falls short of formulating a comprehensive theoretical framework for oil-exporting developing countries with respect to the role of the government. The model invariably ignored the role of the government and its control over the oil sector revenues. Moreover, the short-term financial repercussions of the changes in oil income, operating via the government budget constraints, were also neglected. This assumption is inappropriate for Saudi Arabia in the sense that the private sector was not as developed in terms of assets and experience as in developed countries. Therefore, it is vital to incorporate into the model the involvement and expansion of the public sector's activities in the Saudi Arabian economy. The rise in the scope of the government intervention over time has been due to its need to control the economy after the unification of the country in the 1930s. Historically, the private sector has been small and inexperienced one and business has been unable and unwilling to undertake large-scale investments. For example, the government took on the responsibility to carry out major projects such as communication, transport, construction and the countrywide road network[8]. The participation of the public sector via the budgetary expenditure is the most distinguishing feature of the Saudi Arabian economy. Therefore, government spending is a key indicator of the impact of oil revenue changes. In addition, the government has been the major source of the increased private sector liquidity. In Looney's (1990) analysis of the gross liquidity pumped into the economy in the late 1970s and early 1980s, around 94 percent of the private sector cash flows came from the government, and only 6 percent from the commercial bank credit.

Table 4.2 Annual Average Targets and Actual Real Growth Rates Under the Development Plans

Non-oil Sectors	First Development Plan (1970-74)		Second Development Plan (1975-79)		Third Development Plan (1980-84)		Fourth Development Plan (1985-89)		Fifth Development Plan (1990-94)	
	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Producing Sectors										
Agriculture	4.6	3.6	4.0	7.0	5.4	8.7	6.0	13.8	7.0	3.1
Manufacturing	14.0	11.4	14.0	15.4	18.8	14.1	10.5	-4.6	7.5	4.4
Utilities	13.2	10.9	15.0	22.3	29.5	24.0	5.0	5.7	6.9	4.5
Construction	10.4	18.6	15.0	16.4	-2.5	-1.4	-2.8	-6.7	3.8	0.0
Service Sectors										
Trade	12.8	13.9	15.0	22.8	8.4	8.8	2.5	-1.5	3.0	1.3
Transport	12.9	17.0	15.0	19.4	12.9	7.1	5.0	-1.9	3.2	1.6
Finance	11.0	8.2	9.7	14.1	7.3	13.1	9.0	-4.8	5.7	1.8
Other Services	10.0	7.1	14.0	11.8	3.0	7.9	3.5	0.5	1.7	0.7
Government		7.8	12.9	6.5	7.2	5.8	0.0	1.5	0.8	2.8

Source: SAMA, Annual Report, 1998.

As a result, government domestic spending exercises a dominant influence on the money supply. Because of the strong link between government spending and the money supply, the role of monetary policy has been limited and major changes in monetary expansion have been brought about through the regulation of government spending.

Consequently, government spending, and in turn the money supply, is expected to have a strong impact on changes in the relative price of non-traded to traded goods, the real exchange rate and reallocation of domestic resources. As a corollary, the model developed for the Saudi Arabian economy has to include the two independent variables of government expenditure and money supply in order to capture the impact of the spending effect on the national economy.

4.5.1 The Model

The significant changes in the Saudi Arabian oil revenues during the last three decades and their implications for the domestic economy suggest the need to examine the impact of such changes on the price levels (broken down into traded and non-traded prices), the real exchange rate, and outputs of the traded and non-traded goods sectors.

A number of studies have been conducted to analyse the economic implications of unanticipated changes (particularly a rise in commodity prices) for an economy. Some of these studies such as Forsyth and Kay (1980), Cordon (1981) Bruno and Sachs (1983) and Neary and Wijnbergen (1986) focused mainly on the economic sectoral effects of North Sea Oil on the British economy, while Eastwood and Venables (1982), Buiter and Purvis (1982), Fender (1985) and Chalterji and Price (1988) among others emphasised on the macroeconomic effects on the UK economy. In addition to the U.K., the oil revenue effects on the economies of Norway, the Netherlands, and Canada have been subjected to analysis and discussion in Barker and Brailovsky (1981).

Despite the important contribution of the preceding studies, these studies are highly related to the structure of the industrial economies rather than to oil-exporting developing countries. The economic characteristics of the former differ from those of the latter in terms of floating exchange rate, the role of the private sector, international capital mobility, and importantly, fullemployment. Furthermore, they ignore the financial repercussions of oil income that operate through the government budget constraint and the asset position of the private sector (Pesaran, 1984, P. 253). Those assumptions might be inappropriate, to a large extent, for the developing oil-exporting countries in general and for Saudi Arabia in particular.

On the other hand, studies such as those of Warr (1986), Woo et al. (1994) and Morley (1989) among others, conducted in relation to the economic implication of a commodity price increase in oil-exporting developing countries have identified some features, which differ from those of some oil-exporting countries. The most important distinction is the existence of thriving manufacturing and agricultural sectors prior to the emergence of oil as the dominant activity. Examples of these countries are Mexico, Iran, Indonesia, Algeria, and Nigeria. However, in Saudi Arabia, the manufacturing sector, in particular, was limited and in its early stages, so that de-industrialisation in its broad sense was not as negatively affected as economic theory predicts. However, de-agriculturalisation and slower growth rate of the manufacturing sector might appear as a result of influx of oil revenues.

Consequently, to describe the reaction that the economy may have to a rise or fall in the international oil price, a simple model will be developed to analyse the export boom and bust phenomenon.

4.5.2 Basic Structure

The model is a simple version of the dependent open economy model of Salter (1959) and Swan (1960). Its derivation is based on the Corden (1984) model. This model probably is one of the simplest that can be used to cope with the adverse side-effects on the Saudi Arabian economy of the dramatic changes in oil revenue in the boom and slump periods, taking into account the structure and sources of growth of the Saudi Arabian rentier economy. First, it is important to consider what is meant by a rentier economy, rentier economy is defined as an economy that receives on a regular basis substantial amounts of external rents. External rents are in turn defined as a stream income which is not required to reward capital and labour or to pay for intermediate inputs (Daniel, 1990, p. 2), in the sense that this rent (Ricardian rent) is recognised when the price of oil is independent of the cost of exploiting this resource. The lack of any meaningful relationship between the level of oil production and the local economy can be seen from the negligible effect of oil extraction cost on determining its price (a variant of the Hottling rule that takes oil pricing into account). In the case of Saudi Arabia, the oil cost at its peak capacity is of an average of 2.5 dollars per a barrel (Middle East Oil and Gas, 1995. P. 50). This implies that the oil revenues received by the government have very little to do with the production processes of the domestic economy, in the sense that the inputs from the local economy, to a large extent, are insignificant.

Accordingly, the oil sector as a whole and in turn oil price and revenues have to be specified due to their roles as major variables in the economy. The essential characteristics of the oil sector are distinguished as follows: (i) the oil price is determined in the international market rather than in domestic economic policies (no power in the market); (ii) the oil is priced and sold in U.S. dollars; (iii) the extraction cost is a negligible portion with regard to its costs, therefore, the depletion cost is neglected in the model; (iv) the oil sector is completely owned by the government and hence all the oil earnings accrue directly to it rather than to the factors of production. Consequently, the government plays a crucial role in maintaining and controlling the economy.

The model assumes that the Saudi Arabian economy is a three-sector economy: oil, non-oil traded goods, and non-traded goods sectors. Each class of goods is taken to be a composite so that the relative prices of goods within each group are invariant. Traded goods are assumed to be perfect substitutes in the sense that there are no trade barriers. The aggregation chosen here places emphasis on the relative price of non-traded in terms of traded goods. The price of traded goods is determined exogenously in the international market as long as the economy is assumed to be open and small, whereas, the price of non-traded goods is determined indogenously through the interaction between the domestic supply and demand. Furthermore, all goods in the three sectors are assumed to be normal goods and produced according to the neo-classical production function with two factors of production: labour and capital. This can be expressed as:

$$Y = Y(L, K)$$

Where Y, L and K represent the total output, labour, and capital respectively. However, each sector in the economy is restricted by a factor specific to that sector in addition to the labour. The labour factor can move freely between traded and non-traded sectors. Since the boom or slump is assumed to be sizeable and temporary, the analysis is considered to be of a short-run nature and cannot be changed during the time span in which the analysis holds. Thus, every sector has a predetermined fixed quantity of capital.

As mentioned earlier, the oil revenues will be treated as an 'external renter'; the demand-side of the economy will be taken into account through the impact of the spending effect rather than the supply-side of resource movement involvement. The model used will be applied to examine the effects of oil revenue changes during two separate periods within the entire sample from 1965 to 1997. To achieve this aim, one can use this unified model in order to test the impact of the oil export boom (henceforth, stage one) from 1965 till the end of the boom in 1982. In addition to that, the impact of the oil export slump (stage two) will be tested as well covering the period from 1983 to 1997.

4.6 The Macroeconomic Effects of the External Resource Change

Oil revenue fluctuations are commonly viewed as an important factor behind the variations in resource movements in an open economy. The enormous growth of oil revenues resulting from the 1973-74 and 1979-80 energy shocks led to an enormity of domestic expenditure. The predicted consequences of such an increase can be specified in terms of its changes in macroeconomic variables: first, the relative price of non-traded versus traded goods went up causing the exchange rate to appreciate; second, an appreciation in the exchange rate called for a reduction in the country's competitiveness in the world market; third, the production structure shifted in favour of non-traded goods.

On the other hand, the collapse of oil prices occurring since 1982 has created a decline in the domestic expenditure. The outcomes resulting from such a reduction were, as expected to widespread: first, a fall in the relative prices brought about a depreciation in the exchange rate; second, a lower exchange rate raised the country's competitiveness in the international market; and third, the production structure turned in favour of the traded goods.

For more exposition of the macroeconomic effects, it is necessary to highlight the role of the oil revenues changes in determining the relative price of non-traded in term of traded goods, the real exchange rate, and the reallocation of resources which has taken place in the domestic economy.

4.6.1- The relative price

A temporary (unanticipated) rise in oil revenues causes the economy to run a trade surplus. This surplus must be matched by an excess demand for non-traded goods. Since the market for non-traded goods is assumed to clear instantaneously, the price of tradables must rise relative to the exogenous price of traded goods. A rise in the price of non-tradables relative to tradables reduces the output of traded goods and increases the output of non-traded goods, which corresponds to a movement along the economy's PPC. A rise in the relative price will also increase domestic consumption of tradables and discourage consumption in the non-traded goods sector. Lower production and greater consumption of traded goods will reduce the traded surplus, while larger output and reduced consumption of non-traded goods will eliminate the excess demand for these goods.

On the other hand, the reverse situation prevails when a decline in oil revenues takes place. Various price indices are used as proxies for prices of non-traded and traded goods. The most popular are indices of GDP deflator and Consumer Price Index (CPI), representing the price of non-traded goods, while Import Price Index, Wholesale Price Index, World Price Index, and Industrialised Countries Consumer Price Index are proxies of the price of the traded goods. Table 4.3 shows some selected price indices that illustrate the response of the relative price to the external shocks. This table indicates that the relative price increased during the boom periods of 1973-74 and 1979-80, while in the slump period in 1983 onwards, the relative price declined. One can conclude that oil price and thus oil revenues are major determinants of the relative price. Oil revenues are included because oil prices may rise or fall while oil revenues might not follow the same trend due to the quantity of oil produced that might compensate for the increase or decrease in oil prices. The consequences of an oil boom represented by oil price and oil revenues are not the only determinants of changes in relative prices as the comparative static analysis predicts. In such a static framework, all other determinants of the relative price are held constant. In practise, however, it is obvious that these factors are not necessarily stationary. As noted before, since oil revenues in Saudi Arabia typically accrue directly to the government, monetary and, especially, fiscal policy play a most crucial role in the direction of government spending. Fiscal policy involves both macroeconomic decisions (spending affects overall level of demand) and microeconomic decisions (choosing a pattern of expenditure) that serves such goals as better distribution or greater efficiency or is intended to encourage or discourage specific types of economic

Table 4.3 Selected Relative Prices

Year	Relative P. Pn/Pt*	Relative P. Pn/Pt**	Relative P. S.GDPd./I.CPI***	Relative P. S.GDPd/W.CPI
1965	106.1	96.6	48.5	75.3
1970	94.7	92.7	48.0	71.4
1973	100.8	97.5	110.6	160.2
1974	107.8	97.1	135.9	194.1
1978	147.9	143.3	121.2	159.4
1979	137.3	131.1	155.5	199.6
1982	110.8	108.1	127.5	147.7
1984	**100.0**	**100.0**	**100.0**	**100.0**
1986	87.7	94.9	71.0	58.7
1987	84.2	93.0	70.9	52.9
1990	77.0	86.9	74.2	36.5
1991	77.4	90.1	74.1	32.2
1992	74.9	89.3	72.6	27.6
1994	72.4	89.7	67.5	18.5
1996	72.6	90.4	71.2	17.1
1997	70.8	89.6	69.5	16.2

* represents Domestic Price Index divided by Industrial Price Index

** calculated by dividing Domestic Price Index by Industrial Wholesale Price Index.

*** S, I, and W stand for Saudi, Industrial, and World figures

Source: International Financial Statistics, IMF, 1994 and 1998.

activity. Saudi policy instruments such as subsidies, tariffs, access to credit, and government investment aim favouring activities have a major impact on the relative price. To sum up, the government spending primarily affects the relative price since it falls mainly on non-traded goods through investment in its infrastructure.

In the light of what has been mentioned above, two additional variables affecting the behaviour of the relative price, namely government spending and broad money supply, should be included in the equation. The objective of this, is to capture the spending effect resulting from oil shocks. The new equation developed has the relative price of non-tradables as a dependent variable and four explanatory variables: oil revenues, price of oil, government spending and money supply. It is expected that all independent variables are positively related to the relative price. Hence, the relative price equation can be rearranged as follows:

$$q = q\ (ORt, POt, Gt, Mt) \qquad 4.1$$

$$\delta q/\delta OR,\ \delta q/\delta PO,\ \delta q/\delta G,\ \text{and}\ \ \delta q/\delta M > 0$$

Where OR and PO represent the oil revenues and price of oil respectively, while Gt and Mt are the government spending and broad money supply respectively.

In an important strand of literature on open economy, there is a strong link between changes in the relative price and the real exchange rate. This is due to the fact that changes in determinants of the relative price reflect directly on changes in the country's external position in the sense of changes in its international competitiveness.

4.6.2 The Real Exchange Rate

The distinction between the nominal and real exchange rate has become increasingly important. The nominal exchange rate is a monetary concept that measures the relative price of two currencies. The nominal exchange rate is frequently defined as the number of units of domestic currency per unit of foreign currency. This can be expressed as:

$$e = Pd/Pf$$

Where e is the nominal exchange rate, while Pd and Pf are the amount of home and foreign currencies respectively. An increase in domestic currency is referred to as a depreciation with respect to foreign currency, while a decrease in domestic currency is identified as an appreciation.

Exchange rate policy involves choosing an exchange rate system and determining the particular rate at which foreign exchange rate transition will take place. There are commonly three options for exchange rates: pegging the domestic currency to a single foreign currency, notably one of an industrial country's currency; or pegging it to a basket of currencies, chiefly, Special Drawing Rights (SDR); and finally, adopting an independent floating exchange rate.

After the collapse of the Bretton Woods agreement in 1971, the vast majority of developing countries continued to maintain fixed exchange rate for their currencies. Developing countries have typically fixed their currencies in terms of industrial foreign currency, mostly, the U.S. dollar. The striking objective of pegging to one currency is to avoid fluctuations in the exchange rates, which might harmfully affect the economies in terms of instability in domestic prices and revenues. Saudi Arabia pegged its domestic currency - the Riyal- to the U.S. dollar after the collapse of the fixed exchange rate (Al-Gaeed, 1991, P. 71). This can be attributed to many reasons: (i) as the oil revenue was and still is denominated in the U.S. dollar and since oil revenues accrue to the government, it would help to forecast the potential budget with no major uncertainty; (ii) the U.S. is one of the main trading partners and hence most Saudi investments are denominated in U.S. dollars. (iii) it would keep the domestic prices relatively stable, especially when Saudi Arabia depends heavily on trade for final, intermediate, raw material and capital goods. However, in order to maintain the level of the peg, it must also follow policies, which will maintain stable prices. Thus, an exchange rate peg may serve as a basis for following macroeconomic policies consistent with domestic stability (Bath, 1992, P. 37).

One can argue that the U.S. dollar itself is subject to fluctuation as well, which raises the importance of pegging the local currency to a basket of the five major hard currencies in order to avoid any fluctuations in a single currency, namely the Special Drawing Rights (SDR). Saudi Arabia pegged its currency to SDR from 1975 to 1981. The appreciation in the U.S. dollar in 1979, however, allowed the government to abandon the SDR and to repeg its currency to the dollar.

Nevertheless, the nominal exchange rate cannot give an accurate picture of the country's international competitiveness position. This is due to the fact that the nominal exchange rate does not measure the purchasing power parity (PPP) of the domestic currency with respect to its counterpart in the foreign country. The traditional PPP forms are based on: (i) the low of one price, which relates exchange rates to prices of individual, homogenous goods in different countries; (ii) absolute PPP, which relates exchange rates to overall price levels; (iii) and relative PPP, which relates exchange rate to changes in inflation rates among the countries concerned. Their usefulness as guides to exchange rate behaviour is limited. This can be due first to the adoption of a floating exchange rate, which fluctuates to offset the differences in price levels across countries, while Saudi Arabia and 35.9% of the world nations pegged their own currencies to a single currency in 1990 (Bath, 1992, P. 40). Secondly, transportation and information costs, and institutional impediments to trade, such tariffs and quotas, prevent the price levels from being equalised (Clark, et al., 1994, P.4). Alternatively, most recent studies define the real exchange rate as the domestic relative prices of the traded goods to the non-traded goods. This can be expressed as:

Real Exchange Rate (RER) = Price of tradable goods (Pt) / Price of nontradable goods (Pn)

Examples of these studies are those of Khan and Ostery (1991), Marsh and Tokarick (1994), Micossi and Milesi-Ferretti, (1994), Zietz (1996) and Masters and Ianchovichinal (1998) among others. The definition of the real exchange rate in terms of the price of traded to non-traded goods identifies more readily the incentives that guide domestic resource allocation. Its focus on domestic resource allocation has made this alternative definition of the real exchange rate a favourite tool for analysing issues of competitiveness for developing countries (Zietz, 1996, P. 147). A decline in the RER, or a real exchange rate appreciation, reflects an increase in the domestic cost of producing tradable goods, if there are no changes in relative prices in the rest of the world. In this case, the RER decline represents a deterioration of the country's international competitiveness. Symmetrically, a rise in the RER represents an improvement in international competitiveness.

However, changes in RER are sometimes affected by real events in the economy (Edwards, 1992. P.46). There are a number of factors which have contributed to changes in RER in Saudi Arabia: the rise of oil price and oil revenues during the 1970s induced an appreciation of the Saudi RER via the spending effect resulting from an increased relative price of non-traded goods. In contrast, the decline of oil revenues in the early 1980s brought about a depreciation in the RER. In Figure 4.10, changes in the RER have fluctuated in response to the oil price and thus oil revenue changes during the sample period. The consequences of oil price and oil revenue upward and downward changes are not the only determinants of the RER as the comparative static analysis predicts. Edwards (1992) counted many factors that play a large role in determining the RER domestically and externally.

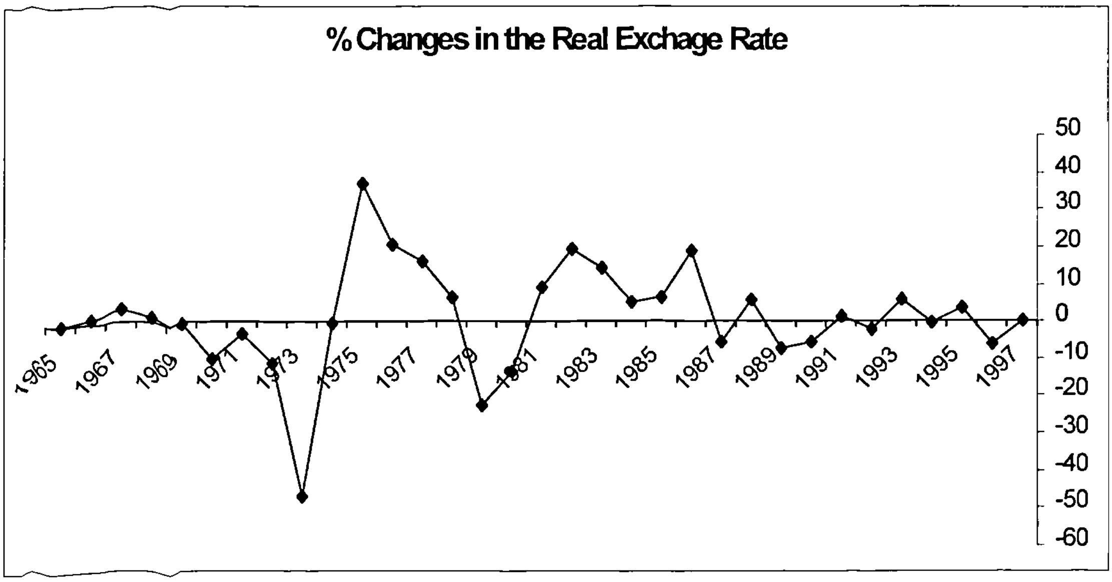


Figure 4.10 **The Real Exchange Rate Movements**

The major factors related to the Saudi Arabian economy are international prices, international transfer, subsidies and the composition of government expenditure. Since the oil revenues accrue to the government and thus transmit partially or entirely to the domestic economy, government spending through the national budget has a dominant control over the expenditure and money supply. Consequently, the plausible factors determining the Saudi

Arabian RER can include oil price, oil revenues, government spending and money supply. This can be expressed as:

$$RER = RER\,(ORt, POt, Gt, Mt) \qquad 4.2$$

$$\delta RER/\delta OR,\ \delta RER/\delta PO,\ \delta RER/\delta G, \text{ and } \delta RER/\delta M < 0$$

The relationship between the RER as a dependent variable and explanatory variables is expected to be negative as theory and empirical studies predict. It is worth mentioning that the real exchange rate is measured on aggregate external and internal price indices such as domestic CPI, national GDP deflators, world price index and industrial price index. The different measures of the RER seem to lead to different conclusions, where the RER is calculated on the basis of different deflators. All price indices used as proxies of the price of tradable and non-tradable goods are discussed in the following chapter.

Regarding the importance of the RER as the cornerstone in the existing natural resource fluctuations' model, it is necessary to analyse its influence on the sectoral outputs of the Saudi Arabian economy.

The theoretical natural resource literature predicts that any unanticipated oil revenue changes would reallocate resources employed in the national economy. This reflects the need to examine the implication of oil revenue changes on the total output, decomposed into non-traded and traded goods productions, although, world and national statistical references are not produced with regard to such division.

4.6.3 The Non-Traded Goods Output

The theoretical literature on the impact of the natural resource changes on the sectoral domestic economy relies upon a neat division of the commodities into tradable and non-tradable goods. While the conceptual dichotomy between tradables and non-tradables is convenient for theoretical purposes, it does not fit closely with the available data[1]. As a result, however, some economists have identified approaches to separate them for empirical purposes. Manufacture and agriculture are defined as tradable even though some of them are non-traded goods, while the category of non-tradables includes services (although many of services are tradable goods. An alternative approach used by Kamas (1986) is to identify the commodity's tradability according to its share in the international trade, while some economists use the United Nations International Standard Industrial Classification (ISIC). In the latter classification, a primary sector includes agriculture, fishing and trapping, and forestry, while the industrial sector includes mining and quarrying.

However, in this study, agriculture and manufacture will be treated as being in the traded goods sector, whereas the service sector will include construction, transportation and communication, real estate and business services, personal and other services.

Despite these different definitions, it remains possible to extract a relatively clear picture of the impact of the natural resource changes on the allocation of resources.

It seems obvious that the two major external oil shocks have played a significant role over the last three decades in the Saudi Arabian economy.

Table 4.4 shows fluctuations in the production and the growth rate of the traded and non-traded goods sectors over the sample period of the study (1965-1997).

As the economic literature predicts, the oil price explosion of 1973-74 led the volume as well as the growth rate of tradable goods to increase considerably. From 1972 to 1981, with the exception of 1968, the growth rate of non-tradable goods expanded faster than the corresponding trend in tradable goods. The former reached its highest growth rates of 20.1 and 20.2 percent in 1975 and 1976 respectively. The tremendous growth rates following the oil boom were due to large government spending in which the major share was directed to the non-traded goods sector. However, the growth rate of non-tradables tended to grow but in decreasing rates from 1977 onward, with the exception of 1979, due to the higher oil prices since. The decline in the growth of the non-traded goods sector was attributed firstly to the reduction in government spending during the increased inflation rate resulting from the bottlenecks in the economy during the accelerated development in the booming era; and secondly, to the slight decrease in the nominal US dollar over 1975-78, which might have affected the purchasing power of the Saudi Riyal. Nevertheless, the two booming periods have caused the growth rate of the non-tradable sector to soar around 20.2 and 11.9 percent in 1976 and 1980 respectively.

As the world economy moved into recession in the 1980s and successful conservative measures were adopted in the major oil consuming countries, the demand for oil declined and thus the oil prices fell by six to eight dollars per barrel. The decline in the growth rate of the non-traded goods sector in 1982 and afterwards was related to two factors: (i) the deterioration of government spending resulting from the collapse of the country's oil revenues; (ii) the completion of the major infrastructure projects which were carried out during the booming periods. 1990, reaching its highest peak since 1982. These results are consistent with the theory of the Dutch disease predictions.

Table 4.4 Outputs and Growth Rates of Traded and Non-trade Sectors

Year	Non-Tradable Output	Growth (%)	Tradable Output	Growth (%)
1965	33887		4839	
1966	35373	4.4	5171	6.9
1967	36847	4.2	5501	6.4
1968	40441	9.8	5820	5.8
1969	42020	3.9	6142	5.5
1970	43568	3.7	6558	6.8
1971	46200	6.0	6981	6.5
1972	51028	10.5	7448	6.7
1973	58774	15.2	7898	6.0
1974	68951	17.3	8381	6.1
1975	82835	20.1	8994	7.3
1976	99563	20.2	9861	9.6
1977	115002	15.5	11134	12.9
1978	130185	13.2	12489	12.2
1979	146141	12.3	13793	10.4
1980	163468	11.9	15342	11.2
1981	184064	12.6	17948	17.0
1982	193020	4.9	19850	10.6
1983	193985	0.5	21495	8.3
1984	**187788**	-3.2	**25217**	17.3
1985	186138	-0.9	28045	11.2
1986	177753	-4.5	29705	5.9
1987	182163	2.5	32242	8.5
1988	183377	0.7	34636	7.4
1989	184814	0.8	36631	5.8
1990	190211	2.9	38057	3.9
1991	205921	8.3	38321	0.7
1992	205888	0.0	39024	1.8
1993	209080	1.6	39549	1.3
1994	180577	-13.6	40491	2.4
1995	180577	0.0	40901	1.0
1996	184095	1.9	42292	3.4
1997	187593	1.9	43747	3.4

Source: SAMA, Annual Report, Various Years
: M. of Planning, Achievements of Development Plans, (1990-1995)
:International Financial Statistics, Yearbook, IMF, 1997

On the other hand, the Saudi Arabian economy experienced a negative growth rate of 3.2 percent in 1984 and then it regained positive rates after the oil price recovery in 1987. Further evidence of the impact of the oil price and government spending increases on non-traded goods can be seen clearly from the Iraq-Kuwait crisis which started in 1991. This induced the Saudi Arabian oil revenues to rise in terms of price and quantity and thus the production of non-tradables jumped 8.3 percent in 1991 from 2.9 percent in

One can conclude that the standard Slater-Swan neo-classical model of adjustment predicts several consequences of an oil-led boost (slump) in domestic expenditure. Firstly, the real exchange rate will appreciate (depreciate) and thus, secondly and more importantly, this is associated with a shift in production structure toward the non-traded (traded) goods sectors. From the above analysis, the model designated must shed light on the major variables that might be expected to affect the production within the non-traded goods sector in the national economy. These variables can be specified as oil price, oil revenues, the real exchange rate and government expenditure. As the theory predicts, the production of non-tradables is expected to respond negatively to the real exchange rate, while the rest of variables are expected to respond positively. This can be rewritten as:

$$NT = NT\ (Pot, ORt, RERt, Gt) \qquad (4.3)$$

$$\delta NT/\delta Po,\ \delta NT/\delta OR, \text{ and } \delta NT/\delta G > 0 \qquad \text{and } \delta NT/\delta RER < 0$$

4.6.4 The Traded Goods Output

An obvious bench mark for tradability is the extent to which particular goods are actually traded. This bench mark implicitly underlies the short-cut adopted in most empirical studies of labelling agriculture and manufacture as tradable.

The world oil price quadrupled over 1973-73 caused a first external oil shock. Thereafter, another oil price increase followed in 1979-80 peaking at around $35 per barrel. This oil boom has been characterised as one with a large government spending effect resulting from a tremendous increase in the Saudi Arabian national wealth. Hence, the basic outcome of such change has brought about an appreciation of the local currency. This would have been associated with a fall in the supply of the domestic traded goods sector. Consequently, the difficulty that arose can be classed as an adverse effect of using oil revenues. The latter turned out to be a mixed blessing in spite of a higher proportion of wealth for the country.

Similarly, the collapse of the world price of oil in the mid 1980s caused a reverse effect of the oil boom in terms of a depreciation in the real exchange rate and thus the expansion of the production of the traded goods sector at the expense of the non-traded goods sector. The distinguishing features of the domestic growth rate of the output of tradables responding to oil revenue changes were: (i) the growth rate of tradables was positive but in a decreasing rate particularly during the first two years after the first external shock. Thereafter, the growth rate declined from 6.7 percent in 1972 to 6 and 6.1 percent in 1973 and 1974 respectively. On the other hand, the growth rate of this sector during the second oil shock in 1979 led to a fall from 12.2 in 1978 to 10.4 percent in 1979; (ii) the highest growth rate ever was of 17.3 percent in 1984 as a result of a deterioration in oil prices and revenues which began in 1982; (iii) during the 1972-80 period, the growth rate of tradables had lagged behind non-tradables. These consequences are viewed as consistent with the literature of the natural resource boom predictions.

On the other hand, as shown in Table 4.4, the oil price declined in the early 1980s and afterwards and the growth rate of tradables grew faster than non-tradables except in 1991 when the growth rate of tradables declined to 0.7 percent compared with 8.3 percent of non-tradables, due to the massive government military expenditure required during the Iraqi invasion of Kuwait.

However, just as an oil boom caused a squeezed traded goods sector, the oil slump has led to an expansion of its production, both of which are consistent with the economic theory if the differential of the growth rate between the two sectors is the norm rather than of one deteriorating at the expense of the other. Saudi Arabia has experienced a growth of the traded goods sector even in the boom periods. This can be attributed to tremendous subsidies provided by the government during that period as noted in the previous chapter.

Similar to the discussion of variables affecting the production of the non-traded goods sector, the production of the traded goods sector can be specified as a function of oil prices, oil revenues, government spending and the real exchange rate. The first three variables are expected to affect it negatively, while the real exchange rate is expected to affect it positively. This can be expressed as:

$$T = T\,(\,Pot,\ ORt,\ Gt,\ RERt) \qquad (4.4)$$

$$\delta T/\delta Po,\ \delta T/\delta OR,\ \delta T/\delta G\ < 0 \quad \text{and } \delta T/\delta RER > 0$$

The question may be raised with regard to the inclusion of the oil revenue and the government expenditure in such equations is the possibility of the present of high multicollinearity between these variables, which is likely to severely affect the estimation results. Hence, a statistical test has been used to check the degree of multicollinearity between the oil revenue and the government expenditure for the entire sample period and for every three years of the sample. This test indicates a small degree of multicollinearity for both periods with an exception of the first three years of the sample[9]. This unexpected result can be attributed to two reasons. Firstly, the oil revenue, during the oil boom, did not fully transmitted to the domestic economy since a significant amount of oil receipts were either saved and invested abroad, and/or allocated to developing countries and financial institutions in forms of assistance, aid, grants and loans (Amuzegar, 1999). During the oil slump, the government expenditure did not highly follow the decline in oil revenue due to the fact that the government found itself in a position to continue to accelerate its development projects through drawing down from its reserves as well as increasing its borrowing domestically and internationally[10]. Second, although the oil revenue was massive during the boom period, the government smoothed it expenditure as an instrument of the fiscal policy to combat the pressure of inflation.

Finally one should demonstrate the complete model showing the endogenous and exogenous variables in logarithms as well as the identification properties as follows:

1- $lrp_t = \alpha_1 + \beta_1\, lrev_t + \gamma_1\, lg_t + e_t$

2- $lrer_t = \alpha_2 + \beta_2\, lrev_t + \gamma_2\, lg_t + e_t$

$3\text{-}\ IT_t = \alpha_3 + \pi_1 rp_t + \chi_1\, lms_t + \delta_1 lpo_t + \phi_1 lwp_t + e_t$

$4\text{-}\ IS_t = \alpha_4 + \pi_2 rer_t + \gamma_2\, lg_t + \chi_2\, lms_t + \delta_2 lpo_t + \phi_2 lwp_t + e_t$

$5\text{-}\ Yn_t = S_t + T_t$

Endogenous Variables:

rp = the relative prices of nontraded to traded goods

rer = the real exchange rate (Pt/Pn)

T = the value of traded goods

S= the value of nontraded goods

Yn= non-oil GDP

Exogenous Variables:

rev = oil revenues

g = the government expenditure

ms = the broad money supply (M3)

po = the price of oil

wp = the world price index

Since precondition for the application of the Two-Stage Least Square (2SLS) of an equation in the model has to be identified, the order condition of identification as a necessary but not sufficient condition is used. The order condition of an equation to be identified requires that the number of exogenous variables in the system is equal or greater than the number of slope of coefficients in the equation concerned (Studemund, 1996).

Applying such requirement on each equation in the model indicates that the number of exogenous variables in the model (i. e., 5) exceeds the number of slope coefficients of the relative prices and the real exchange rates equations (i. e., 2). Similarly, the slope of coefficients of the traded and nontraded goods equations are four, while the number of exogenous variables are five. Since, the identity equation is not estimated, it is not necessary to deal with its identification properties. As a result, the order condition implies that all equations are over-identified. According to Studement (1996), 2SLS can be applied to equations that are either exactly or over-identified.

However, these equations are expected to demonstrate and explain the impact of oil changes on the economy. Such outcome is associated with some adverse side-effects, the government has to intervene through implementing appropriate economic polices in order to mitigate such negative results emerging form the external shock.

4.7 Policy Response

The oil income increase can be a mixed blessing if the policy adopted is not adequate to relieve the economy. It is needless to say that adjusting to external shocks is not easy and painless. Rather, it requires hard decisions to escape from adverse external shocks with only minor effects rather than a major reduction in the traditional sector. The question raised is: What policy should be followed to avoid the reallocation of resources and redistribution of income resulting from the oil export fluctuations?. In the oil export boom, the answer depends upon the political and economic situation in which a country experiences such effects. In the literature, the government has many domestic options to choose from in order to protect the traditional sector and achieve the external and internal balance. To show mathematically how a government policy responds to an export change, in particular an export boom, one can use the model assumptions indicated earlier in this chapter. For the sake of simplicity, all variables other than the real exchange rate and government spending are ignored. Hence, we have:

Traded goods

- Supply of traded goods $Ts = Ts(RER)$ where $\delta Ts/\delta RER > 0$
- Demand for traded goods $Td = Td(RER, \beta G)$ where $\delta Td/\delta RER < 0$ and $\delta Td/\delta G > 0$
- Trade balance $TB = Ts(RER) + OR - Td(RER)$

The derivative of TB with respect to RER is $\delta TB/\delta RER = \delta Ts/\delta RER - \delta Td/\delta RER > 0$ and the derivative of TB with respect to G is $\delta TB/\delta G = -\beta$

Where β is the proportion of government spending on traded goods, e is the nominal exchange rate defined as units of domestic currency per unit of foreign currency

It can been seen that a devaluation (a rise in e) or a depreciation (a rise in Pn/Pt) in the exchange rate will improve the trade balance since $\delta Ts/\delta RER > 0$ and $\delta Td/\delta RER < 0$, and thus $\delta TB/\delta RER = \delta Ts/\delta RER - \delta Td/\delta RER > 0$. With regard to government spending, a reduction in government spending will improve the trade balance as well, since $\delta TB/\delta G = -\beta$

The interpretation of the trade balance improvement is straightforward. Devaluation in the exchange rate raises the price of imported goods, which causes the residents demand to switch from imported goods to domestic goods. Moreover, with respect to foreign demand, the domestic goods become cheaper than foreign goods. This stimulates the demand for domestic traded goods. Although a devaluation unambiguously improves the traded balance, albeit temporarily, as a result of the "expenditure-switching" (substitution) effect in production toward traded goods, the "expenditure-reducing" effect which reduces income and thus expenditure on domestic traded goods causes a consumption away from traded goods.

Non-traded goods. The demand and supply of non-traded goods $Nd = Nd(RER, 1\text{-}\beta\ G) = Ns(RER)$

Where $\delta Nd/\delta RER > 0$, $\delta Nd/\delta G > 0$ and $\delta Ns/\delta RER < 0$

A devaluation in exchange rate results in both an increased demand for non-traded goods, since traded goods have become more expensive, and, at the same time, a decreased supply of non-traded goods as producers shift to the more profitable sector (i.e., traded goods). A decline in government spending is necessary to dampen the excess demand for non-traded goods (as $\delta Nd/\delta G > 0$). However, there are two tendencies involved: the tendency of an "expenditure-switching" effect toward the consumption of non-traded goods and the tendency of an "expenditure-reducing" effect away from the production of non-traded goods, leading to a temporary slump in the price of non-traded goods rather than a rise. These two effects are purely transitory, but they play a crucial role during the adjustment to devaluation (Taylor and Connoly, 1976)

The preceding discussion arises from the fact that foreign exchange receipts resulting from an export boom are spent partially or entirely on the domestic economy. If the extra income resulting from an export boom is saved internationally or invested abroad, the key feature is that oil revenue simply has no feedback to the local economy. This implies that old exports and old imports would continue as before with no change in the balance of trade. In other words, there would be no added income received at home that would increase the price of non-traded goods or change the allocation of resources between traded and non-traded goods. Hence, one can express this as:

$$OR = G + IR + If$$

where IR and If are the international reserve and investment abroad respectively.

An incremental oil revenue would raise either international reserves or investment abroad or both rather than government spending. The impact of this policy can be illustrated by taking the total differentiation of the traded and non-traded goods' equations as follows:

$dTs = \delta Ts/\delta RER \; dRER$ where $Ts^* = dTs/Ts$ and $RER^* = dRER/RER$

and ' * ' indicates a percentage change. So, by substituting and dividing by Ts, the equation can be rewritten as:

$$Ts \; Ts^* = \delta Ts/\delta RER \;\; RER/Ts \; RER^*$$

$Ts^* = \alpha \; RER^*$ where $\alpha = \delta Ts/\delta RER \;\; RER/Ts$

Since the economy is still as it was in the pre-boom condition, the price of non-traded goods and thus the real exchange rate remain unchanged. This leads to: $RER^* = 0$ and thus $Ts^* = 0$.

Using the same approach with the non-traded goods equation gives the same conclusion. This policy of preventing the adverse side effects of the boom on the domestic economy is termed by Corden as "exchange rate protection". Clearly, this policy would lead to two results: (i) diminishing the fluctuation in current absorption, reducing the present adverse effects of a resource boom and slowing down the adjustment process; (ii) allowing the economy to store some benefits of the resource boom to use during the slump periods.

However, in practice, on one hand, the government allows all or part of the extra income to spill over to the domestic economy, and on the other hand, the government is urged to protect the traded goods sector or part of it from the adverse effects of the boom. This policy can be implemented through subsidising the traded goods sector or imposing tariffs on imported goods. Hence, the price of traded goods will decline by units of subsidy:

$$Pt = Pd\ (1\text{-}S)$$

where S and Pd represent subsidy and domestic cost of the traded goods respectively.

As the government chooses this option, it pays a certain subsidy per unit of output of tradables, which lowers the cost and improves the profitability of the subsidised sector. Accordingly, this sector expands its production since the price of tradables falls further than or equal to the world price. Such an expansion in the traded goods sector is attributed to two factors: a rise in domestic demand for tradables as long as they are equal to or cheaper than imported goods; the foreign demand for domestic goods may increase if their prices are competitive with those in foreign countries.

The alternative method is to impose tariffs on imported goods. Hence, the price of foreign goods (Pf) increases by the amount of tariff imposed (t). The new price of foreign goods is:

$$Pf = Pd\ (1+t)$$

As a result, the demand for imported goods will deteriorate since they become more expensive compared with domestic goods. This stimulates the production of the traded goods sector. Whether it is worth mentioning the impact of two such policies on the domestic economy in the long run is debatable. A detailed discussion of positive and negative effects and determinants of government subsidies and tariffs is presented by Benedict et al (1998 and 1995) and Chu and Hemming (1991). Finally, the policy response to oil revenue fluctuations with respect to Saudi Arabia can be considered in more detail as follows:

4.7.1- To reduce the economy's absorptive capacity by a reduction in the expenditure in order to eliminate the excess demand. This may lead to the reallocation of the domestic resources in favour of traded goods as a result of the increase in the relative prices. Such a choice can be applied if the resource movement effect is in operation, but since the oil sector is an enclave sector, the spending effect is the only strong effect which influences the economy. The cut in private and public demand can be through raising taxes, restricting credit creation, cutting government spending and subsidies. The reduction of expenditures can affect the domestic investment negatively and may lead to a contractionary effect. Moreover, the economic growth rate may decline and be accompanied with lower subsidies. The Saudi authorities had not used this policy effectively prior to 1983. There were various plausible explanations for the increase in spending during the boom period. First, the economy was in its early stage of modernisation, which urged the government to expand their oil earnings in order to accelerate the country's economic developments, particularly those related to capital projects. Capital projects can be difficult to terminate in mid course for technological and economic reasons. Second, the Saudi government may have genuinely believed the oil boom to be temporary. This may have induced them to expand or at least to moderate government spending. On the other hand, the decline in government expenditure from 1983 onward was due to the reduction in its quota in OPEC. However, the incentives provided to the traditional sector were not completely cut as a result of a fall in its oil revenues, rather they were reduced gradually. The possibility of deterioration in the traditional sector as a result of a spending cut forced the government to reject this choice, particularly in the first and second external oil export booms.

4.7.2- To promote expenditures toward the traditional sector (specifically the manufacturing sector) from non-tradables. With this option, policy-makers have to decide to rely either on the devaluation of the domestic currency or on adopting commercial policies or both.

Devaluation: It is worth noting that there is a subtle distinction between devaluation and depreciation in terms of government intervention in the exchange rate. Moreover, the devaluation is a discrete change, while depreciation is a continuous change in the exchange rate. However, devaluation reflects a deliberate government decision, while depreciation is an outcome of the interaction between market forces and government decision (Krugman and Obstfeld, 1997, p. 492). Devaluation is used as an instrument to increase the foreign exchange earnings or to improve the balance of payments and to protect the tradable sector. Since an oil export boom leads the output of non-tradables to expand at the expense of the output of tradables through a rise in the relative price of non-tradables, devaluation ($e = Pd/Pf$ falls) would increase the value of one unit of foreign currency measured by the amount of local currency. At a constant interest rate (no changes in world and home price levels in the short-term), an increase in the foreign exchange rate will raise the price of foreign goods and services and reduce the price of domestic goods and services relative to foreign ones. This implies a reduction in imports associated with an increase in exports (a rise in competitiveness). The higher the elasticities of response of goods perfectly substituted, the stronger the influence of devaluation. However, sometimes a devaluation is unfavourable due to its effect on the balance of payments (if not sterilised) causing a rise in money supply and thus inflation. Furthermore, the devaluation might not last for long but its influence may continue for much longer. Warr (1986) realised that while the Indonesian 50% devaluation in 1978 lasted three to five months, its effects lasted for an average of sixteen months. According to the study by Reinhart, Kiguel and Gheis (1995), the real effects of devaluation in low-inflation economies with a fixed exchange rate may be experienced for longer than one year. However, the results of that devaluation on non-oil traded goods is debatable. Some analysts have attributed the rise in the non-oil traded sector to devaluation and some to the unrelated world price increase (Woo, et al., 1994). In the case of Saudi Arabia, the non-oil exports are unlikely to have been significantly stimulated by devaluation, as they were mostly oil related products which were sold in dollars. Furthermore, a devaluation could have set off an inflationary spiral, a situation the government wanted to avoid at all costs (Looney, 1990, p. 254). Devaluation can be a successful instrument if it is associated with other macroeconomic policies. If not, it may lead to economic, social and political pressures.

Commercial Policies (supply-side economy): the adverse effect resulting from a boom is a fall in the output of the non-oil traded sector, notably, the manufacturing and agricultural sectors. To avoid this, some strategies need to be implemented to protect these sectors. One of these strategies is to adopt commercial policies, which include a protection, or subsidising, of the production of tradables in order to survive and/or to compete with world trade. Wijnbergin (1984, p.53) stressed that high temporary oil revenues should lead to an increase in subsidies to the sector concerned during the boom period rather than an accumulation of foreign assets. The Saudi Arabian government has adopted a policy of production subsidy for the agricultural and manufacturing sectors. The objective has been to lower the cost of such sectors in order to experience a profit and thus allow them to expand. The subsidy has been provided through establishing specialised agricultural and industrial development banks. These banks provide long-term loans with negative or at least zero interest rates. Moreover, other incentives have been provided such as free or cheap rent for land, reduced energy, tariff waivers, reduced import taxes, and the purchase of wheat and other products from farmers. All of the government subsidies have been detailed in the previous chapter.

4.7.3-<u>The exchange rate protection</u>. Taking into consideration the fact that high oil revenue is temporary, a real appreciation of the exchange rate resulting from the boom is one of the main causes of a fall in the output of the non-oil traded goods sector. Therefore, it should be protected by government intervention, which aims to avoid a real appreciation of exchange rate through the sterilisation of the balance of payments. The term "exchange rate protection" is used by Corden (1984) to describe the government strategy to reallocate resources. This policy can be implemented by: (i) intervening in the foreign exchange markets to prevent the nominal exchange rate from appreciation through open market operations; or (ii) sterilising the domestic monetary effects of the resulting balance of payments surplus. This can be done through saving extra income or investing it abroad (Corden and Warr, 1981, p. 344). The Saudi Arabian government has, to some extent, selected the route of foreign assets accumulation during the boom. The Saudi international reserves (excluding gold) rose from $2.3 billion in 1972 to reach a peak of $32.2 billion in 1981 (The World Bank, 1994, p. 562). The reasons behind this can be attributed either to its low domestic absorptive capacity (Wijnbergen, 1984, p.53) or to the involuntary political pressures to increase domestic spending through narrowing the gaps between the increased value of oil exports and the value of imports from developing counties (EL-Emam, 1984, p. 21).

4.8 Conclusion

This chapter has analysed theoretically the impact of the external shocks of a particular export sector (i.e, oil) on the rest of a small open economy. The impact of such shocks on the economy is reflected in the relative price of non-traded goods to traded goods and thus the real exchange rates mechanism. However, for the present study a theoretical model has been built based on Corden's model with some important limitations, which take the local circumstances of Saudi Arabia and the economic literature into consideration. The main findings regarding the impact of an external shock can be summarised in the case of the boom as: (i) a rise in the price of the non-traded goods sector relative to the price of the traded good sector; (ii) as a result of (i), an accompanying appreciation in the real exchange rate; (iii) an expansion in the non-traded goods sector and a contraction in the traded goods sector. In the case of the export slump, these results are reversed.

From a policy maker's perspective, this chapter has presented many alternative government policies. A government can choose one or more of the options (devaluation, government expenditure-switching, government expenditure-reducing, subsidies, restrictive commercial policies and exchange protection) in order to mitigate the adverse effects of external shocks. These policies have also been discussed with respect to Saudi Arabia. Here, government expenditure control in the aftermath of an external shock might be the best alternative remedy. This is due to the fact that government expenditure plays a crucial role in Saudi Arabia through its influences on the economy, directly through government involvement in consumption and investment, or indirectly via the budgetary financial incentives and constraints.

It worth noting that, as in most developing countries, data may not be as accurate or available as in developed countries. Therefore, the available data have to be subject to particular care in order to select the most precise figures. The data description is discussed in the following chapter.

Notes

[1] See chapter two for more details on some of these studies.

[2] For more details in models of the oil market, see Cremer and Salehi-Isfahani (1991).

[3] This also is known as the concentration ratio, which shows the endeavour of diversification.

[4] Jones (1986) discussed that a rise in price of the booming exportable sector confers gains to the community as a whole, which helps to raise the price of non-tradables. If substitution effects are relatively strong compared with income effects, the rise in Pn is kept below the rise in PB (price the booming sector) and vice versa when substitution effects are weak.

[5] These equations are based on Neary and Wijnbergen (1986).

[6] Prove: $dYn = Yn/q\ dq$ and since $Yn = dYn/Y$ and $\hat{q} = dq/q$. by substitution and dividing by Yn , one can get $Yn = \hat{q}$

[7] According to the Central Statistics Department, 1993.

[8] For more details in the role of Saudi Arabian government in the economy, see Presley, (1984).

[9] The correlation matrix shows that the correlation coefficient for the entire sample period is 0.40, while the correlation coefficients for every three years prevails 0.99, - 0.38 , 0.31, 0.05, 0.70, -0.13, - 0.72 and 0.46 respectively.

[10] See Chapter 7, for more details .

Chapter Five

Data Description

5.1-Introduction

Before turning to the empirical analysis, it is useful to review some information concerning the data involved in this study, in order to give a clear definition of the selected endogenous and exogenous variables employed in the study's empirical model. This chapter is based on the need to explain observed differences in the evolution of the relative price of non-tradables in terms of tradables and of real exchange rate indicators. At the outset, it is necessary to indicate that the estimation is based on annual data for thirty-three years. The sample period is between 1965 and 1997. The selection of such samples is due to the availability of data, particularly from the Saudi Arabian sources. The data collected will be divided according to two time periods or stages. Stage one begins in 1965 prior to the oil export revenues boom and covers the period until the end of the two external oil boom shocks in 1981. The aim here is to test the impact of the oil export boom on the domestic economy. Stage two deals with the period of the oil revenue deterioration, which started in 1982 and was followed by dramatic fluctuations until the end of 1997. The latter period is selected due to the Saudi published available data.

The structure of this chapter is as follows. Section 5.2 presents the sources of data. Section 5.3 identifies some simple stylised facts concerning the definitions of the traded and non-traded goods sectors. Price indices used as proxies of the price of both categories of goods are provided in section 5.4.

Section 5.5 throws light on some other exogenous and endogenous variables selected in the study. In section 5.6, descriptive statistics are presented, while the summary is provided in section 5.7.

5.2 Sources of Data

Before proceeding to a discussion of some of the economic variables used, it is useful to present the major sources of the data involved. The main sources are the domestic Saudi Arabian statistical reports. These sources include: the Saudi Arabian Monetary Agency (SAMA), particularly the Annual and Monthly Reports; the Ministry of Planning's Achievements of the Development Plans; and the Ministry of Finance and the National Economy Financial and Statistical Reports, especially those from the Central Department of Statistics. In addition, secondary sources of data are derived from regional and international sources such as the International Monetary Fund's (IMF) Statistical Publications; the World Bank's World Tables; and OECD Publications, particularly those of the Middle East Oil and Gas Reports on oil prices, production and oil revenues and of the World and Industrial Countries' Price Indices; OPEC and OAPEC Annual Statistical Bulletins. These sources are not the only ones used, but other minor sources are cited either below the tables or in the text.

5.3 Traded and Non-traded Goods

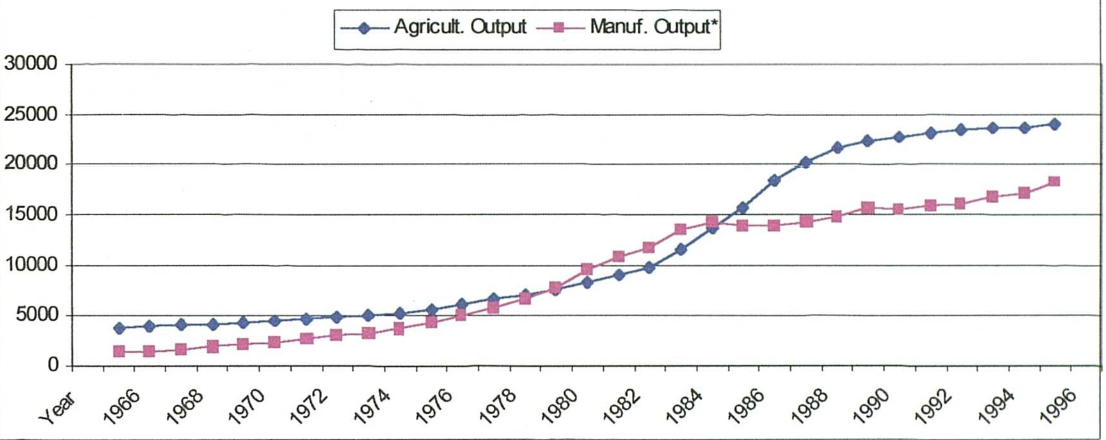
In order to understand the three-sector dependent economy model, a distinction must be made between the traded and non-traded goods sectors. The disaggregated data corresponding to such a division are not widely available. Therefore, empirical studies generally designate different approaches to distinguish between them. The traded goods sector as defined in the OECD National Account (ANA) publications comprises only manufacturing, while the non-traded goods sector compasses the service sectors comprising: (1) electricity, gas and water, (2) construction, (3) wholesale and retail trade, restaurants, and hotels, (4) transport, storage and communications, (5) financial services and insurance, (6) community, social and personal services and (7) government services (Strauss, 1994). Micossi and Milesi-Ferretti (1994), and De Gregorio et al., (1994) used the same approach in their definition of tradability when they classified manufactured goods, excluding construction, as tradables, and services as non-tradables. Agriculture and mining were excluded the categorisation of tradables. The authors attributed that to the fact that inter-country trade is partially hindered in some economies by large tariffs and informal barriers.

Another approach used is to define tradables as all commodities except construction, whereas non-tradables are all services including construction (Kravis et al., 1978). However, most empirical studies label manufacturing and agricultural goods as tradables and services as non-tradables. This definition is the most comprehensive one since it includes and fully explains trade flows in a wide class of traded goods (manufactured and agricultural) rather than just in manufactured goods (Marsh, and Tokarick, 1994).

However, an important consideration concerning the usefulness of this alternative approach is the amount of information contained in it and its relevance for explaining the case concerned. As the objective of using a specific approach is to provide information for an assessment of sectoral changes in the economy, one can use the Saudi Arabian classification of tradable/nontradable goods. The aim of following such a division is to facilitate the analysis with the availability of domestic data. With regard to the Saudi Arabian classification, all commodities and services are divided into oil and non-oil sectors. The latter comprises agriculture, mining, manufacturing, construction, transportation and communication, real estate and business services, personal and other services. Accordingly, tradable goods can be defined as all goods other than services and oil-related products, notably, manufacturing and agricultural goods. The former includes all manufacturing industries excluding the oil-related industries, while the latter contains food, agricultural and animal products, forestry, and fishing. Mining is excluded from the manufacturing industries due to its negligible portion in the Saudi Arabian GDP during the sample period. However, the residual non-oil sub-sectors can be aggregated and treated as non-tradable goods (services). Using such a classification achieves our aim of having data divided properly and highlights the impact of oil revenue fluctuations on the Saudi Arabian structural changes. In addition, it may illuminate the government policies designed to lessen heavy reliance on oil as the main source of the national income.

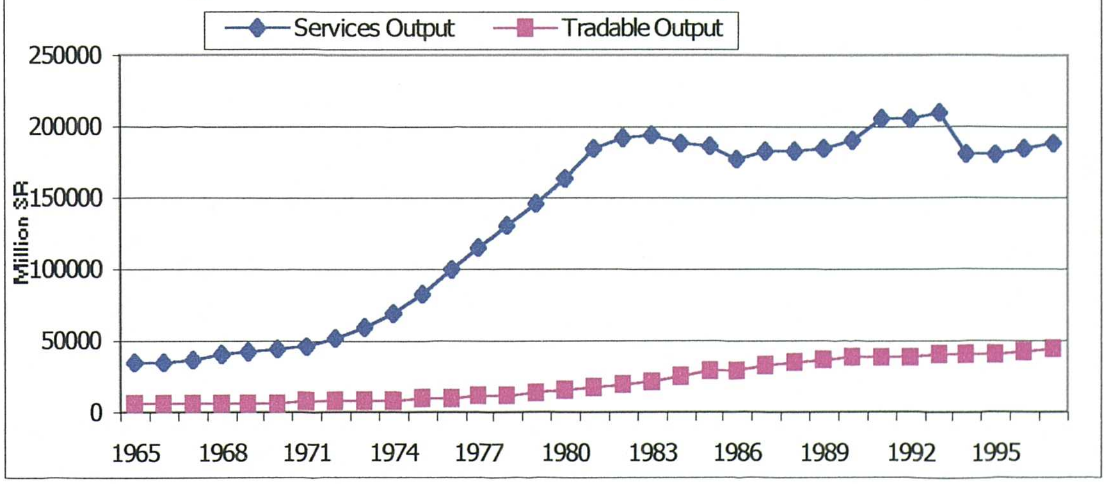
Accordingly, it is necessary to shed light on the trend in the output of the traded goods sector during the sample period. As stated in the previous chapter, in the context of a growing economy, the definition of de-industrialisation and de-agriculturalisation emerges from their slower-than-normal growth rather than from their absolute values. In the absence of an oil boom, one would expect manufacturing to grow faster than other sectors. In Saudi Arabia, the growth of manufacturing and agricultural goods, during the boom, has increased slightly, as shown in Figure 5.1. This outcome is likely to be related to the structure and nature of these sectors. They were, prior to the boom, limited and underdeveloped, but the increase in oil prices may have induced the output of both categories of goods to grow briskly.

Figure 5.1 Agricultural and Manufacturing Outputs



Despite this tendency, their increasing outputs fell behind the non-tradable output's growth. Figure 5.2 shows this outcome, which is highly consistent with the impact of the oil export boom predictions in the latest definition of de-industrialisation.

Figure 5.2 Services and Tradables Outputs



With regard to the provision of services, Figure 5.2 indicates how value added by the service sector expanded at an increasing rate until the economy started to slow down in the mid-1980s. The expansion in the service sector was due to increased capital formation through investments in physical and human programmes. From 1983 onward, services become more stable with little fluctuation. The value added by services ceased to rise due to the completion of the major development projects in the country. The exception to such stability was in 1992-93 when aftermath of the Second Gulf Crisis in 1990-91 caused an increase in the value added of the service sector.

5.4 Price Indices

Based on the classification derived above, one can aggregate sectoral deflators to obtain aggregate price indices for tradable and non-tradable goods. For policy-makers concerned primarily with relative prices, real exchange rates and resource allocation, it is necessary to use either between-country or local measures as proxies to represent the price of tradable and non-tradable goods. The aim of having such proxies is to demonstrate the movement of tradable/nontradable prices, the real exchange rate and the reallocation of resources. Various price indices are commonly used as deflators. The most popular indices proxied for the price of non-tradable goods are the Consumer Price Index (CPI), and the Gross Domestic Product (GDP) deflator, whereas the indices for the price of tradable goods can be proxied either by domestic price indices such as the Wholesale Price Index (WSPI), the Import Price Index (MPI), or by foreign price indices such as the World Wholesale Price Index (WWPI) or the Industrial Countries' Wholesale Price Index (IWPI). Marsh and Tokarick (1994) and Kravis and Lipsey (1978) provide a survey of alternative real exchange rate indices in current use.

Since there are different price indices used as proxies for the price of tradable and non-tradable goods, this seems to lead to different conclusions. This sub-section aims to shed light on the major indices commonly used to measure the relative prices and thus the real exchange rate both internationally and in Saudi Arabia.

5.4.1 Consumer Price Index (CPI)

The CPI is traditionally treated as the most comprehensive measure of the price of non-traded goods and it encompasses all sectors of the economy. Zietz (1996), Edwards (1989), Harberger (1986) and Goldstein and Officer (1979), among others, suggest the CPI as a proxy for the index of nontradable prices, as the CPI is heavily influenced by services' activity. The CPI tends to exhibit much volatility because it is sensitive to the position of the economy in business cycles and is also subject to the influence of distortions, e.g. subsidy or taxes.

In Saudi Arabia, the cost of living is measured by two principal indices: the All Cities Index and the Middle Income Index. The overall item sample size was raised from 150 to 220 items in 1988. The All Cities Index is the most comprehensive indicator because it covers the largest percentage of households in the country - both Saudi and non-Saudi. This index was originally produced in 1979 and has been in a continuous monthly index series since then. On the other hand, the Middle Income Index has changed from covering Saudi households with a monthly expenditure of SR 3,000-11,000 to Saudi households with SR 2,500-10,000. This index represents at least 50 percent of all Saudi households in the population (Ministry of Planning, Central Department of Statistics, 1998)

Generally speaking, the CPI possesses some advantages such as the following: (i) it is calculated on the basis of a basket of goods that is fairly comparable across the country; (ii) it is readily available and published frequently; (iii) it reflects factor costs since many production inputs, such as labour, are priced in line with the CPI, and so it may provide a useful indicator for the cost of production. However, despite these advantages, the CPI in Saudi Arabia may not have a high enough degree of accuracy to represent the price of non-tradables. This can be attributed to the following factors: (i) the CPI contains both traded and non-traded goods.

Figures 5.3 and 5.4 show that the shares of traded and non-traded goods for the Middle Income Index are 62 and 38 percent respectively, while for all cities, they are 60 and 40 percent respectively; (ii) the All Cities Price Index was not available prior to 1979, which means the Middle Income Index must be used prior to that date. The latter index does not include non-Saudi households, it covers only five (and later ten) major cities (50 percent of the

Figure 5.3 Cost of Living (Middle Income Index)

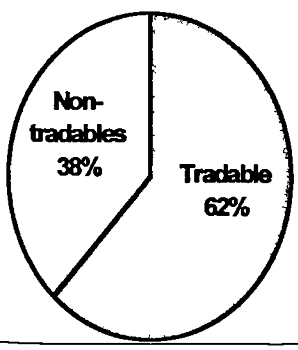
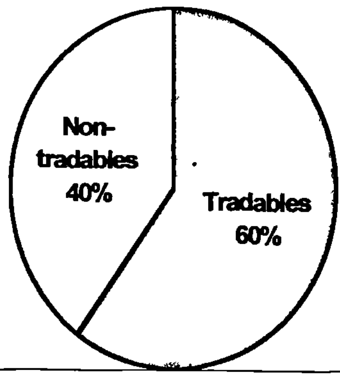


Figure 5.4 Cost of Living (All Cities)



Source: derived from Central Department of Statistics, Ministry of Planning, Saudi Arabia, 1998.

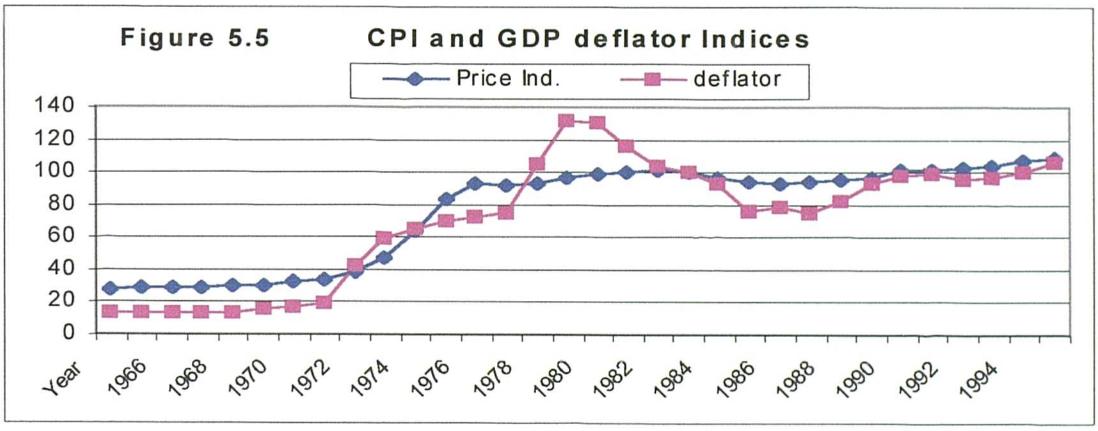
entire population); (iii) the CPI does not include the rate and prices of intermediate inputs, capital goods and raw materials, which determine the final price of goods.

One can conclude that the Saudi CPI provides a partial rather than a comprehensive measure of the price level in general and the price of non-traded goods in particular. The GDP deflator can be used as an alternative proxy for the movement of non-traded goods' prices.

5.4.2 The GDP Deflator

In the economic literature, the GDP implicit deflator is calculated as the ratio of nominal GDP in a given year to real GDP of that year (Dornbusch and Fischer, 1994). Since the GDP deflator is based on a calculation involving all the goods produced in the economy, it is a widely based price index that is frequently used to measure price changes. Kravis and Lipsey (1978) chose the GDP deflator as the one with the strongest claim to represent a general measure of a country's price level. They attributed this to the fact that it is based on a conceptual framework that assigns an appropriate weight to each category of goods, whatever the classification chosen, as, for example, between traded and non-traded goods. Wood (1991), De Gregorio et al (1993), and Micossi and Milesi-Ferretti (1994) have focused on the GDP deflator to measure the real exchange rate changes and they consider it as the more conventional measure.

In Saudi Arabia, the GDP deflator provides a precise measure for the movement of price level in general and the price of non-traded goods in particular. This outcome is derived from many factors: (i) it provides a comprehensive measure of price level since it contains all goods produced domestically, unlike the CPI, which covers between 150 and 220 items only for 50 percent of the Saudi population; (ii) since both GDP deflator and CPI include a large portion of tradables, as Figure 5.5 suggests, there is a high correlation between GDP deflator movements and those of the domestic economic trends, although the GDP deflator does not include prices of imports but only prices of goods produced domestically. The upward trend in the early and late 1970s and the downward trend in 1986 indicate the movement of the GDP deflator as being more consistent with the trend of the economy than the CPI does. Clark et al. (1994) argue that goods with too high a price may be excluded from the CPI which may lead to a sampling bias; (iii) the basket of goods included in the GDP deflator differs from year to year, depending on what is produced in the economy each year, while the CPI measures the cost of a given basket of goods, which is the same as in previous years.



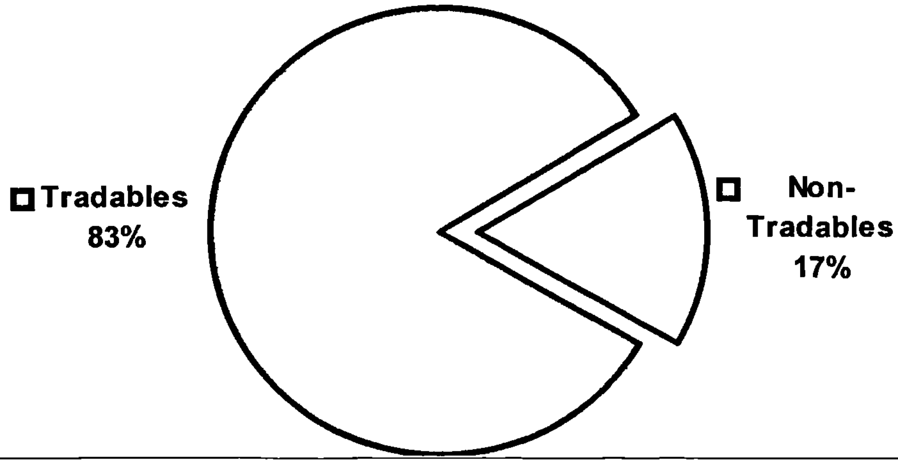
5.4.3 Wholesale Price Index (WPI) and Import Price Index (MPI)

The Wholesale Price Index is one of the price indices most widely used to measure the cost of a given basket of goods. It differs from the CPI partly in its coverage, which includes, for example, raw materials and semi-finished goods. In addition, the WPI is designed to measure prices at an early stage of the distribution system, while the CPI measures prices at the point where urban households actually do their spending. At the retail level, the WPI is constructed from prices at the point of the first significant commercial transactions. This makes the WPI a relatively flexible price index and one that generally signals changes in the general price level. Since the occasional movements of traded goods prices are presumably more similar in different countries than those of non-tradables, the WPI is historically the index most widely used as a proxy for prices of traded goods, due to its inclusion of a higher proportion of traded goods than either the GDP deflator or the CPI (Kravis and Lipsey, 1978)

Papell (1994) found in his empirical study on the effect of the exchange rate on the price level on the Group Seven (7G) countries that the strongest effect was on the UK, followed by the US and Canada when the prices are measured by the WPI (Papell, 1994). Zietz (1996), Edwards (1989), and Harberger (1986) among others, suggest using the WPI as a proxy for the price of tradables since it contains heavily traded goods.

However, the Import Price Index (MPI) can be used as an alternative measure of the price of tradables. With regard to the Saudi Arabian import price index, Figure 5.6 shows that it contains 83 and 17 percent of tradables and nontradables respectively. Nevertheless, the Saudi Import Price Index is limited in scope as it only covers imported retail prices. This deficiency emerges from the fact that the Saudi MPI does include imported military goods, wholesale items and capital goods. In addition, there are many reasons not to use the MPI as a precise proxy for representing tradable prices: (i) an import price index should cover all imported goods rather than just retail imported goods (ii) a retail import price does not use prices that are collected at the point of entry and usually include C.I.F. (cost, insurance and freight); (iii) even with respect to imported retail items, prices can vary substantially from what they were at the point of entry. This can be due to many factors such as tariffs, changes in the margin of wholesalers or retailers and changes in the transportation costs.

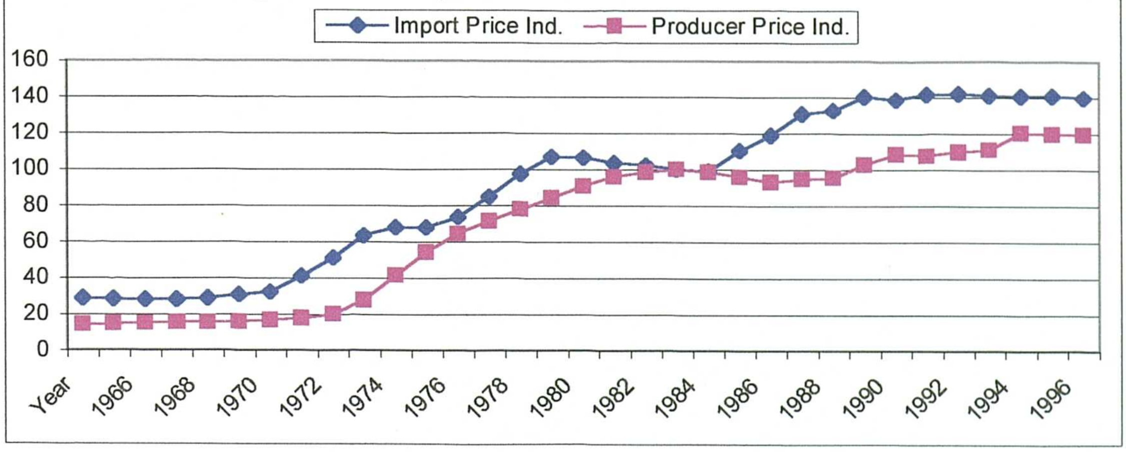
Figure 5.6 Shares of Traded and Nontraded goods in MPI (1988=100)



Source: Derived from Central Department of Statistics, Ministry of Planning, Saudi Arabia, 1998.

Accordingly, the Saudi WPI will be used as an indicator for the movement of the price of tradables. It covers all major commercial transactions carried out in the primary markets in the country. The Saudi WPI includes transactions of domestic and imported goods, crude and processed materials, and agricultural and manufactured goods. In addition, it includes government purchases, except for military goods, and sales of goods. The sampling frame in the WPI is drawn from lists of wholesalers in Riyadh, Jeddah and Dammam. The calculation of the WPI is based on more than 160 items among ten SITC (Standard International Trade Categories) sections (Central Department of Statistics, 1998). Figure 5.7 indicates that both indices' (MPI and WPI) movements are similar, but the WPI has a lower trend than the MPI. This can be due to the fact that the retail MPI includes some factors that cause higher prices, such as transportation costs, the wholesale and retail profit margin, and tariffs inclusion. In sum, the Saudi WPI will be chosen to represent the price of tradables, while the Saudi GDP deflator will be used as a proxy for the price of nontradables. These measures can show the movements of the domestic relative prices and the movements of the real exchange rate over the sample period. Therefore, these two indices will be used to represent the relative price of nontraded goods with respect to traded goods.

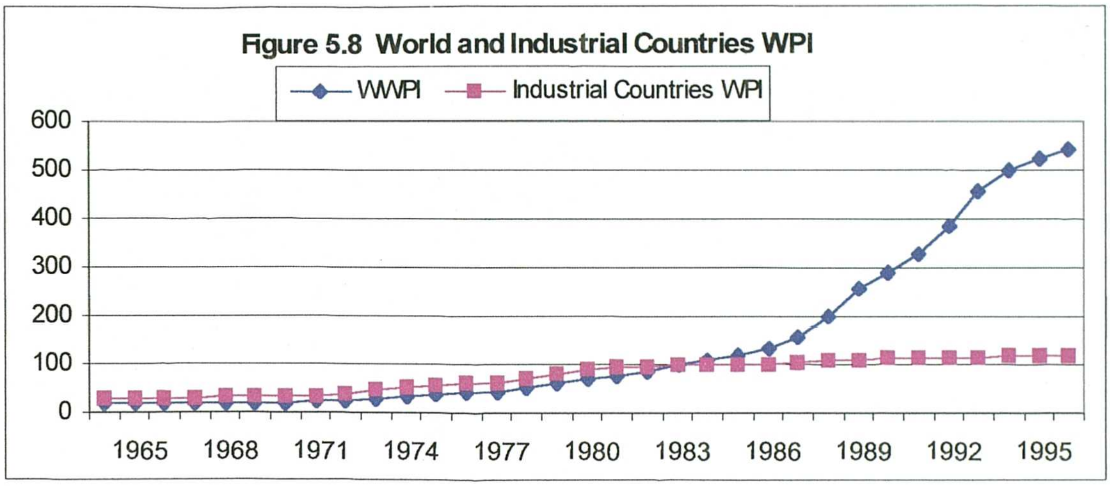
Figure 5.7 Import and Wholesale Price Indices



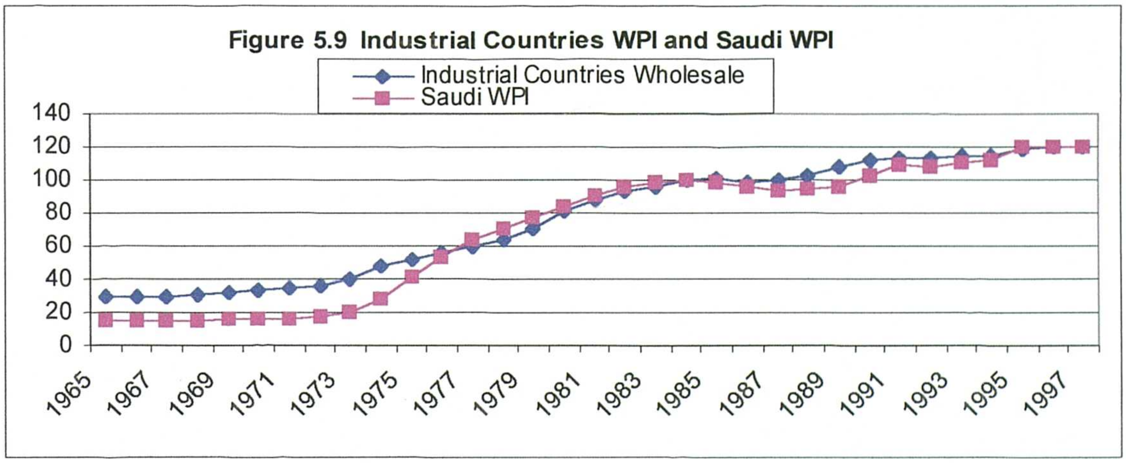
5.4.4 World and Industrial Wholesale Price Indices

Some empirical studies, have constructed different measures, such as the World Price Index or the price index of the most common trading partner countries, in order to represent the price of traded goods, rather than using a domestic one. The aim of using the foreign index is to measure the movement of the relative prices and the real exchange rate over time to assess a country's export competitiveness. Figure 5.8 shows the sharp upward increase in movement of the World Price Index following the mid-1980s. This might be attributed to higher inflation rates in developing countries (for example, due to the debit crisis of the 1980s) and/or the economic developments in the economies in transition in Eastern Europe and the former Soviet Union.

Therefore, the World WPI is a relatively poor proxy to represent the movements of the prices of traded goods.



On the other hand, Figure 5.9 shows the similarly between the Saudi and Industrial countries' WPI. The reason behind this is that the industrial countries are the most common trading partners of Saudi Arabia.



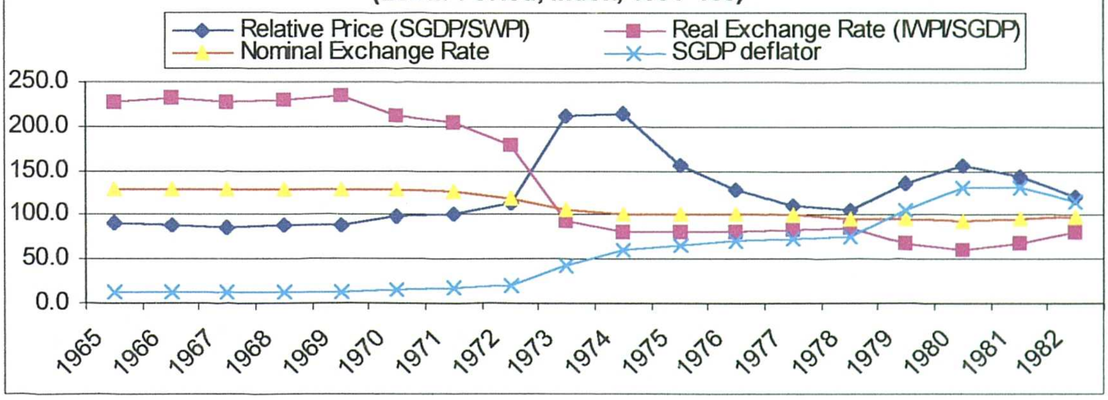
Accordingly, the industrial countries' WPI will be chosen to represent the price of traded goods. In sum, the traded and nontraded goods' price proxies are the industrial countries' WPI and the Saudi GDP deflator respectively. This outcome allows a focus on the movements of the Saudi Arabian real exchange rate.

5.4.5 The Relative Prices and Real Exchange Rate

The impact of the natural resource export revenues relies mainly on changes in the relative price of nontraded goods in terms of traded goods and on changes in the real exchange rate. These two variables have a major influence on an economy through their impacts on the reallocation of domestic resources.

The importance of the relative price of nontraded and traded goods comes from the equilibrium response to a shock originating in the real sector of the economy and, as such, does not warrant monetary policy interventions and exchange rate realignment. Figure 5.10 shows that the Saudi Arabian relative price of non-traded goods in terms of traded goods, measured by the ratio of the Saudi GDP deflator to the Saudi WPI, had an upward trend in 1973-74. The percentage increase in the relative price of the non-tradable with respect to the tradable goods was 88.4 percent. This sharp increase indicates persistent inflation differentials between the two categories of goods.

Figure 5.10 Saudi Relative Price, Exchange Rates and GDP Deflator (Boom Period, Index, 1984=100)



This phenomenon (a rise in the relative price of nontradables, i.e., a real appreciation) may have been caused by a number of factors such as: (i) a rise in oil price and oil production in the first oil shock and (ii) a temporary increase in government purchases of nontradables, which led to a temporary increase in total spending; (iii) the higher demand for nontradables by households and government, which caused bottlenecks in the economy (because of limited capacity in physical infrastructure, shortages in housing and construction). The relative price experienced a comparatively downward trend between 1975 and 1978. This was due to the government tightening its fiscal policy, implemented in order to mitigate the effect of the high inflation of the previous years. The Iranian Revolution commenced in 1979, followed by the Iranian-Iraqi war. This caused another oil price shock inducing a rise in the relative price of nontradable goods in terms of tradable goods. The subsequent increase in the relative price of the nontraded goods sector remained high until the end of 1981, after which the Saudi Arabian oil revenues declined. The cause of such a decline was related to a deterioration in the international oil demand resulting from the world recession, and also due to the adoption of an oil conservation policy in the Industrialised countries. Furthermore, the share of the non-OPEC countries in the international market increased at the expense of the OPEC countries' share. These factors, including the excess production of some OPEC countries, led to a decline in the Saudi oil production since it was practising as an oil swing producer in OPEC.

The Saudi Arabian economy has suffered from the effects of lower oil prices since 1982. Figure 5.11 shows the decline in the relative prices until 1986 when the Saudi government ceased to practice swing production in the world market. With regard to the Saudi nominal exchange rate, Figure 5.12 shows that it has two features. The first is that the Saudi Riyal (SR), vis-a vis the US dollar, is relatively fixed as a matter of policy which was subject to a slight depreciation occurring in 1973. The second is that the movement of the Saudi Riyal followed closely the movement of the US dollar.

Figure 5.11 Saudi Relative Price, Exchange Rates and GDP Deflator (Slump Period, Index, 1984=100)

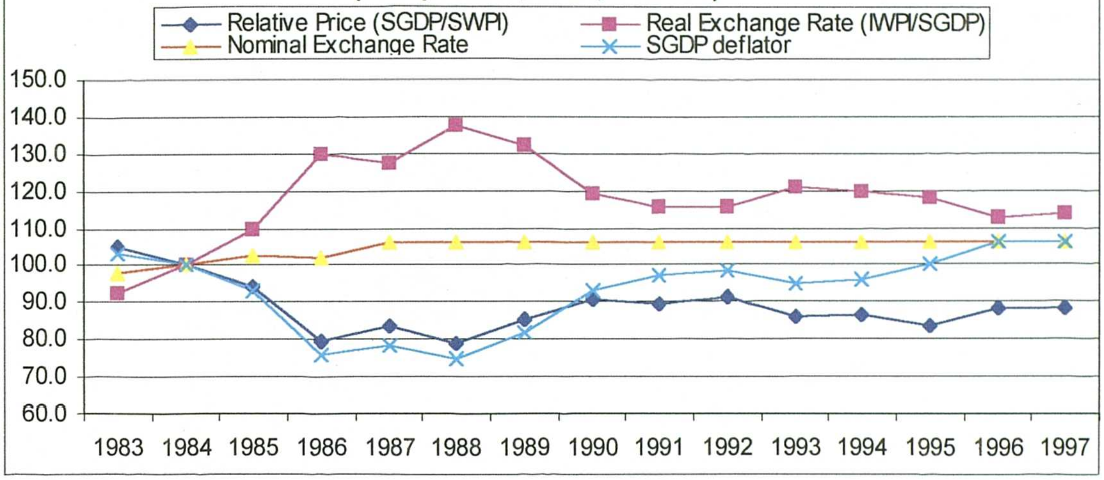
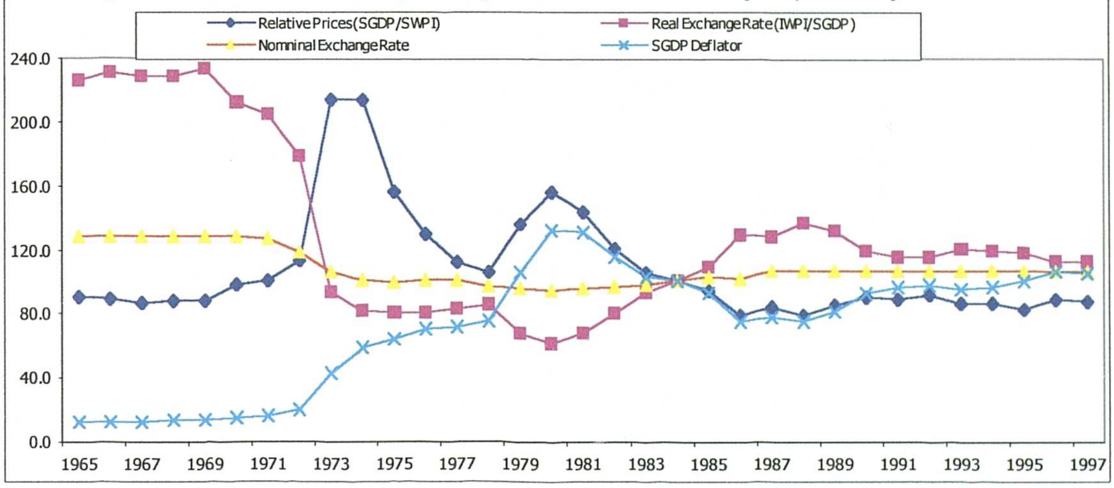


Figure 5.12 Saudi Relative Price, Exchange Rates and GDP Deflator (Index, 1984=100)



However, one would expect the nominal exchange rate to have no significant influence on the relative prices. Therefore, the nominal exchange rate must be adjusted for the movement in prices to measure the country's external competitiveness. This adjustment is known as the real exchange rate (RER). As mentioned in the previous chapter, there are two definitions of the RER: (i) one is that it corresponds to the relative price of traded goods with respect to nontraded goods; (ii) the other, and more conventional, definition is that the measure of the RER is the ratio between the most common trading partners' Wholesale Price Index and the domestic GDP deflator. An important difference between the two measures of the RER is that the first one measures the relative price between two types of domestic goods and, in contrast, the second one measures the relative price between domestic and foreign goods. The latter definition is implemented here, since the former is adopted by reversing it to measure the relative price of nontradable in terms of tradable goods. Nevertheless, Figures 5.10, 5.11, and 5.12 show that the two measures exhibit similar patterns since a sizeable portion of the change in domestic RER may have been driven by changes in the domestic relative prices. The only exception to the two trends occurred between 1975 and 1978. These differences might be attributed to the rise in costs and prices in the industrial countries, resulting from the first oil price shock, with regard to the Saudi price levels.

On the other hand, depreciation started to take place in 1982 to reach its peak of 19.1 percent, while it stood at 15 and 18.6 percent in 1983 and 1986 respectively. The annual average depreciation in the slump period (i.e., between 1982 to 1986) was 11.3 percent. This was followed by a slight appreciation (1.3 percent) in 1991 when Iraq invaded Kuwait, prices of oil increased and the Saudi Arabian government spending was raised to cover the cost of the liberation of Kuwait. The average of the annual decline in the period from 1982 to 1997 was 2.24 percent.

Overall, one can conclude that the movements of the real exchange rate and the relative price of nontraded with respect to traded goods can be related to the oil export boom and slump. These upward and downward trends are illustrated in Figure 5.12.

5.5 Selected Exogenous and Endogenous Variables

Having discussed the proxies used to represent the relative prices and the real exchange rate, it is useful to provide some stylised facts about the major variables used in this study, particularly those which need more attention in terms of their calculations, such as the price of oil, or in terms of their determinations, such as the real government expenditure, the real non-oil GDP and the money supply.

5.5.1- Oil Prices and Oil Revenues

Since the oil prices are volatile on a daily basis and the data used in this study are concerned with annual figures, one can adjust these prices to give a clear picture of the oil price movements during the entire year. Therefore, the data collected from the OPEC Statistical Bulletin are based on monthly figures and have been adjusted by taking the average prices of the twelve months to represent the whole year, whilst the data collected from the Saudi Achievement Plans are based on quarterly figures, which have been similarly amended by taking the average prices for the four quarters. Despite the differences in sources of data, the prices of oil extracted are almost identical. In addition, since the price of oil is denominated in US dollars, it is useful to use it as long as the Saudi Riyal is pegged to the US dollar.

In the oil market, the pricing of oil depends upon a number of factors, the most influential of which is the quality of oil determined by the index of the API (American Petroleum Institute) gravity. Saudi Arabia produces a range of crude oils. Historically, the four major grades produced have been Arab Berri (API gravity of about 39°), Arab Light (API about 34°), Arab Medium (API about 30°)

and Arab Heavy (API about 28°). In addition, the secondary grades produced in recent years have been Arab Extra Light (API about 37°) and Arab Super Light, whose API between 39° and 52.9°) (Middle East Oil and Gas, 1994).

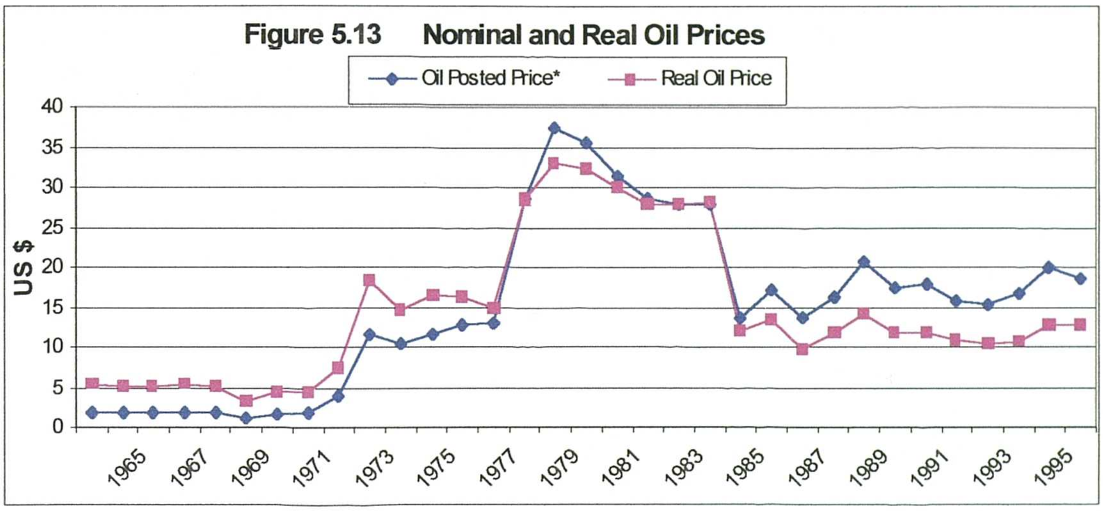
Since there are different oil qualities and thus prices, the price of oil used in this study is the price representing the Arab Light crude oil only. The reasons for choosing this kind of oil are related to two factors: its role in the OPEC pricing system and its share in the total Saudi oil production. Regarding the former, OPEC used the price of Arab Light as an indicator for all OPEC members' crude oils from its birth to the early 1980s. Regarding the latter. Table 5.1 shows that the Arab Light has been the dominant crude oil produced in Saudi Arabia and sold on the world market from 1965 up to now. The highest share of this oil was 81 percent, reached in 1975, while the lowest was 53 percent in 1985. Since 1995, the country has developed new fields (Hawtah, Dilam, Raghib, Ghinah, and Hazmiyah) which contain light crude oil. As production of the lighter grade increases, the output of Arab Heavy and Arab Medium will be reduced (Middle East Oil and Gas, 1995).

Table 5.1 Shares of the Saudi Crude Oil by Grade*

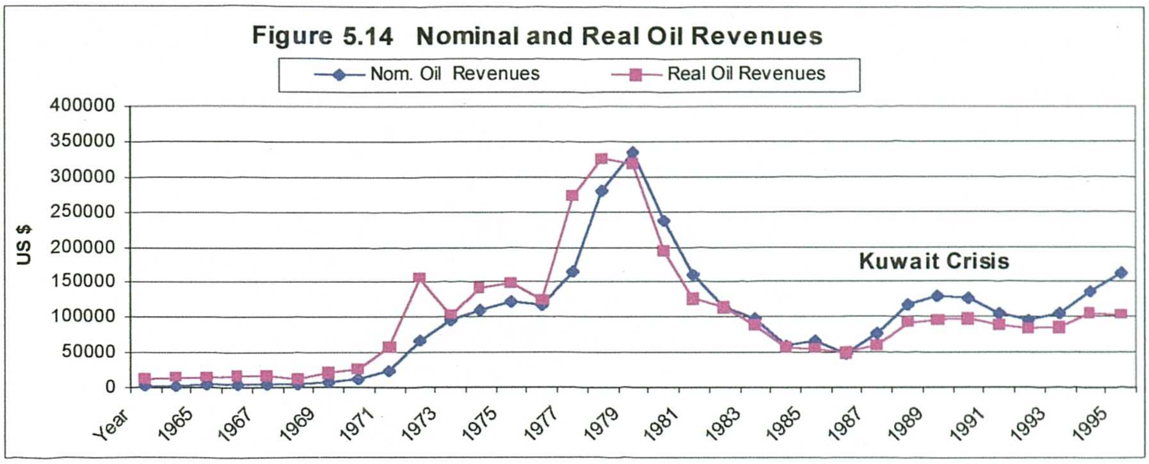
Year	Heavy 28.0/3.0	Medium 30.3/2.4	Light 34.2/1.7	Extra Light 39.0/0.87
1965	23.3	8.0	68.6	0.0
1970	22.3	7.1	69.4	1.2
1975	9.1	4.0	81.0	5.9
1980	16.4	11.2	66.9	5.5
1985	25.0	15.3	53.0	6.6
1990	13.4	15.7	61.4	9.4
1994	10.2	12.1	63.7	14.0

* Numbers below crude names indicate the API gravity percentage of Sulphur by weight
Sources: Middle East Oil and Gas, OECD, 1995.
OPEC, Annual Statistical Bulletin, 1997.

Turning to fluctuations in oil prices and revenues, one should first focus on both nominal (market) and real prices (adjusted by inflation rate and exchange rate changes). Figure 5.13 shows that both real and nominal oil prices have very similar trends reflecting an upward movement during the boom period and a downward and during the rest of the sample period.



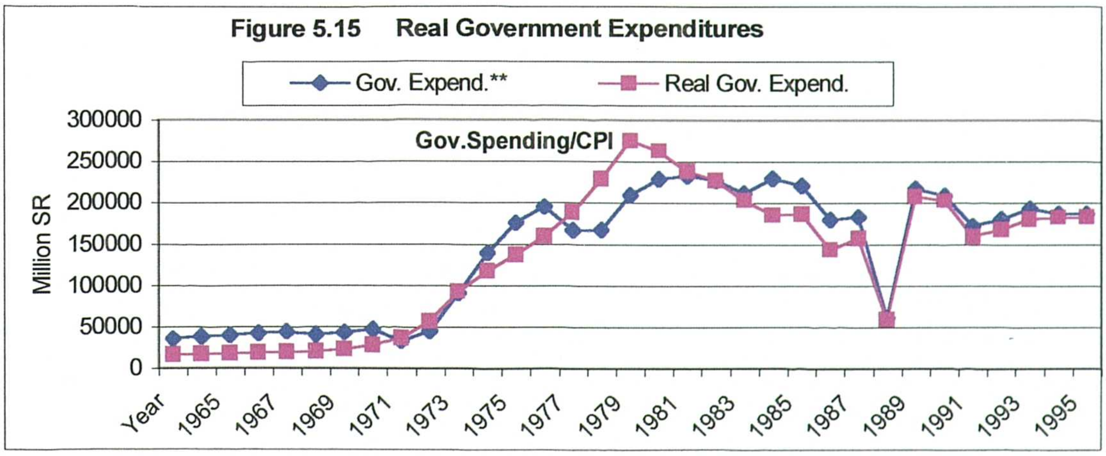
With regard to the trend of oil revenues, nominal and real oil revenues are shown in Figure 5.14 as having the same trends. In comparison to oil prices during the sample period, this shows that the both have followed the same trend with the exception of 1990-91 when the Saudi government agreed to increase its production to compensate for the shortage in the world oil market's demand resulting from the invasion of Kuwait. However, the oil revenues tended to decline at a faster rate than the oil prices did. This can be attributed, as mentioned earlier, to the decline in the Saudi quota in OPEC and the World market, particularly from 1982 to 1986, when its production fell from five million barrels a day to about three million barrels a day. For this reason, the oil revenue is included as an exogenous variable and it might have a similar



or higher impact than oil price does.

5.5.2 Government Expenditures

As has been indicated in the previous chapters, government spending plays a dominant role in the entire economy due to the fact that all oil and non-oil revenues accrue directly to the government. Figure 5.15 shows the government spending adjusted by the CPI and the GDP deflator. Although they have to follow the same trend, government spending deflated by the CPI seems to be more sensitive than if the GDP deflator measures it. Nevertheless, both measures indicate that the government spending from 1965 to 1972 was relatively constant, and thereafter, it increased continuously during the first and second oil shocks.



This outcome was not surprising since the Saudi Arabian economy was limited and the acceleration of the pace of development requires government spending in order to improve the human and physical infrastructures, and to develop the agricultural and manufacturing sectors. On the other hand, this has been associated with bottlenecks, which have caused inflationary pressures.

The completion of the major infrastructure and the existence of a higher rate of inflation in the early and mid 1970s convinced the government to reduce its spending temporarily between 1976 and 1978 (shown clearly by the downward trend in government spending adjusted by the GDP deflator). The reduction afterwards was straightforward due to the decline in oil price and/or oil production. The sharp decline in the early 1990s was related to reallocation of financial resources in favour of the liberation of Kuwait, and although high expenses were paid, they were included in the government budget.

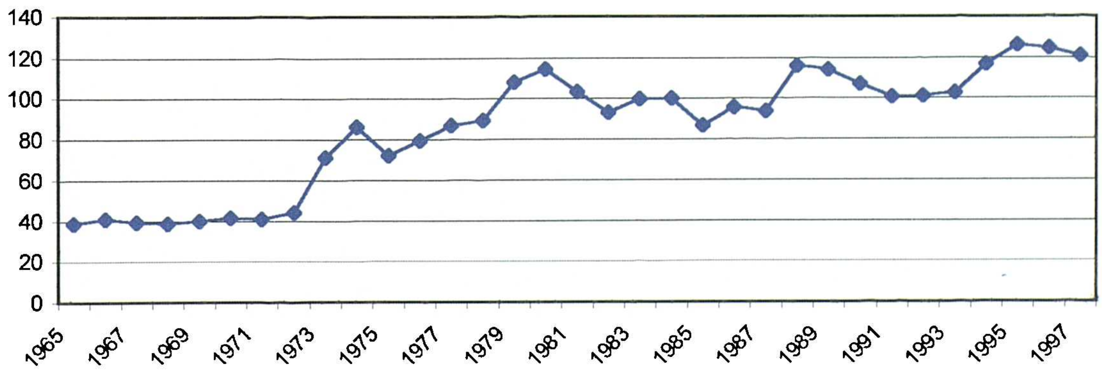
5.5.3 Industrial Commodity Price Index

Considering the spending effect, the core model of the Dutch disease concludes that the increase in oil revenues raises the relative price of nontraded goods (profitability) and expands their output at the expense of traded goods. In fact, however, the traded goods sector expanded in most developing countries following the oil boom. Neary and Wijinbergen (1986) attributed the expansion of the traded goods to protection of this sector by the tariffs and quotas imposed. Fardamanesh (1990) provides another explanation for such an expansion: the rise in the world price of traded goods. He points out that the rise in the world price of oil raised the world relative price of traded goods through increases in the oil import cost and hence, the production cost of traded goods in the developed-exporting countries. Since the Saudi Arabian economy was and still is an open economy, the expansion in traded goods cannot be due to the adoption of prohibitive barriers, but may a result of other factors such as the rise of the competitive trade countries and/or subsidies provided by the government. As a result, the commodity price index of the most commonly trading countries with Saudi Arabia has to be included as an exogenous variable. The objective of doing so is to test the impact of such an effect on the composition of the sectoral output in the domestic economy. Figure 5.16 shows that there was a rise in the industrial countries' price index during the period of the boom from 1973 to 1981, followed by a slight fluctuation.

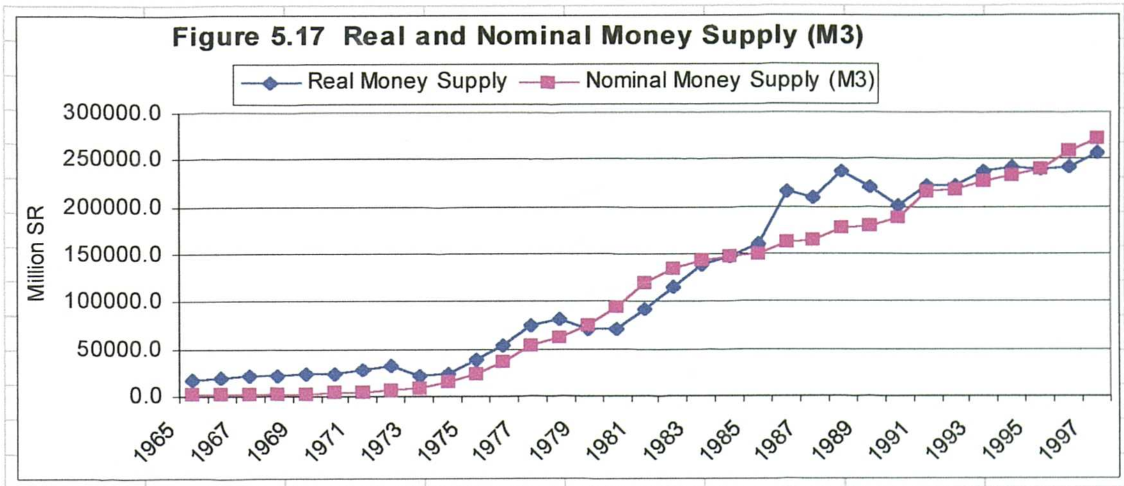
5.5.4 Money Supply

Money supply can be defined both narrowly and broadly. The former definition covers currency outside banks and demand deposits (M1), whereas the broad definition includes M1, time and savings deposits, and other quasi-monetary deposits (i.e., residents' foreign currency deposits, marginal deposits for letter credits, guarantees and outstanding remittances). It is useful to use the broad money definition since it is a comprehensive indicator, which may accurately be employed as a measurement of the spending effect. Therefore,

Figure 5.16 Industrial Commodity Price Index



focusing on the impact of export earning fluctuations requires the money supply to be used in real terms. The domestic government spending exercises a dominant influence on the money supply through being the major source of liquidity. For instance, in the late 1970s and the early 1980s, 90 percent of the gross liquidity came from the government cash flows. As just noted, when inflationary pressures increase, the government shows some fiscal restraint. There are strong links between government spending and the money supply, and given the freedom of transferring foreign exchanges, the role of the monetary policy becomes limited and major monetary expansion is brought about through the regulation adopted by government spending via its budget. Figure 5.17 shows the upward trend in nominal and real money supplies.



5.6 Descriptive Statistics

The standard descriptive statistics for all variables included in the model are provided in Tables 5.2, 5.3 and 5.4. These statistics include the mean, medium, standard deviation, skewness, kurtosis and Jarque-Bera. The first two descriptive statistics are used as the measures of the central tendency of the data being studied, while the standard deviation shows how the data used are dispersed around the central point (the mean and medium). The skewness indicates any bias in the dispersion of the data. There are two forms of skewness emerging from the symmetrical distribution. The latter indicates zero skewness in the data, while other forms show either a negative skewness if the distribution has a long tail to the left or a positive skewness if it has a long tail to the right. Whereas the skewness indicates the degree of symmetry in the frequency distribution, the kurtosis indicates the peakedness of that distribution as being normal, peaked or flatter. (Watsham and, Parramore, 1997).

A test used for checking whether the series is normally distributed is the Jarque-Bera test. It measures the difference between the skewness and kurtosis of the series and those from the normal distribution (that is, with values of zero for skewness and 3 for kurtosis), which follows the chi-square distribution with 2 degrees of freedom. Under the p-value (representing the probability) method, one can accept the null hypothesis of the normal distribution if the reported probability exceeds the designated level of significance (that is, 1 or 5 percent). Tables 5.2, 5.3 and 5.4 represent the descriptive statistics for the entire sample period (1965-1997), the boom period (1965-1981) and the slump period (1982-1997). All probability values for the real variables of the government spending (G), the money supply (Ms), nontraded goods (S), traded goods (T), the real exchange rate (RER), relative prices (RP), the industrial commodity price index (WP) oil revenues (REV) and the price of oil (Po) are lead to the acceptance of the null hypothesis of the normal distribution for all variables at a 1 percent level of significance as well as at a 5 percent level of significance except for the relative price in the slump period.

5.7 Summary

The model's major component variables have been briefly described in terms of their derivation, movement trends and references. Since the fluctuations in the Saudi Arabian oil revenues and prices are temporary, the value of variables is measured in real terms using the year 1984, the middle year of the sample period as the base year in order to shed light on changes in the real economy.

Furthermore, the traded and non-traded goods sectors have been specified due to the division by the Saudi Arabian government of its non-oil GDP components. The traded goods sector includes agriculture, manufacturing, forestry, and fishery, while the residuals are defined as representing the non-traded goods sectors.

With regard to the proxies used to represent the relative price of non-traded in terms of traded goods, the domestic GDP deflator is used as an indicator of the price of the non-traded goods sector, while the domestic Wholesale Price Index is used as a proxy for the traded goods. However, the real exchange rate is measured by the ratio of the Industrial Countries' Wholesale Price Index to the domestic GDP deflator. The former represents the price of traded goods in the most of the trading partner countries, while the latter represents the domestic prices of non-traded goods.

Generally speaking, the movements of relative prices and the real exchange rate are sensitive to changes taking place in some variables, particularly, oil revenues and government expenditures. Not surprisingly, the economic fluctuations are associated with changes in oil revenues since the economy operates procyclically according to oil market movements.

Table 5.2 Test for Normality (1965-1997)

	G	Ms	S	T	RER	RP	WP	REV	PO
Mean	11.464	10.750	11.628	9.707	4.788	4.389	4.379	11.136	2.476
Medium	11.966	11.690	12.088	9.795	4.752	4.265	4.539	11.404	2.485
Standard Deviation	0.986	1.733	0.660	0.774	0.399	0.413	0.415	0.956	0.654
Skewness	-0.829	-0.697	-0.725	-0.156	0.354	0.226	-0.865	-0.481	-0.152
Kurtosis	1.996	1.839	1.826	1.464	2.122	1.845	2.156	2.293	2.124
Jarque-Bera	5.172	4.529	4.787	3.376	1.747	2.113	5.093	1.961	1.182
Probability	0.075	0.104	0.091	0.184	0.417	0.347	0.078	0.375	0.553
Observations	33	33	33	33	33	33	33	33	33

Computations were performed using EVIEWS 3.0.

Table 5.3 Test for Normality (1965-1981)

	G	Ms	S	T	RER	RP	WP	REV	PO
Mean	10.855	9.428	11.137	9.036	4.834	4.425	4.115	10.899	2.274
Medium	10.504	9.075	10.981	8.974	4.536	4.709	4.262	10.942	2.007
Standard Deviation	1.048	1.458	0.584	0.396	0.544	0.550	0.424	1.262	0.783
Skewness	0.307	0.255	0.370	0.415	0.055	-0.041	0.107	0.107	0.277
Kurtosis	1.443	1.462	1.647	2.060	1.174	1.153	1.308	1.373	1.582
Jarque-Bera	1.984	1.860	1.685	1.114	2.369	2.420	2.060	1.907	1.640
Probability	0.371	0.394	0.430	0.573	0.305	0.3705	0.357	0.385	0.440
Observations	17	17	17	17	17	17	17	17	17

Table 5.4 Test for Normality (1982-1997)

	G	Ms	S	T	RER	RP	WP	REV	PO
Mean	12.111	12.156	12.150	10.149	4.739	4.351	4.659	11.388	2.690
Medium	12.119	12.124	12.138	10.527	4.762	4.264	4.624	11.408	2.517
Standard Deviation	0.188	0.223	0.049	0.244	0.136	0.197	0.113	0.345	0.404
Skewness	0.246	0.033	0.852	-0.955	-1.154	1.450	0.115	0.210	0.973
Kurtosis	2.343	1.703	2.580	2.691	4.010	3.773	1.901	3.147	2.219
Jarque-Bera	0.449	1.123	2.056	2.496	4.236	6.006	0.840	0.133	2.932
Probability	0.798	0.570	0.357	0.287	0.120	0.050	0.656	0.935	0.230
Observations	16	16	16	16	16	16	16	16	16

Chapter Six

The Empirical Results of the Oil Boom

6.1 Introduction

The sudden and sharp increases in oil prices and the new discovery of oil in the North Sea in 1970s have contributed to a renewal of interests in the economic impacts of the oil boom on a domestic economy. The oil boom represents, on the one hand, opportunities for the accelerated development of the domestic economy, rising standards of living, increasing economic welfare and improving the balance of payments, and on the other hand, the traditional traded goods sector can be adversely affected by the boom and may even lead to 'de-industrialisation'. The squeeze in the non-oil traded goods sector in this context is stigmatised as the 'Dutch disease phenomenon'.

This phenomenon has been the subject of many studies in developed and developing countries. As previously pointed out in Chapter 2, theoretical and empirical studies have been conducted in the developed countries, mainly in the U.K and the Netherlands. Examples of such studies are these of Corden and Neary (1980), Forsyth and Kay (1980), Eastwood and Venables (1982), Buiter and Purvis (1982), Bruno and Sach (1982) and Wijnbergen (1984) among others. However, there is a debate, especially in the U.K on the cause of the decline in the manufacturing sector in the late 1970 and early 1980s. Forsyth and Kay emphasise that the discovery of oil in the North Sea has led to an appreciation in the sterling pound which negatively affected the relative size of the traded goods sector. On the other hand, Bean (1986) argues that the decline in the manufacturing sector might be related to the adoption of contractionary fiscal and monetary policies in 1979-81 by the Conservative government, aimed at combating inflation and reducing the size of public sector. Moreover, Eastwood and Venables (1982) pointed out that the discovery of oil leads to an expansionary effect on the economy unless there is a gap between the discovery of oil and the increased demand, while Buiter and Purvis (1982) argue that the discovery of oil may lead to a contractionary effect.

Although most of the studies on the Dutch disease have referred to developed countries, a great deal of studies has focused on the impact of windfalls on the developing countries. These studies have taken into account the characteristics of developing countries. Examples of such studies are: Al-Gaeed (1991), Fardamensh (1991), Looney (1990), Warr (1986), Stevens (1986), Pinto (1987), Usui (1996), Zind (1999) among others. Focusing on the impact of oil price increases on Saudi Arabia and some oil-exporting countries, there is a controversial issue about whether the oil price increase can lead to a deterioration in the traded goods sector. Al-Gaeed (1991) empirically confirms the presence of the classic Dutch disease in Saudi Arabia during the boom period, while Stevens (1986) argues that the Gulf countries are highly unlikely to be subject to such a phenomenon. The reason behind this is that the Gulf countries had actually few directly productive activities before the discovery of oil, and hence there was little to be damaged. Moreover, Davis (1995) reports that developing economies with significant oil production recorded better growth performance than other developing economies in the period of 1970 to 1990. Fardamensh (1991) comes in between, arguing that the manufacturing sector may expand, while agricultural output may contract in the Gulf countries as a result of energy price increases. He attributes such an outcome to the rise in world prices of manufacturing goods, which raises the profitability of domestic production. The main criticism of his argument is it omits the striking role of the spending effect, which has an important impact on the local economies and hence on the allocation of resources.

With regard to Al-Gaeed, his empirical results stem from his examination of the impact of the oil boom during the period from 1970 to 1987. He includes six observations of the oil slump period, which might have diverted the result of his study toward a decline in the traded goods' output. Moreover, there are signs of misspecification, which appeared clearly in the explosive behaviour of some variables and the omission of the unit root test. However, Looney (1990) emphasises only the impact of the real exchange rate as a proxy for the Dutch disease on the manufacturing sector, and excludes the relative price of nontraded goods to traded goods despite its importance. Furthermore, Looney found that the manufacturing sector has expanded at about the same pace as that experienced by the nontraded goods sector.

As a result of such a controversial issue, the main purpose of this chapter is to examine empirically the consequences of the oil boom on the Saudi Arabian economy during the period from 1965 to 1981, in the sense that one should test for the existence of the Dutch disease during the sample period, particularly the main objectives of this chapter are the answers to the following questions:

- Did the oil boom represented by oil revenue, oil price and the spending effect, positively affect the relative price of the nontraded goods sector relative to the traded goods sector? If so, to what extent did the oil boom affect the relative price?

- Did the real exchange rate appreciate in response to the oil revenue, the oil price and the spending effect? If so, to what extent was the appreciation of the real exchange rate affected?
- Was the traded goods sector squeezed as a result of the oil boom? If so, to what extent was it affected and what were the causes of such an outcome?
- Did the oil boom bring about an expansion of the nontraded goods sector? If so, how and to what extent did it do so?

The answers to these questions may not be adequate unless the policy response to the boom is discussed. Therefore, the secondary purpose of this chapter is to discuss the government policy response both within the context of the analysis and also separately.

The chapter is organised as follows: Section 6.2 discusses briefly the stationarity and cointegration and their implications for the econometric model. In section 6.3, modelling approaches are reviewed. In section 6.4, the specifications of each dependent variable's structural equation and estimation in log terms, as well as the empirical results, are identified and discussed. Section 6.5 is devoted to the government policy response adopted during the boom period. The conclusion is provided in section 6.6.

6.2 Stationarity

Time series analysis assumes implicitly that the data being analysed are in fact stationary. This implies that the mean, the variance and the covariance of a time series remain the same no matter at what time a series is measured. However, in practice, most the time series are nonstationary since the value of the variable in one period is an important factor in determining the variable's value in the following period, and the error terms for successive observations are autocorrelated (Maddala, 1992). So regressing a time series variable on another time series variable, where both exhibit strong trend (sustained upward and downward movement), will often exhibit a very high coefficient of determination (i.e., R^2) even though there is no meaningful relationship between variables. This situation exemplifies the problem of spurious regression due to the fact that the high R^2 observed is due to the presence of the trend rather than to the exhibition of the true relationship between variables involved in the model (Gujarati, 1995).

To avoid spurious regression, it is necessary to test for stationary via the unit root test, as the common approach in determining the order of integration needed for obtaining stationarity. If the data shows stationarity at the level, it will be integrated of order zero, denoted as $I(0)$. On the other hand, if a time series is non-stationary, and needs to be made stationary, it must be transformed in such a way that its moments of distribution are no longer time-dependent. This can be carried out by taking the differences of that variable; that is a difference stationarity process. If the first difference of non-stationary variable is stationary, that the variable is said to be integrated of order one, written as $I(1)$, while if second differences are required to achieve stationarity, then the variable is integrated of order two and so on[1].

It is appropriate to use Dickey-Fuller (DF) approach for unit root test. This approach is robust against reasonable degree of heteroscedasticity, but autocorrelation causes problem. This problem of testing for stationarity when there is autocorrelation in the residuals, is solved by using either the Augmented Dickey-Fuller (ADF) or Phillips and Perron (PP) tests. These approachs incorporate lagged values of the dependent variable in the regression equation, with the number of lags being chosen, simply to be sufficient to remove the autocorrelation in the residuals (Watsham and Parramore, 1998). Nevertheless, the ADF test yields spurious rejections of the unit root null hypothesis. This result is due to the fact that the ADF test does not take into account the broken linear trend, particularly when it comes relatively early (Kim et al, 1999) as in the case under investigation. Consequently, the PP test is used since the Saudi Arabian economy was subject to a significant oil shock in the early 1970s[2].

By using PP test to check if the variable selected has a unit root, the null hypothesis of nonstationarity can be rejected if the test statistics exceeds the critical value that relates to the 95 percent and 99 percent levels of confidence. Table A1, postulates the unit root test for all variables at levels, first and second differences at 5% and 1% levels of significance. All variables show nonstationartiy at the levels and thus the null hypothesis is accepted as long as the test statistics are smaller than the critical values. However, the first difference series of the government expenditure (G), the price of oil (Po), the real exchange rate (RER), the oil revenue (REV) and the world price index (WP) exhibit stationarity, while the money supply (Ms), the relative price (RP), traded goods (T), and nontraded goods (S), show stationarity at second difference since PP test statistics exceed the MacKinnon critical values. However, both the constant and the trend are included in the test regression because the data seem to contain trend as shown visually in chapter five. Bearing in mind that all variables will be first differenced before being estimated. The aim of such, as stated earlier, is to avoid any spurious and misleading results.

6.3 Modelling Approaches

Although the main concern of this chapter is to estimate the formulated model to explain the relationship between the dependent and independent variables, one should first elaborate on the two approaches used to arrive at the final model.

Both approaches stem from the choice of independent variables based on economic theory, other similar studies and previous experience. The two approaches to model formulation differ considerably in terms of their methodologies as follows:

General to specific modelling (Hendry's/LSE approach): this method starts with a general unrestricted model, which includes more lags and variables than one would normally start with. Then one can reduce the model by eliminating one at time the variable with the least significant coefficient. Diagnostic tools, frequently used are the Lagrange Multiplier (LM) and Wald tests to simplify the model. The advantage of using this approach is that it increases the precision of the estimates because of reduced multicollinearity. In addition, it increases the degrees of freedom and makes the estimate more reliable and induced greater power of test.

Although this approach is preferable in principle, using it in its pure form might be troublesome. This comes from the fact that adding variables with their lags are likely to cause independent variables to have high correlation. This high correlation often makes it difficult to measure separate impacts on explanatory variables (Ramanathan, 1998). To overcome such a problem, one can use alternative approach, namely *Specific to general modelling:* this method starts with a basic specification about which an investigator has a great deal of confidence, and then performs diagnostic tests that suggest whether more variables should be added. A diagnostic tool frequently used in this approach is the LM test as well as Likelihood Ratio (LR) and the Wald test.

Since both approaches have their own advantages and disadvantages, which are discussed in Kennedy (1999) in more details, one should use the relevant method (that is due to the number of observations and the size of available data), to select the appropriate model, in order to give robust results. However, several criteria are used to choose the most suitable model. The most commonly used criteria for model comparison are t-Statistics, F-Statistics, DW, and unadjusted and adjusted R^2 as well as other criteria such as Akaike Information Criteria (AIC), and Schwarz Criteria (SC) among others.

It is worth mentioning that the significant results in one or more diagnostic test might be at the cost of one of the others. For example, the increasing number of variables in a model causes the residual sum of squares (ESS) to decline and R^2 to rise, but at the cost of loss in degrees of freedom. Adjusted R^2 and the standard errors of the residuals take account of the trade-off between the reduction in ESS and a loss of degrees of freedom.

Accordingly, since the data used in our model are from a small-size sample (i.e., 17 observations from 1965 to 1981) due to the unavailability, data prior to 1965 and the end of the oil boom in 1981, simpler models seem to be more appropriate for three reasons. First, the inclusion of too many variables is highly likely to adversely affect the sign and magnitude of the coefficient of the variables. This is due to the possibility of multicollinearity. Second, the resulting loss of degrees of freedom is likely to reduce the power of the test preferred on the coefficient. Thus, the probability of committing a type II error (i.e., accepting a false hypothesis) increases as the degrees of freedom decrease. Third, simpler models are easier to comprehend than the complex ones. As a result, the general to specific approach is used in this study due to its advantages expressed earlier. All potential variables used in previous studies, past experience and in the economic literature are included. A sample of one model containing all suggested variables is reported in table A2. An elimination of one at time the variable with the least significant coefficient was used according to the diagnostic results until the appropriate model is chosen.

6.4 The Model Specification and Empirical Results

Having discussed both the time series properties as well as the model formulation approaches, it is now time to specify the model under investigation and exhibit the regression results. But before proceeding with such an objective, it is necessary to describe the model. It consists of four behavioural equations. Thus, there are four endogenous variables: the supply of traded goods (T), the supply of nontraded goods (NT), the relative price of nontraded goods to traded goods (RP) and the real exchange rate (RER, and four exogenous variables, notably, the oil revenue, the price of oil, the government expenditure and the broad money supply. All variables used are expressed in real terms by deflating them by appropriate indices. In addition, the necessary and order conditions of each equation are checked. It is found that all equation are over-identified.

The method used to estimate the equations is the Two-Stage Least Squares (TSLS) method. The right-hand side of the relative price and the real exchange rate equations are not correlated with the residuals. Thus, they are treated as exogenous with no simultaneity problem and thus OLS estimators can produce a consistent and efficient estimator. However, on the right-hand side of the traded and nontraded goods' equations, there are two endogenously determined variables, which are included in these equations and are correlated with the error terms. This result is tested, by using the Hausman specification error test. The test exhibits the presence of simultaneity in the real exchange rate and the relative prices variables by including them in the other two equations. Therefore, one should use the TSLS method in order to give the estimators consistency and efficiency.

However, in addition to the time series data properties, the correlation matrix indicates that the correlation coefficients are highly likely to face a problem of multicollinearity so long as the variables move together in underlying trends. In our case, one should put emphasis on retaining the variable in the model, even if the multicollinearity is present as long as two conditions are satisfied. Firstly, there is a strong theoretical reason for including the variable, even though it is not statistically significant. Secondly, when using a t-value of one as a guide to identify the candidate variable for elimination, if the t-value of such a variable is greater than one, one should retain the variable in the model. This is because if one drops a variable whose t-value is greater than one, the adjusted R^2 will be declined. In addition, handling the multicollinearity is not an easy task since this is a problem with uncontrolled experimental data, rather than with the model itself[3].

Accordingly, the model used rests mainly on economic theory and previous experience. Hence, the literature of the natural resource boom predicts that the rise in oil price (equivalent to a new discovery) results in a large transfer of wealth. This wealth spent partially or entirely on the national economy leads to great public spending. This in turn brings about a deterioration in tradables as a result of a rise in the relative price of nontradable relative to tradable goods and thus an appreciation of the real exchange rate. On the other hand, the supply of nontradable goods expands as a result of such an outcome[4]. So, one can check these consequences separately, starting first with the implication of a rise in oil price or the oil revenue associated with a proxy of the spending effect, on the relative prices and real exchange rates. This is followed by examining the impact of windfalls on structural changes, through the expansion of the output of one sector at the expense of the output of the other. Specification of the model is the first task followed by the statistical results.

6.4.1 Specification of the Relative Price

As indicated in Chapter 4, the Dutch disease theory predicts that an increase in oil revenues and/or an increase in oil prices may positively affect the relative price of the non-traded goods sector. The justification for that is straightforward. That is, as the oil revenue is spent partially or entirely on the domestic economy, the demand for both traded and non-traded goods increases. The high demand for the former is met by higher demand for imported goods (i.e., the economy is assumed to be open), while the high demand for the latter leads to an increase in the price of non-traded goods since its price is determined domestically and thus the supply of nontraded goods cannot increase immediately.

In order to trace this effect for Saudi Arabia, the first null hypothesis, which needs to be checked, is that the rise in the price of oil or oil revenues leads to an increase in the spending effect which is proxied by the government spending and/or the money supply. Thus, the oil boom affects positively the relative price of nontraded goods versus traded goods, in the sense that the hypothesis can be written as follows:

Ho: $\beta_{t\text{ and }}\lambda_t = 0$ null hypothesis

H1: $\beta_{t\text{ and }}\lambda_t > 0$ alternative hypothesis

Where β_t is the coefficients of the boom represented by the spending effect proxied by government spending and money supply, while λ_t represents either the coefficient of oil revenue or oil price, The equations for the relative price of non-traded goods can be written as follows:

$$rp_t = \alpha_t + \beta gm_t + \lambda pr_t + e_t \qquad 6.1$$

Where *gm* represents either the government spending or the money supply, while *pr* represents the oil revenue or the oil price and *e* is the error term. Then the respecification of the equation of the relative price can be rewritten in the following forms:

$$rp_t = \alpha_1 + \beta_1 g_t + \lambda_1 or_t + e_1 \qquad 6.2$$

$$rp_t = \alpha_2 + \beta_2 g_t + \lambda_2 po_t + e_2 \qquad 6.3$$

$$rp_t = \alpha_3 + \beta_3 ms_t + \lambda_3 or_t + e_3 \qquad 6.4$$

$$rp_t = \alpha_4 + \beta_4 ms_t + \lambda_4 po_t + e_4 \qquad 6.5$$

6.4.1.1 Statistical Results

Table 6.1 shows the result of regressing the relative price of nontraded goods against the oil revenue and the government spending. The result for the former is consistent with the theory predictions in terms of coefficient sign and magnitude. A ten percent increase in the oil revenue causes the relative price to rise by about 7.4 percent. The coefficient has the right sign and is highly statistically significant. However, the proxy of the spending effect exhibits a negative effect in the relative price via the role of the government expenditure. A ten percent increase in the government spending brings about a 3.7 percent fall in the relative price. The sign of the coefficient is contradictory to the theory and is statistically significant at a one percent level. The reason behind this is likely to be due to direct government intervention and/or the world price effect. The government intervention took the form of consumers' and producers' price subsidies on utilities and the large share of government in the total value added in the services sector. The world price effect influences the price of domestic traded goods through the increase in the world's price index of traded goods, which reflected positively on the domestic price (Fardamensh, 1991).

However, other indicators show that these two variables are jointly significant and explain 94 percent of the variation in the relative price. Thus, one can safely reject the null hypothesis of the coefficient of the oil revenue and accept the alternative one, while one cannot accept the null hypothesis of the government spending but instead would conclude that it is statistically significant with a reverse coefficient sign.

Table 6.1

Estimation of the Relative Price

	Equation 6.2	Equation 6.3	Equation 6.3	Equation 6.4
Intercept	**0.322**	**-.669**	**- 1.174**	**1.043**
	(0.990)	(-1.412)	(-4.319)	(1.587)
OR	**0.746**	-----	**0.746**	-------
	(7.635)**		(7.804)**	
PO	--------	**0.387**	--------	**0.304**
		(2.102)*		(2.242)*
G	**- 0.371**	**- 0.464**	--------	--------
	(-3.047)**	(-10.958)**		
MS	--------	--------	**0.269**	**0.352**
			(3.042)**	(3.355)**
R^2	**0.950**	**0.921**	**0.952**	**0.920**
Adj-R^2	**0.940**	**0.900**	**0.940**	**0.900**
F-test	**78.20**	**43.89**	**82.35**	**42.51**
DW	**2.05**	**2.07**	**2.14**	**2.02**
Diagnostic Tests: (Figures represent the probability values)				
Normality (J-B)	**0.569**	**0.555**	**0.636**	**0.427**
Serial Correl. LM	**0.172**	**0.580**	**0.242**	**0.489**
Heteroscedasticity	**0.070**	**0.727**	**0.907**	**0.485**

Values in parenthesis are t-ratio with N =17

* significant at 5%, ** significant at 1% and *** significant at 10%

Now, if the oil revenue is replaced by the price of oil, Table 6.1 indicates that both variables, namely the government spending and the oil price, have the same effects on the relative price as in the previous equation with oil revenue and government spending. A ten percent increase in the government expenditure leads to about a 4.6 percent decline in the relative price. The coefficient has the wrong sign and is statistically significant at a one percent level. On the other hand, the oil price is statistically significant at a one percent level. A ten percent increase in oil price causes about 3.9 percent increase in the relative price. Both variables are jointly significant and explain about 90 percent of the variation in the relative price. Hence, one can reject the null hypothesis of the coefficient of the oil price as being positive, whereas the null hypothesis of the coefficient sign of the government spending cannot be accepted but instead one would conclude that it is statistically significant with the opposite sign. Although the negative impact of the government spending is unexpected in a boom in the developed countries and the developing countries with a significant share of traded goods in the GDP such as Nigeria, some other oil-exporting developing countries may experience such a result due to government intervention. Jazayeri (1986) points out that Iran, during the 1970s, had experienced a decline in the relative price of services due to the Iranian government subsidies. On the other hand, Fardamensh (1991) argues that the Gulf States including Saudi Arabia, can be subject to a decline in the relative price, due to the rise in the world price index resulting from the oil price increase, which in turn increases the domestic price of the traded goods sector.

Alternatively, if government expenditure and oil price are replaced by the money supply as a proxy for the spending effect and oil revenue, one should check to see what happens to the relative price as a result of such changes. With regard to the money supply, a ten percent here brings about a 2.7 percent increases in the relative price. The coefficient has the expected positive sign and is statistically significant at a one percent level. Similarly, the oil revenue is functioning in the same direction with a highly significant level of its coefficient. A ten percent rise in oil revenue causes about a 7.4 percent increase in the relative price in. However, 94 percent changes in the relative price are explained by variation in the money supply and oil revenue. Thus, the null hypothesis of the oil revenue and the money supply are rejected in favour of the alternative hypothesis.

Now, the relative price will be tested against the money supply and oil price rather than oil revenue. However, Table 6.1 shows that both variables have affected the relative price in the same manner as the money supply and oil revenue have. The price of oil is statistically significant at a five percent level, and a ten percent increase in the price of oil leads to about a three percent increases in the relative price, while a ten percent increase in the money supply leads to about a 3.5 percent increases in the relative prices and is statistically significant at a one percent level. However, about a 90 percent variation in the relative price is explained by the oil price and the money supply variables together, which are individually and jointly statistically significant. So, the null hypothesis of the coefficients of the oil price and the money supply can be rejected and the alternative ones are accepted.

To sum up, although it is theoretically expected that the oil price, the oil revenue, the government expenditure and the money supply positively affect the relative price, the regression results provide the right signs with the money supply, oil revenues and oil prices. By contrast, the government spending resulting from the boom influences the relative price negatively due to the provision of subsidies and to the world price effect, in the sense that the behaviour of the relative price is explained by four variables: oil price, oil revenue, money supply and government spending. Two conclusions worth mentioning due to their significance economically and statistically. First, the magnitude of the coefficients of either the oil revenue or the price of oil, are almost the same when regressed against either proxies of the spending effect. This indicates that there are no statistical problems such as multicollinearity. Second, the oil revenue has a stronger effect than the oil price. This outcome is not surprising since the national income of Saudi Arabia mainly depends on oil earnings rather than on oil prices, which differ according to its grade (i.e., Light, Medium or Heavy) and oil price may fall but be compensated by increased oil production. In addition, the price of oil may increase internationally, but it was sold below the world standard domestically. Hence, the role of the oil revenue in the national economy is crucial due to its control over both the fiscal and monetary policies. At this stage, one can confirm the presence of one of the predictions of the Dutch disease literature, which implies that the rise in the oil price, oil revenue and the money supply has a positive effect on the relative price, while the government spending has the reverse outcome on the relative price. This leads to the need to check the second prediction of the impact of the price of oil or oil revenues associated with a proxy of the spending effect on the real exchange rate.

6.4.2 Specification of the Real Exchange Rate

The second prediction of the Dutch disease theory is that the increase in oil revenue or oil price and the spending effect may call for an appreciation of the real exchange rate of the domestic currency, in the sense that there is a negative impact of the influx of wealth on the real exchange rate. In the case of Saudi Arabia, the local currency is fixed to the US dollar and thus the oil boom, which occurred in the 1970s, is expected to have had a negative impact on the real exchange rate rather than on the nominal exchange rate. Therefore, the proxy for the former is applied and defined as the ratio of the industrial wholesale price index (the largest trade-partners) to the Saudi GDP deflator. However, to test if the oil boom did negatively affect the Saudi real exchange rate, the following hypothesis should be tested:

Ho: β_t and $\lambda_t = 0$ null hypothesis

H1: βt and $\lambda_t < 0$ alternative hypothesis

Where β_t is the coefficient of the boom represented by the oil revenue or the oil price and, while λ_t represents either the government spending or the money supply. The equations for the real exchange rate can be written as follows:

$$rer_t = \alpha_t + \beta gm_t + \lambda pr_t + e_t \quad 6.6$$

Where *gm* represents either the government spending or the money supply, while *pr* represents the oil revenue or the price of oil and *e* is the error term. Then the respecification of the equation of the real exchange rate can be rewritten in the following manner:

$$rer_t = \alpha_1 + \beta_1 g_t + \lambda_1 or_t + e_1 \quad 6.7$$

$$rer_t = \alpha_2 + \beta_2 g_t + \lambda_2 op_t + e_2 \quad 6.8$$

$$rer_t = \alpha_3 + \beta_3 ms_t + \lambda_3 or_t + e_3 \qquad 6.9$$

$$rer_t = \alpha_4 + \beta_4 ms_t + \lambda_4 po_t + e_4 \qquad 6.10$$

6.4.2.1 Statistical Results

In equation 6.7, the regression of the real exchange rate against the oil revenue confirms the literature prediction of the negative impact of the increase in oil revenue on the real exchange rate. Table 6.2 shows that the oil revenue has the right negative sign, and is very highly statistically significant. A ten percent increase in the oil revenue causes about a 7.4 percent appreciation in the real exchange rate of the Saudi Riyal.

On the other hand, the role of the spending effect resulting from the wealth increases acts to reduce the price of nontraded goods since the government spending as a proxy of the spending effect has the positive sign and is statistically significant at a five percent level. It is found that a ten percent increase in the government spending causes the real exchange rate to depreciate by 3.7 percent. As repeatedly stressed, this can be explained by the rise in the price of the traded goods sector due to the world price effect and/or a fall in the price of nontradables due to subsidies provided to the services sector. The statistical criteria show that 93 percent of the variation in the real exchange rate is determined jointly by the oil revenue and the government spending. Thus, one can reject the null hypothesis of the oil revenue and accept the alternative hypothesis, while the null hypothesis of the government spending is not accepted, but one should conclude that the coefficient is statistically significant with a positive sign. Using the price of oil variable to replace the oil revenue with the government spending, the result for

Figure 6.2

Estimation of the Real Exchange Rate

	Equation 6.7	Equation 6.8	Equation 6.9	Equation 6.10
Intercept	8.944	9.749	10.157	7.963
	(24.881)	(11.915)	(46.855)	(14.431)
OR	- 0.743	-----	- 0.653	-------
	(- 5.717)**		(- 8.894)**	
PO	--------	- 0.299	--------	- 0.276
		(- 2.331)*		(- 2.136)*
G	0.370	0.450	--------	--------
	(2.320)*	(6.166)**		
MS	--------	--------	0.190	0.328
			(2.718)*	(5.913)**
R^2	0.947	0.932	0.960	0.930
Adj-R^2	0.933	0.914	0.950	0.910
F-test	74.18	51.08	92.07	47.42
DW	2.04	2.12	1.92	2.03
Diagnostic Tests: (Figures represent the probability's values)				
Normality (J.B)	0.558	0.191	0.971	0.258
Serial Correl. LM	0.071	0.435	0.255	0.846
Heteroscedasticity	0.557	0.720	0.905	0.465

Values in parenthesis are t-statistic with N =17

* significant at 5%, ** significant at 1% and *** significant at 10%

the price of oil is consistent with the economic theory prediction, whereas the government spending is inconsistent with the literature prediction.

However, the oil price and the government spending are jointly and also individually statistically significant at a one percent level for the latter and a five percent level for the former. The only minor difference is that the magnitude of the oil price is relatively small in comparison with that of the oil revenue. This outcome can be due to the fact that oil revenues accurately represent the wealth, which accrues to the government, while the oil price selected in the model refers only to Arabian Light oil, and ignores the other grades. Thus, since the Arabian Light oil price only represents about 79 percent of all the oil grades, it may not be very precise. Nevertheless, the statistical criteria indicate that the model is an appropriate model due to the determination coefficient, magnitudes, DW and t-statistics. A ten percent increase in the oil price calls for about a 3.0 percent appreciation in the real exchange rate, while a ten percent increase in the government spending leads to about a 4.5 percent depreciation in the real exchange rate. Therefore, the null hypothesis for the oil price is rejected and one can conclude that the price of oil has a predicted economic impact on the Saudi real exchange rate. On the other hand, the null hypothesis of the coefficient of the government spending cannot be accepted but instead one would conclude that it is statistically significant with the opposite sign.

Turning to the impact of the oil revenue and the money supply on the real exchange rate, the sign of the oil revenue coefficient is as expected in the economic literature and is statistically significant at a one percent level. A ten percent increase in the oil revenue calls for a 6.5 percent appreciation in real Saudi Riyals. Whereas the money supply is statistically significant at a five percent level, the impact of the money supply is positive. A ten percent increase in the money supply brings nearly a two percent depreciation in the real exchange rate. Again, this is likely to be due to the role of government intervention in form of subsidising the producer and consumer price of services.

Nevertheless, both variables are jointly significant and they explain 95 percent of the variation in the real exchange rate. Hence, one can reject the null hypothesis of the oil revenue in favour of the alternative hypothesis. While the null hypothesis of the money supply is not accepted, one can however conclude that it is statistically significant with the opposite sign.

Regressing the real exchange rate against the price of oil and the money supply indicates that the oil price acts as the theory predicts, while the money supply does not. However, both of the coefficient signs are statistically significant at a one percent level for the price of oil and a one percent level for the money supply. A ten percent increase in the oil price causes an appreciation of the real exchange rate by 2.7 percent. On the other hand, a ten percent increase in the money supply causes a 3.3 depreciation of the real exchange rate. In addition, the price of oil and the money supply explain about 91 percent of the variation in the real exchange rate. Thus, the alternative hypothesis of the price of oil is accepted at the expense of the null hypothesis, while the null hypothesis of the money supply cannot be accepted but one would instead conclude that it is statistically significant with a different sign.

Finally, one can conclude that the oil revenue and government spending have a stronger effect than the oil price and money supply. With regard to the money supply, this can mainly be attributed to the role of the monetary policy in Saudi Arabia, particularly during the period under study (i.e., 1965 to 1981). The oil revenue accrues directly to the government rather than to private citizens, in the sense that the domestic money supply will not increase unless the government spends at home out of the increased oil earnings. Since the government has had massive oil revenues, it has increased its investments abroad and its net foreign assets in the central bank. Consequently, the money supply is mainly controlled by the government's fiscal policy. Moreover, the interest rate as an important instrument in monetary policy is not effective due to religious restrictions on usury[5]. Therefore, the supply of money is mainly determined by government spending rather than by traditional monetary instruments.

The importance of analysing the impact of the boom on the relative price and the real exchange rate stems from their vital role in the economic activities. This outcome, theoretically, may lead to reallocation of resources. Therefore, it is necessary to check the impact of the oil boom on the supply of both the traded and nontraded good sectors.

6.4.3 Specification of the Traded Goods

The main two consequences of the preceding empirical results are: (i) the increased wealth that accrued to the government had partially been transmitted to the domestic economy. This was evident from the spending effect of the boom through the government expenditure and/or the money supply; (ii) this was followed by an appreciation of the real exchange rate of the local currency as well as a rise in the relative price of the nontradable to tradable goods. The importance of such a tendency is related to their impact on the reallocation of resources in the economy. In the absence of any immediate economic adjustment, the theory predicts that the output of the traded goods sector may suffer from contraction during the boom period.

Here, one should determine empirically if the national economy had experienced such a negative side-effect, resulting from the boom and reflecting the contraction of the output of the traded goods sector. Therefore, the supply of traded goods will be tested with the price of oil, the money supply, the relative price, the real exchange rate and the world price index. On the other hand, the government spending and the oil revenue will be examined through their impacts on the relative price and the real exchange rate alternatively. Hence, the regression of the supply of traded goods will be tested against the oil price, the money supply, the estimated relative price, the estimated real exchange rate and the world price index[6], as shown in the following equation:

$$T_t = \alpha_t + \beta ms_t + \lambda po_t + \phi r\hat{e}p_t + \gamma wp + e_t \qquad 6.11$$

Where *ms, po* and wp are the money supply, the price of oil and the world price index respectively, while $\hat{r}ep$ represents either the estimated relative price or the real exchange rate.

Therefore, the null and alternative hypotheses of the coefficients of the supply of traded goods can be formulated as follows:

Ho: $\beta_t, \lambda_t, \phi_t, \gamma$ and $\delta_t = 0$

H1: $\beta_t, \lambda_t, \delta_t < 0$ and ϕ and $\gamma > 0$

Where β_t, λ_t, and δ_t are the coefficients of the money supply, the oil price and the estimated relative price of nontraded goods versus traded goods respectively, while ϕ and γ are the coefficients of the estimated real exchange rate and the world price index respectively.

Accordingly, one can respecify this equation in the following manner:

$$T_t = \alpha_1 + \beta_1 ms_t + \lambda_1 po_t + \delta_1 \hat{r}p_t + \gamma_1 wp + e_1 \quad 6.12$$

$$T_t = \alpha_2 + \beta_2 ms_t + \lambda_2 po_t + \phi_1 \hat{r}er_t + \gamma_2 wp + e_2 \quad 6.13$$

Where

$$\hat{r}p_t = \alpha_3 + \beta_3 g_t + \lambda_3 or_t + e_3 \quad 6.14$$

$$r\hat{e}r_t = \alpha_4 + \beta_4 g_t + \lambda_4 or_t + e_4 \quad 6.15$$

6.4.3.1. Statistical Results

To test how the oil boom affects the output of traded goods, one should regress the traded goods against a proxy of the spending effect (i.e., the money supply), oil price and the estimated relative prices of nontraded goods to traded goods or the real exchange rate. The role of oil revenue and government spending on the output of tradables will be inferred through their influences on the relative prices and the real exchange rate. Therefore, the empirical results of the regression are divided into two parts as follows:

1. Impact of the Oil Price, Money Supply and Relative Prices

Table 6.3 shows that the oil price, the money supply and the relative prices are individually and jointly statistically significant in affecting the supply of the traded goods sector. About 96 percent of the variation in the traded goods production is explained by the variation in the oil price, the money supply and the relative prices. However, the coefficient of the oil price has the expected negative sign and is statistically significant at a five percent level. A ten percent increase in the oil price brings about a one percent fall in the output of traded goods.

With regard to the money supply, it behaves inconsistently with the standard

Table 6.3

Estimation of the Supply of Traded Goods

	Equation 6.7	Equation 6.8	Estimated RP	Estimated RER
Intercept	**6.803**	**3.054**		
	(33.027)	(2.702)		
OR	---------	--------	**- 0.240**	**- 0.288**
PO	**- 0.100**	**- 0.199**	---------	---------
	(-2.030)*	(- 4.877)**		
G	--------	--------	**0.112**	**0.143**
MS	**0.406**	**0.478**		
	(8.859)**	(7.572)**		
$\hat{RP}$	**- 0.322**	--------		
	(-3.211)**			
$R\hat{E}R$	---------	**0.388**		
		(3.072)**		
LWP	**0.178**	**0.221**		
	(3.501)**	(3.599)**		
R^2	**0.971**	**0.970**		
Adj-R^2	**0.960**	**0.957**		
F-test	**86.47**	**80.94**		
DW	**1.92**	**2.00**		
Diagnostic Tests:	(Figures represent the probabilities)			
Normality (J-B)	0.267	0.305		
Serial Correl. LM	0.251	0.132		
Heteroscedasticity	0.165	0.173		

Values in parenthesis are t-statistic with N =17

* Significant at 5%, ** significant at 1% and *** significant at 10%

Dutch disease literature's prediction. A ten percent increase in the money supply causes the output of the traded goods sector to rise by about four percent and is statistically significant at less than a one percent level. This outcome is likely to be related to government intervention in the form of massive domestic subsidies to the local producers and/or to the rise in the world price index resulting from the sharp rise in the oil price in the early and late 1970s. On the other hand, the coefficient of the relative price is consistent with the theory prediction. Thus, it has the right sign and is statistically significant at a one percent level. A ten percent increase in the relative price of nontradables to tradables brings about a 3.2 percent decline in the supply of the traded goods sector. Accordingly, the oil revenue negatively affects the supply of traded goods through the relative price, in the sense that the coefficient of the oil revenue has the right sign and thus is consistent with the literature prediction. Table 6.3 shows that a ten percent increase in the oil revenue causes the supply of traded goods to fall by about 2.4 percent, whereas the impact of the government spending on the traded goods' production does not support the theory prediction. Hence, the sign of the coefficient is positive. A ten percent increase in the government spending brings about a 1.1 percent increase in the supply of traded goods.

The explanation of why the spending effect proxies (i.e., the money supply and the government spending) act in contrast to the theory prediction is likely to be due to the following reasons. Firstly, the Saudi Arabian economy, at that time, was to some extent limited and the share of the traded goods sector was very small. Hence, the government policy tended to protect and stimulate the traded goods sector through two channels: imposing some trade restrictions such as low percentage of tariffs on imported commodities and providing some incentives such as loans with a zero or negative interest rate, cheap energy and free lands. Corden and Warr (1981) point out that the government could adopt a policy of protecting the traded goods sector by imposing tariffs and providing subsidies rather than using exchange rate controls. Moreover, Neary and Wijnbergen (1986) attributed the expansion in the traded goods sector in many oil-exporting countries to the imposition of some tariffs and quotas to protect the squeezed sector. Secondly, the oil price boom also caused an increase in world manufacturing goods, which in turn raised the price of foreign traded goods and consequently the price of domestic traded goods which may have risen causing an expansion effect on that sector.

Fardmanesh (1991) who identified the so-called "world-price effect" and stated that the inclusion of this effect is warranted, on one hand by the fact that oil price increases have been associated with increases in the world price of manufactured relative to agricultural products and, on the other hand, by the fact that oil-exporting countries experienced a significant increase in the domestic relative price of manufactured goods as oil prices increased. As a result, by adding the world price effect to the equation, the table 6.3 shows that a rise in the world price index in those periods calls for a rise in the supply of the traded goods sector by about 1.8 percent. This outcome confirms the positive impact of the rise in the world price on the domestic traded goods production.

It is worth mentioning that the government of Saudi Arabia did not impose taxes and hence could not have depended on tax reduction to stimulate production. Instead it provided subsidies (direct and indirect) and incentives (preference for domestic products in government projects) to investors in order to avoid the adverse short-run effect of the boom[7]. Thirdly, the resource movement will not occur in the case of Saudi Arabia as long as the oil sector is a capital-intensive sector, and thus mostly isolated, and the demand for labour can be met by welcoming foreign labour rather than shifting labour from one sector to another. Fourthly, although migrant labour (i.e., about one third of the total population) has some negative impacts, such as massive remittances and social problems, one can argue that the migrants, to a large extent, are likely to dampen the role of the relative price through both a higher demand for tradables and a low cost for nontradables (low-wage labour). Finally, there is no pure separation between the traded and nontraded goods sectors since some traded goods are treated as nontradables due to certain trade barriers such as tariffs and quotas and hence traded goods are expected to expand. Roemer (1985), in his study about Dutch disease in developing countries, found that five major oil-exporting countries, namely, Indonesia, Kuwait, Mexico, Nigeria and Saudi Arabia, have enjoyed an expansion in the traded goods sector in both manufactured and agricultural sectors. The only exception was Nigeria, which suffered from a decline in the agricultural sector alone. Roemer attributed such an outcome to the existence of underemployment in the economies of over-populated countries or to the influx of foreign labour in small countries. This would mitigate the impact of the resource movement effect and stimulate the production of the tradable sector.

Consequently, the null hypothesis of the coefficients of the oil price, the oil revenue and the relative price are rejected, while the null hypothesis of the government spending and the money supply cannot be accepted but one would instead conclude that the coefficients are statistically significant with opposite signs.

2. Impact of the Oil Price, the Money Supply and the Real Exchange Rate

It is time now to replace the relative prices with the real exchange rate in the preceding equations. As shown in table 6.3, the real exchange rate is acting as the theory predicts. As the real exchange rate (RER) of the Saudi currency appreciates (i.e., a decline in the RER, which is an inverse of the relative price), the output of the traded goods sector contracts. A ten percent appreciation in the real exchange rate causes about a 3.9 percent decline in the production of traded goods. It is also statistically significant at a one percent level. The appreciation of the Saudi Riyal can be related to the rise in the price of nontradables and to the surplus in the balance of payments, which resulted from the massive oil earnings accrued to the government during that period.

With respect to the price of oil, it has the right sign and is statistically significant at a one percent level. A ten percent increase in the oil price leads to about a two percent decline in the production of the traded goods sector. On the other hand, using the money supply as an alternative representative of the spending effect, shows that the rise in the money supply affects the supply of traded goods positively which is in contrast to the economic theory prediction. A ten percent increase in the money supply causes the supply of tradables to rise by about 4.8 percent. However, the coefficient is statistically significant at a one percent level. Similarly, the traded goods sector's production responds positively to the government spending via its impact on the real exchange rate.

A ten percent increase in the government spending leads the supply of tradables to increase by about 1.4 percent. As repeatedly stressed this outcome is likely to be due to government intervention and to world price effect. Figure 6.3 shows that a ten percent increase in the world price index causes the supply of tradables to increase by about 2.2 percent.

However, the final diagnosis of the impact of the oil boom determines that oil revenue, oil price and the real exchange rate cause a deterioration in the traditional traded sector. On the other hand, the proxies of the spending effect raise the production of the traded goods sector according to the subsidies provided and the rise in the world price index.

Consequently, the null hypothesis of the coefficients of the oil revenue, the oil price and the real exchange rate are rejected, while the null hypothesis of the coefficients of the spending effect's proxies cannot be accepted but one would instead conclude that they are statistically significant with opposite signs.

The preceding results confirm that the impact of the oil boom on the traded goods sector, for some oil-exporting countries which are characterised by large revenues and small populations, is likely to have positive rather than negative effects in contradiction with the boom literature. Al-Barazi (1987) and Roemer (1985), among others, suggest in their studies of the impact of the oil boom on the reallocation of resources that a discovery of oil might expand the traded goods production due to the significant spending effect and/or the weakness of the role of the resource movement effect. Furthermore, Bejamin *et al*, (1989) and Fardmanesh (1991) argue that the Dutch disease can be reversed, in the sense that not all the traded goods sector will contract. Both studies reveal that the manufacturing sector may benefit from the boom, while the agricultural sector is most likely to be badly affected. Bejamin *et al* attributed such an outcome to the government intervention to protect the traded sector, while Fardmanesh ascribes this to the rise in the world price which positively affects the supply of the domestic traded goods sector.

In contrast, Al-Gaeed (1991), in his study about the existence of the Dutch disease in Saudi Arabia, reveals that the oil revenue and oil price affect the supply of tradables positively, while the spending effect and the relative price affect them negatively. These results can be argued with respect to three aspects. Firstly, the oil price cannot be regarded as a good indicator of the boom since the oil price is denominated in US dollars and the rise in the price can be mitigated either by lowering the quantity of oil produced or by adjusting the government spending in order to reduce the inflation pressures. Moreover, the price of oil is sold domestically cheaper than the world price, which might have negative consequences as is shown in this study. Secondly, the agricultural and manufacturing sectors were very limited in terms of size and development. This leads to the conclusion that these sectors cannot be harmfully affected especially if one takes into consideration some variables that may stimulate the production of tradables such as subsidies, protection and the world price effect. Thirdly, the statistical tests of his study show that there is some kind of model misspecification, which has led to spurious results. This outcome was inferred from the explosive behaviour of some of the variables as well as from the indication of the presence of serial correlation.

With regard to the impact of the oil boom on the traded goods sector in the advanced economies, there is a controversial explanation for so-called de-industrialisation. For example, Forsyth (1986) argues that the cause of the decline in the manufacturing sector in the UK is likely to be due to the discovery of oil in the late 1970s, while others such as Purvis (1986) and Corden (1984) attributed such an outcome to the tightening monetary policy that coincided with the North Sea Oil discovery rather than to the oil discovery itself. Even for the Netherlands, the cause of de-industrialisation might be related to the existence of unemployment, which was exacerbated by the increase in social security contributions and labour market regulations such as the minimum wage (Neary and Wijnbergen, 1986). Moreover, Corden (1984) argues that the appreciation of the guilder is due to the booming sector revenues used for social services which it has been politically difficult to reduce (Corden, 1984).

To sum up, although some variables are not consistent with the theory predictions due to government policies adopted in order to prevent the shrinkage of the tradable sector, the most significant explanatory variables affecting the supply of the traded goods sector are the oil revenue, the real exchange rate and the government expenditure. However, can these variables affect the supply of the non-traded goods sector as the literature predicts? This is tested in the following section.

6.4.4 Specification of the Nontraded Goods Sector

Having discussed the consequences of the impact of the oil revenue, oil prices, relative prices, the real exchange rate and the spending effect proxies on the supply of the traded goods sector, it is now time to examine the fourth symptom of the Dutch disease theory. The theory assumes that the oil boom may lead to a reallocation of resources in favour of an expansion of the nontraded goods sector. There are three channels through which the increase in the national income resulting from the boom can affect the supply of nontradables. The first is the increase in the relative price emerging from the high demand for nontraded goods. The short-run implication of such an outcome is an increase in the profitability of nontraded goods as long as the supply does not contemporaneously match the increase in the demand for this sector. The second channel is a consequence of the first, and is a tendency to overvaluation of the national currency (i. e., the real exchange rate, by definition, is an inverse of the relative price). The impact of the real exchange rate tends to substitute the demand for nontraded goods for that of traded goods to encourage the former to expand. Finally, and most importantly, is the spending effect channel, which has its effect through the government spending and the money supply. Since the increased national wealth may enforce the government to share the boom benefit with the citizens, the immediate response of such high per capita income would be a high demand for nontradables. One has to bear in mind that the government intervention has been through the services subsidies or by a reduction in the government spending to reduce the inflationary pressures that occurred during 1974 to 1977. This policy can affect negatively the supply of nontradables since the government is the main supplier of such goods. In addition, it is necessary to examine the impact of the world price index on the supply of nontradables during that period, the aim of which, is to demonstrate whether the world price index can have a negative effect as long as it seems to raise the price of traded goods.

In short, the supply of nontraded goods is expected to respond positively to changes in the relative price and the spending effect, while it responds negatively to changes in the real exchange rate and the world price index for the period of higher inflation. Since the Saudi Riyal is fixed to the US dollar, the impact of the boom will mainly be through the spending effect via the relative price and the real exchange rate. Hence, the regression of the supply of nontraded goods will be tested against the oil price, the money supply, the estimated relative price, the real exchange rate and the world price index as shown in the following equation:

$$S_t = \alpha_t + \beta ms_t + \lambda po_t + \phi r\hat{e}p_t + \gamma wp + e_t \qquad 6.16$$

Therefore, the null and alternative hypotheses of the coefficients of the supply of nontraded goods can be formulated as follows:

Ho: $\beta_{t,} \lambda_{t,} \phi_{t,} \delta_t$ and $\gamma = 0$

H1: $\beta_{t,}\lambda_t$ and $\delta_t > 0$ and ϕ and $\gamma < 0$

Where $\beta_{t,}\lambda_t$ and δ_t are the coefficients of the money supply, the oil price and the relative price of nontraded goods respectively, while ϕ and γ are the coefficients of the real exchange rate and the world price respectively. To examine such hypotheses empirically, the equations should be formulated as follows:

$$S_t + a_1 + \beta_1 ms + \lambda_1 po_t + \delta_1 r\hat{p}_t + \gamma wp + e_t \qquad 6.17$$

$$S_t = \alpha_2 + \beta_2 ms_t + \lambda_2 po_t + \gamma_2 wp + \phi_1 r\hat{e}r_t + e_t \qquad 6.18$$

Where

$$r\hat{p}_t = \alpha_3 + \beta_3 g_t + \lambda_3 or_t + e_3 \qquad 6.19$$

$$r\hat{e}r_t = \alpha_4 + \beta_4 g_t + \lambda_4 or_t + e_4 \qquad 6.20$$

6.4.4.1 Statistical Results

To test how the oil boom affects the output of nontraded goods, one should regress the nontraded goods against the oil price, the proxy of the spending effect, the oil revenue, the world price index and the estimated relative prices or the real exchange rate. The role of oil revenue and government spending on the output of tradables will be inferred through their influence on the relative prices and the real exchange rate. Therefore, the empirical results of the regression are divided into two parts as follows:

1. Impact of the Oil price, Money Supply and Relative Prices

The regression results of the impact of all the variables except the government spending, on the supply of nontraded goods show that they are consistent with the economic theory prediction in terms of the coefficient signs and levels of significance. Table 6.4 demonstrates that the coefficient of the oil price has a positive sign and is statistically significant at a ten percent level. A ten percent increase in the price of oil causes an 1.28 percent increase in the supply of nontradables. Similarly, the impact of the money supply is consistent with the Dutch disease theory. Hence, its coefficient has the positive sign and is statistically significant at even less than a one percent level. A ten percent increase in the money supply leads to about a 3.7 percent increase in the supply of nontradables.

With respect to the world price index, measures the reaction of the supply of the nontraded goods sector to the rise in the world price index. It is found that there is a negative relationship between them, in the sense that a ten percent

Table 6.4

Estimation of the Supply of Non-Traded Goods

	Equation 6.7	Equation 6.8	Estimated RP	Estimated RER
Intercept	**6.245**	**8.799**		
	(12.345)	(14.878)		
OR	---------	--------	**0.240**	**0.245**
PO	**0.128**	**0.002**	---------	---------
	(1.980)***	(0.024)		
G	--------	--------	**- 0.120**	**- 0.122**
MS	**0.368**	**0.444**		
	(10.306)**	(11.441)**		
$\hat{RP}$	**0.323**	--------		
	(2.520)*			
$R\hat{E}R$	--------	**- 0.330**		
		(- 3.098)**		
LWP	**- 0.517**	**- 0.504**		
	(-2.944)*	(-2.791)*		
R^2	**0.991**	**0.991**		
Adj-R^2	**0.986**	**0.990**		
F-test	**179.18**	**313.84**		
DW	**1.95**	**1.74**		
Diagnostic Tests:	(Figures represent the probabilities)			
Normality (J.B)	0.786	0.601		
Serial Correl. LM	0.296	0.516		
Heteroscedasticity	0.124	0.618		

Values in parenthesis are t-statistic with N =17

* Significant at 5%, ** significant at 1% and *** significant at 10%

increase in the world price brings about a 5 percent decline in the production of nontradables, and is statistically significant at a five percent level. However, the coefficient of the estimated relative price has the right sign and is the statistically significant at a five percent level. A ten percent increase in the relative price calls for about a 3.2 percent increase in the supply of nontraded goods. Accordingly, the impacts of the oil revenue and the government spending are shown through their effects on the relative price. The oil revenue positively affects the production of nontradables as the theory predicts,. Thus, its coefficient sign is consistent with the economic theory. A ten percent rises in the oil revenue increases the supply of the nontraded goods sector by about 2.4 percent.

On the other hand, the government expenditure behaves inconsistently with the Dutch disease prediction, so the coefficient of the government spending has a negative sign. A ten percent increase in the government spending calls for a one percent decline in the supply of nontraded goods. Justification of this outcome is likely to be related to the decline in spending in the human and capital infrastructure during the mid-1970s in order to reduce pressures of the domestic and foreign inflation rate. Hence, the share of capital expenditure in the budget declined from 55.8 percent in 1974 to 46 percent in 1978 (SAMA, Annual report, 1997). Another explanation of the negative impact of the government spending can be related to the reduction in the provision of the services' subsidies during that period, the rise in the price of traded goods due to the world price effect and to the treatment of some tradables as nontradables due to certain restrictions imposed on them.

Consequently, all variables included in the equation are individually and jointly significant and also their changes explain about 99 percent of the variation in the nontraded goods sector. One can state that the null hypothesis of the estimated relative price, the real exchange rate, the money supply, the oil price and the oil revenue can be rejected, while the null hypothesis of the government spending cannot be accepted but one instead would conclude that its coefficient is statistically significant but its coefficient sign is opposite to that predicted by the theory.

2. Impact of the Price of Oil, the Money Supply and the Real Exchange Rate

Table 6.4 illustrates that all the regressors except the government spending operate as expected in the economic theory. With regard to the impact of oil price, its coefficient has the right sign but is statistically insignificant. This indicates that the oil price does not significantly affect the production of the nontraded goods sector. This is likely to be due to the fact that the oil price, particularly in the boom era, was not the main factor influencing the domestic economic activity as long as it could be compensated by raising or reducing the production quantities set by the OPEC quotas regardless of the oil price being high or low. Furthermore, the government, internally, tended to stabilise its revenues in order to precisely predict its spending and hence to reduce the domestic inflation (i.e., due to its low absorptive capacity) and, externally, to moderate the oil price (for the sake of the developing countries and to minimise the usage of alternative sources) and to reduce the imported inflation rate.

With regard to the money supply as an alternative proxy for the spending effect, the coefficient of the money supply has the expected right sign and is highly statistically significant at even less than a one percent level. The increase in the money supply by ten percent raises the production of the nontraded goods sector by about 4.4 percent.

Table 6.4 shows that the real exchange rate behaves as the theory predicts, in the sense that the appreciation in the real exchange rate leads to an expansion in the nontradable production. As a result, the coefficient has the correct sign and is statistically significant at a one percent level. A ten percent appreciation in the real exchange rate (i.e., a decline in index of the real exchange rate) calls for about a 3.3 percent rise in the supply of the nontraded goods sector.

The impact of the government expenditure and the oil revenue can be referred to their effects on the nontraded goods sector through the real exchange rate. The sign of the government spending variable's coefficient is not as expected in the theory and thus is negative. A ten percent increase in the government spending brings about a one percent decline in the supply of the nontraded goods sector. Again, this outcome is likely to be due to the reduction of the government expenditure during the high inflation period in the mid-1970s. Furthermore, this result is likely reinforced by the impact of the world price and/or the reduction of the budgetary spending in that period. Thus, the world price index has a significant magnitude and is statistically significant at a five percent level. A ten percent increase in the world price index calls for a 5 percent reduction in the production of the nontradable goods sector regarding its role to raise the profitability of tradables.

On the other hand, the oil revenue has the right coefficient sign. A ten percent increase in the oil revenue raises the supply of nontradables by 2.4 percent. However, all regressors except the oil price are jointly and individually statistically significant and explain about 99 percent of the variation in the supply of the nontraded goods sector.

Finally, the null hypothesis of the oil revenue, the money supply, the relative price, the real exchange and the world price index can easily be rejected, while the null hypothesis of the price of oil can be accepted. On other hand, the null hypothesis of the government spending cannot be rejected but one would instead conclude that the coefficient is statistically significant but with the opposite sign. The aforementioned results show the kind of adjustments made by the government through its intervention in the domestic economy activity in order to mitigate the adverse side-effect associated with the oil boom. It is now necessary to examine the policies adopted by the government during the boom period.

6.5 Government Policy Response

Since oil revenues accrue directly to the Saudi Arabian government, the government itself having to make one of two extreme choices or one in between these choices to deal with the increased oil wealth. Firstly, oil receipts could be entirely spent on the domestic economy through a rise in public consumption and investment. Secondly, in contrast to option one, the oil earnings could all be saved through the accumulation of foreign exchange reserves and/or invested abroad. Thirdly, adopting the in-between option would mean part of the oil revenue would be converted into foreign assets and the rest of the income resulting from the oil boom spent domestically. The Saudi government adopted the third option for three reasons. Firstly, the absorptive capacity of the economy was and is still small, whereas the oil revenue was extremely high. Secondly, the economy at that time was limited and less developed, in the sense that the government had to provide broad strategic goals for constructing a national infrastructure. Moreover, it had made a large public investment in the basic industries with comprehensive support to manufacturing and agriculture. Thirdly, it was stressed that the citizen would share in the benefits from the oil bonanza. Statistically, therefore, the Saudi foreign reserves and investments increased from SR 2.5 billion in 1973 to SR 42,8 billion in 1980, while recurrent and capital expenditures rose from SR 14.15 billion in 1973 to SR 22.1 billion in current prices (SAMA, Various Annual Reports). The massive increase in the human and physical infrastructures brought about a rise in the relative price of nontraded goods versus traded goods (Pn/pt) and thus an appreciation in the real exchange rate. These results are the key symptoms of the Dutch disease. Since the Saudi Riyal is fixed to the US dollar, the higher demand resulting from the expansion in government spending caused a domestic inflation at a rate greater than that of Saudi Arabia's trading partners (e.g., the inflation rate reached its highest level in 1975 by 34.7 percent as shown in Chapter 3).

In attempting to mitigate the effect of the increase in the relative prices and the overvaluation of the domestic currency which may have negatively affected the supply of traded goods, the government had adopted many policies to restore the profitability of the traded goods sectors.

6.5.1 Subsidies

A subsidy can be defined as any government assistance, in cash or in kind, to private sector producers and/or consumers for which the government receives no equivalent compensation in return, although the assistance is conditional on a certain level of performance by the recipients (Clements *et al*, 1995). It includes government operations that result in producers receiving higher returns than suggested by competitive market outcomes (producer subsidies), and consumers obtaining goods or services below their economic costs (consumer subsidies).

Since the Saudi Arabian government did not adopted the policy of devaluation in order to mitigate the effect of the overvaluation of its local currency during the boom period, the fiscal policy behind the budget had an expansion in spending financing subsidies. The consumer subsidies included utility prices, petrol, diesel, gas, air tickets, rice, cooking oil, sugar and meat. The government also disbursed a large amount of money for agriculture, industrial and services' enterprises through credit agencies. Middle and low-income Saudi were given interest free housing loans of at least SR 300,000, of which 25 percent was disregarded if payments occurred as scheduled (Wilson and Graham, 1994).

Furthermore, a full range of investment incentives was provided to stimulate domestic production. These incentives included: (i) availability of industrial loans for soft loans up to 50 percent of their total cost; (ii) preferential treatment for local products in government procurement over competing foreign products; (iii) exemption from customs duties on raw materials, machinery, equipment and spare parts imported for industry; (iv) tariff protection from competing imported goods for certain critical manufacturing products;(v) low-cost plots of land and utilities for factories (Fagih, 1996). The aim of such incentives was not to reduce demand, but rather to lower the cost of production to compete with foreign products. Although these remedies seem to be costly from the economic point of view, they are used even in industrialised countries, as happened in the late 1970s when Norway fixed wages and subsidised old industries and agricultural sectors (Enders and Herberger, 1983). However, taking the total agricultural subsidies as an example of encouragement to Saudi farmers to get highly involved in their sectors, the total subsidies in 1974 were about SR 43 million, while in 1981, they reached about SR 1.1billion in current prices (SAMA, Annual Report, 1986).

6.5.2 Recruitment of Foreign Labour

The government tried to moderate its overvalued exchange rate by welcoming more foreign labour. The non-Saudi working force grew on average by 16.5 percent per annum between 1975 and 1980 from 0.494 million to 1.06 million. Almost 80 percent of the increase in the total civilian workforce in this period, therefore, were accounted for in the growth of non-Saudi employment (Presley, and Westaway, 1989). However, although this remedy to mitigate the appreciation of the real exchange rate is associated with massive remittances going abroad, it had two combined outcomes. Firstly, the recruitment of foreign labour buffered the impact of the sharp increase in the relative price of non-traded goods resulting from the oil boom, which in turn reduced the cost of these kinds of products as long as wages were relatively low. Secondly, the large labour force, to some extent, brought about a higher demand for non-traded goods and also contributed to lowering the cost of these products, which stimulated, and led to an increase in profitability of, the production of traded goods.

6.5.3 Reduction of Government Expenditure

It is obvious that the rise in the public expenditure in the human and physical infrastructures had, to a very large extent, called for an increase in inflation rate and thus the relative price of nontraded goods. The rise in the energy prices in the early 1970s reinforced the domestic inflation with imported inflation to reach its peak in 1974 of about 34 percent. However, in theory, inflation is dependent on the growth in money, income and world inflation. In Saudi Arabia, stimulative fiscal policy leads directly to an increase in the money supply because most of the government expenditures are treated as transfer and because the underlying structure of the country's financial markets is underdeveloped, so money enters the economy largely through government expenditure. The policy implication stemming from the Keynesian approach is that the economy is best stimulated through changes in government expenditure and/or oil revenues (Looney, 1990).

More specifically, given the obvious dependence of the money supply on the government fiscal actions, the government simply attempted to stabilise the economy through its control over public spending. Given the importance of government expenditure as a driving force in the economy, one might expect that the monetary expansion, would at most, play a secondary role in inducing expenditure. Hence, government expenditure was applied as a measure of direct control to influence the patterns of production, investment and consumption.

Consequently, in order to reduce inflation, the government reduced expenditure in its budget, particularly capital expenditure. Thus, the share of capital in the budget declined from 55.8 percent in 1974 to 46 percent in 1978 (SAMA, Annual report, 1997). In contrast, the share of recurrent expenditure increased from about 44 percent to 54 percent during the same period. This was due to the continuation of subsidies and to the rise in wages and salaries of low and middle-income citizens to mitigate the effect of inflation for consumers, and to stimulate the production of traded goods for producers.

To sum up, one can say that higher oil revenues and thus higher government expenditure led to a higher relative price of nontraded goods and increased the inflation rate. This forced the government to intervene by subsiding consumers and producers, importing foreign workers and reducing the level of government spending. These measures were aimed at reducing both the extent of the appreciation of the real exchange rate and also the pressure of domestic price inflation. More specifically, the adopted policies may have delayed or prevented the resource reallocation at the expense of the traded goods sector that might have occurred as a result of the oil boom.

6.6- Conclusion

Throughout this chapter, aspects of economic theory and related findings have been discussed. It is appropriate here to summarise and regroup what has been discussed in the context of this chapter.

6.6.1 The model

6.6.1.1. The model is estimated based on the TSLS method. It was found that the majority of the behavioural equations produced coefficients that are statistically significant and have the right signs according to economic theory and past experience. The only exception is the impact of the spending effect, mainly the government spending, on the output of the traded goods sector. However, this outcome is justified as is explained below. Economically speaking, the results are welcome considering the overwhelming obstacles concerning the availability and reliability of data and the small sample size.

6.6.1.2. All variables are jointly and individually statistically significant with the exception of the impact of the oil price on the supply of the non-traded goods sector. Furthermore, the magnitude of some variables, particularly the oil price and the money supply differ from one equation to another. This is attributed to the dominance of the government spending effect and the oil revenue and is likely to be due to the presence of multicollinearity. Although multicollinearity is a common occurrence in most economic studies, it seems to be acceptable when the variables need to be included in the equation because of their importance or if economic theory and previous experience suggest they should be.

6.6.1.3. In almost all equations, above 90 percent of variations in the endogenous variables are explained by the changes in the exogenous variables. Moreover, in the behavioural equations, it appears that most of them are free of serial correlation.

6.6.2 Empirical Findings

The increase in oil revenues and the simultaneous increase in the national wealth affect the Saudi Arabian economy through the relative price, the real exchange rate and the reallocation of resources as follows.

1. For the entire boom period, the oil revenue and oil price appreciated the Saudi Arabian real exchange rate by an average of about 29 and 69 percent respectively, while they positively affected the relative price of the nontraded goods sector by an average of about 34 and 70 percent respectively.

2. The government spending effect impacts upon the relative price and the real exchange rate inconsistently with the theory prediction. The government spending reduces the relative price by an average of 40 percent, while the money supply behaves as the economic literature expects. It raises the relative price by an average of 31 percent and appreciates the real exchange rate by an average of 26 percent.

3. A reallocation of resources in favour of the nontraded goods sector has taken place. The traded goods sector, contrary to the theory predictions, has expanded, but far below the level of the nontraded goods sector. The money supply has expanded the traded goods sector by an average of 43 percent, whereas the government spending has affected the traded goods sector through the estimated relative price causing an increase of an average of 13 percent. Therefore, in the context of the growing economies, the squeeze of the traded goods sector means it has had a slower-than-normal growth rather than growth in absolute values. Accordingly, the Saudi Arabian economy has experienced one of the key symptoms of the Dutch

disease.

4. The nontraded goods sector responds positively to the increase in the oil revenues, the money supply, and, relatively, to the oil price. Furthermore, this sector is positively affected by the relative price, while the appreciation in the real exchange rate raises the supply of nontradables. On the other hand, the government spending has a negative impact and seems to reduce the supply of nontradables by about 1.2 percent.

5. The spending effect is the key variable in determining the changes in all the variables. This is due to two factors: firstly, the role of the government in controlling the economy and thus the policies adopted in order to carry out massive development projects, on one hand, and to protect the traditional sector; on the other hand; secondly, the absence of the resource movement effect due to the isolation of the oil sector (i.e., a capital-intensive sector with highly skilled labour) and the influx of foreign labour have increased the demand for tradables and relatively lowered the cost of nontraded goods and thus, to some extent, have mitigated the harmful negative effect of the boom. In addition, a considerable share of government finances have gone on military expenses, some of which were spent abroad. The share of defence expenditure during the Second Development Plan (1975-1980) amounted to SR 78.16 billion or about 15.7 percent of the total expenditure (Ministry of Planning, Second Development Plan). This is likely to hinder the impact of the government spending on the domestic economy.

6. The impact of the rise in the world price resulting from the increases in the oil price shocks in 1973-74 and 1979-1980 on the output of tradables and

nontradables shows that it has a positive impact on the former and negative effect on the latter.

Finally, one can conclude that the Saudi Arabian economy was subject to a unique case of the standard Dutch disease during the period of the boom from 1965 to 1981, where some of the symptoms of the Dutch disease, notably the deterioration in the supply of tradables are not applicable.

6.6.3 Policy Response

Attempts were made to mitigate the adverse side-effect of the oil boom through adopting three policies:

- reduction in government expenditure on the nontraded goods sector during the early 1970s to reduce the inflation pressures and to smooth the bottlenecks in ports, transportation, communications and housing;
- imported foreign labour to lessen the appreciation of the real exchange rate and lower the cost of production of the traded goods sector as well as to increase demand for that sector;
- subsidies for consumer and producer products aiming to lower the cost of these products for the low-income citizens and to stimulate production of the traded goods sector. The government adopted such policies regardless of their cost in economic terms.

Notes

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[1] For more details about stationarity and integration, see, Maddala, 1992, Gujarati, 1995 and Mukherjee et al, 1998).

[2] For more details about the structural breaks under the unit root hypothesis see, Kapetanios, 1999 and Kim, 1999.

[3] The alternative methodology has been used to estimate the model specified in this chapter is the method of cointegration. The results from this methodology confirm the results presented in this chapter which are available upon request from the author.

[4] See chapter Four for more details.

[5] The interdependence of the Saudi Arabian monetary and fiscal policy is discussed in more details in Looney, 1990, Chapter 4.

[6] An attempt has been made to estimate the model without including a world price effect. It is found that the empirical results of that model is inferior comparison to that with it.

[7] See chapter Three for more details.

Chapter Seven

The Empirical Results of the Oil Slump

7.1 Introduction

In the previous chapter, the empirical results of the impact of higher oil prices and, in turn, oil revenues on the Saudi Arabian economy during the boom period from 1965 to 1981 has been discussed, it is now time to move one step forward to discuss the impact of the oil slump, starting firstly to demonstrate the causes of the decline in oil prices, which began in 1982, and secondly, to analyse how the deterioration in such prices affected the kingdom's economy. There is an agreement among economists (Amuzegar, 1999; Stevens 1995; 1996, Al-Yousuf, 1990; Mabro, 1988; Attiga 1988, among others) professionals, and, lately, politicians (Iranians, Algerians and Libyans), that the two oil shocks significantly contributed to a continuing decline in the oil prices in the subsequent years. This was, broadly speaking, due to emergence of new oil suppliers, and renewed inducements for energy conservation and for availability of alternative energy resources.

The fall in the spot price of oil began to decline from its peak of over $36 per barrel in 1979-80 to less than $10 in 1986. Accordingly, the oil earnings of OPEC as the residual supplier of the world oil market fell from their peak of $282.6 billion in 1980 to about $77 billion in 1986. Since Saudi Arabia is the largest oil producer among OPEC members, it was obvious that it would be the member most harmed by such a decline in oil receipts. Therefore, Saudi Arabia agreed to cut its production as the residual supplier of OPEC in an attempt to fix the oil prices in the world oil market. Thus, the kingdom's production dropped from an average of 9.9 million barrels per day (mbpd) in 1980 to less than 3 mbpd in 1985. The decline in oil production was accompanied with a fall in oil prices, contributing to a sharp decline in its oil revenues from $119 billion in 1981 to $18 billion in 1986 (OPEC, 1997). As the oil revenues accrue directly to the government, the consequences of such a decline caused deficits in both the national budget and the balance of payments' current account that affected the entire economy, particularly after the Kuwait invasion in 1990. The deterioration in oil prices, which started in 1982 and exacerbated in 1986, has been termed by some authors as the 'third oil shock', or the ' oil-demand crisis', while others may use more neutral terms, such as the 'crash', the 'plunge', the 'collapse' or simply a 'sharp decline' (Ibrahim, 1988).

Although studies conducted into the economic implications of the fall in oil prices are few, most of those which exist are either related to the developed countries, namely the UK, or to some high absorptive developing oil-exporting economies such as Nigeria and Indonesia. As previously pointed out in Chapter two, Henry and Herbert (1986) focus mainly on the impact of the fall in oil price on investment plans in the oil sector in the UK and its depletion policy rather than analysing its impact on the entire economy. Whereas, Powell and Horton (1985) explain how a sustained fall in oil prices affects aggregate demand and supply in the world economy in general, and in a net oil exporter like the UK in particular. This was discussed in terms of the expected degree of change in a lower inflation rate, lower price levels, lower interest rates and redistribution of income between oil-exporting and oil-importing countries. With regard to developing oil-exporting countries with a large absorptive capacity, Afolab and Bladen-Hovell (1990) investigated the two-fold impact of oil price reduction on the Nigerian economy. This impact corresponds firstly to the direct effect of price slump on the domestic economy, and relates primarily to changes in both the balance of payments and government finances. Secondly, Nigeria as an oil producer was also influenced indirectly by the impact of a fall in oil prices on the level of world demand (redistribution of income) and the rate of inflation (reduction in world price levels) in the world economy.

However, few studies have been conducted into the impact of the collapse in oil prices and, in turn, oil revenues as a major source of income in some developing oil-exporting countries with low absorptive capacities. Zind (1999) in his study of oil price movements and the Arabian Gulf economies, pointed out that the decline in oil revenues and the budget deficits affected unequally the different sectors of the economy and thereby led to unequal sectoral output growth rates. The sectoral responses to the oil shocks are determined by a number of factors including the inter-sectoral linkages, changes in quantities and prices of inputs, changes in output prices and in the development priorities of policy makers. He found that the oil sector was the major loser and the gains corresponding to this loss accrued mostly to the government sector and, to a much lesser extent, to relatively slow-growth sectors, namely the manufacturing, transportation and trade sectors.

Al-Yousuf (1990) investigated the impact of the collapse in oil revenues on the economies of Kuwait and Saudi Arabia. The structural changes that took place in both economies following the fall in oil revenues were consistent with theoretical predictions. There was a rise in the value added for traded goods (mainly in the manufacturing sector, including petrochemical production) and a decline in the value added of the private-sector's non-traded goods, particularly in construction. It is worth noting that Al-Yousuf's computation analysis covered the time period up to 1988. This implies that he did not analyse the dramatic changes, which took place in the early 1990s, when the liberation of Kuwait severely affected both economies. Furthermore, he did not elaborate on the determinants of economic changes leading to his findings, such as the magnitude of changes in real exchange rates, relative prices and structural changes.

Ibrahim (1987), Hammoudeh and Al-Barazi (1987), and Mabro (1985) discussed how the decline in oil prices, to a large extent, affected the economies of the majority of Arab countries through its effects on export earnings, net remittances, income from factors of production, capital movement and interest rates. They attributed the sharp deterioration in the Arab countries' GDP growth rates and development between 1980 and 1985 to the collapse of oil prices and thus oil revenues. The oil price collapse greatly influenced the Arab countries in general and Saudi Arabia in particular. However, Saudi Arabia was more severely affected during and after 1990, a period not covered by any previous studies.

Consequently, the main objective of this chapter is to analyse the impact of the dramatic fall in oil price and, in turn, oil revenues on the national Saudi economy up to 1997. This sample period includes the second Gulf crisis which one can term the 'fourth oil shock' due to its severe impact on the domestic economy. The implications of the oil price collapse will be examined through its impact on the price of nontradable relative to tradable goods, the real exchange rate and the allocation of resources. Furthermore, the government policy response will be discussed both within this context and separately.

The organisation of this chapter is as follows. Section 2 reviews the origins and causes of the third oil shock (a decline in the oil prices and oil revenues). In section 3, the empirical findings regarding the decline in oil prices are demonstrated and discussed. The government policy response is elaborated in section 4, and section 5 provides concluding remarks.

7.2 The Origins and Causes of the Third Oil Shock

The causes of the oil price increases in the early 1970s were a debatable issue among economists, with some supporting the property right theory, others cartel theory, the market theory and the absorptive capacity theory[1]. These theories have been briefly discussed in Chapter 2. However, it can be argued, firstly, that the successful attempts of some oil-exporting countries to exercise their control over production levels, together with factors such as the Arab-Israeli conflict and the Iranian Revolution, explained the dramatic increases in oil prices. Other contributory factors include decreases in oil inventories, the strike in Iran in 1978, and the depreciation in the US dollar. Secondly, it was often concluded that high oil prices would bring about their own collapse. After the second oil shock, there was a collective agreement that the rise in oil prices, particularly in the early 1970s, was responsible for introducing fundamental adjustments in energy consumption, production and pricing. Ali Attiga, the secretary general of OAPEC, made the following important statement in the preface to his book about the 1986 oil crisis:

"While the origin of the oil crisis was to be found in the energy policies of the industrial oil-importing countries, the oil price collapse is due to the lack of cohesive policies on the part of the developing countries. Their failure to respond with a concrete policy to the well-known energy policies of the industrial countries after 1974-75 was largely responsible for the oil price collapse". (Attiga, 1987)

However, the decline in oil prices (the third oil shock) could be attributed, broadly speaking, to three distinct factors:

7.2.1 Slackness in world economic activity.

The common presumption is that the demand for energy is closely related to changes in economic activity as measured by GDP (Jensen, 1987). Hence, the reduction in global economic growth in general, and in the industrial countries in particular, dampened the demand for oil as long as it constituted the largest share in the world energy demand. Table 7.1 shows that there were signs of recession in the OECD countries, such as a sharp decline in the overall GDP in 1982 by –0.3 percent, while the highest inflation rate of 12.9 percent was in 1980, and the highest unemployment rate was 9.0 percent in 1983. Moreover, there were massive deficits in the industrialised countries' balance of payments, reaching about $70 billion in 1980. Consequently, there was some rebound in oil and energy demand as a result of the anticipated stimulus to economic activity in the OECD countries and the expectation of lower prices. Arnould (1992) attributes such changes to four external shocks: the rise in raw material prices from 1976-1977, the second oil shock in 1979-80, the appreciation of the dollar between July 1980 and February 1985 and the rise in interest rates between the second quarter of 1979 and the last quarter of 1981.

Table 7.1 Key Economic Indicators for the OECD Countries from 1979 to 1984

Year	GDP (%)	Inflation (%)	Unemployment (%)	Balance of Payments ($ Billion)
1978	3.9	7.9	5.2	9.5
1979	3.3	9.8	5.1	-29.0
1980	1.2	12.9	6.2	-70.1
1981	1.7	10.5	6.9	-24.5
1982	-0.3	7.8	8.4	-27.5
1983	2.6	5.3	9.0	-24.8
1984	4.75	5.0	8.5	-70.5

Source: OAPEC, Statistical Annual Report, 1984.

With respect to the developing countries, Tables 7.2 and 7.3 show that all developing countries experienced a fall in their GDPs except the oil-exporting countries, which maintained a sustainable growth rate till 1980, while the non-oil exporting countries suffered negative growth rates from 1980 and massive current account deficits during the remaining sample period. This was due mainly to increases in their import costs due to the appreciation of the US dollar accompanied by higher oil prices.

Table 7.2 Economic Growth for Developing Countries 1979-1984 (%)

	Years						
Countries	1978	1979	1980	1981	1982	1983	1984
Non-Oil Exporting Countries	6.4	3.7	-2.1	-4.1	-4.3	-0.8	3.8
Oil-Exporting Countries	2.3	5.0	5.0	3.1	1.7	1.8	3.7
All Developing Countries	4.7	4.3	2.3	0.7	-0.1	0.9	3.7

Source: OAPEC, Statistical Annual Report, 1984.

Table 7.3 Current Account Position for Developing Countries 1979-1984 (%)

	Years						
Countries	1978	1979	1980	1981	1982	1983	1984
Non-Oil Exporting Countries	-42.9	-63.3	-88.7	-108.5	-85.9	-52.6	-45.0
Oil-Exporting Countries	5.9	62.3	110.4	53.1	-13.1	-17.5	-8.0
All Developing Countries	-37.3	-1.0	21.8	-55.0	-99.0	-70.1	-53.0

Source: OAPEC, Statistical Annual Report, 1984.

The economic implication of such consequences was a reduction in oil consumption. Table 7.4 shows the strength of the downtrend of oil demand both in the industrialised countries and in the non-communist world.

Table 7.4 Consumption of the World and the Major Industrialised Countries (1978-1984)
{In Million Barrel Per Day (mbpd)}

Country	Years						
	1978	1979	1980	1981	1982	1983	1984
USA	18.3	17.9	16.5	15.6	14.8	14.75	15.5
Japan	5.4	5.5	4.9	4.7	4.4	4.39	4.55
OECD	40.6	40.78	37.6	35.5	33.68	33.26	33.9
World	63.1	64.12	61.6	59.9	58.4	58.04	58.87

Source: BP Statistical Review of World Energy, 1987.
:OAPEC, Annual Report, 1985.

For example, the US as the major consumer of oil (around one-fourth of the world consumption) reduced its consumption from 18.3 mbpd in 1978 to about 14.8 mbpd in 1982, while the OECD consumption fell from 40.6 in 1978 to 33.26 mbpd in 1983. Amuzegar (1999) attributed 28 percent of the fall in oil demand to the recession itself. This outcome led, to some extent, to an excess supply of oil both from OPEC members and from other oil suppliers, which reinforced the deterioration of oil prices.

7.2.2 Non-OPEC supplies.

There is no doubt that the dramatic oil price increases which generated high revenues promoted investments from the mid-1970s in various oil recovery methods in the existing oil fields (because of using new technology and/or extracting oil from marginal fields and high cost areas such as the North Sea and Alaska) and encouraged new investments in attempts to discover new oil fields. Hence, there was a considerable expansion of non-OPEC oil supplies. Table 7.5 shows that the share of non-OPEC oil producers increased from 51.5 percent of the total world oil production in 1979 to 71.6 percent in 1985. This substantial expansion was at the expense of OPEC in general and Saudi Arabia in particular, whose share fell from 17.4 percent of total world oil production in 1981 to about 6 percent in 1985. The growth of the non-OPEC production was partly due to the emergence of Mexico and to the development of the large North Sea Oil reserves, and partly due to new smaller-scale oil suppliers (Mabro, 1987). For example, Mexico increased its own production by an average of 1.94 mbpd in 1980 to 2.78 mbpd in 1983, while the UK's production rose from 1.62 mbpd to 2.23 mbpd in the same period (SAMA, 1984).

Table 7.5 Shares of Oil Production in Saudi Arabia, Non-OPEC and OPEC Countries

Country	Years								
	1978	1979	1980	1981	1982	1983	1984	1985	1986
Saudi Arabia	13.8	15.1	16.5	17.4	12.1	8.56	7.7	6.04	8.6
OPEC (Excluding S.A)	35	33.4	28.2	22.6	22.9	23.14	22.4	22.36	23.2
Non-OPEC	51.2	51.5	55.3	60	65	68.5	69.9	71.6	68.2
Total World	100	100	100	100	100	100	100	100	100

Source: OPEC Statistical Annual Report, 1996.

As a result of such new discoveries, the UK and Norway cut their prices by $3 in February 1983, which forced Nigeria, whose oil's gravity (Bonny) is similar to that of North Sea Oil (Brent), to lower its prices by $5.5 per barrel. The latter cut was 4 dollars less than OPEC's official base price. Furthermore, the Russian oil (equivalent to Arab Light) also reportedly was reduced to as low as $27.5 (Skeet 1988). The unity over oil pricing among OPEC members soon disintegrated and the discipline among members seemed even more difficult to maintain than before. Hence, the oil prices started to decline sharply over the period from 1982 to the end of 1986. About 30 percent of the decline in oil price is attributed to the oil supplies from non-OPEC sources (Amuzegar, 1999).

However, there are other factors that contributed to the collapse of oil prices, such as energy conservation and use of oil substitutes.

7.2.3 Energy alternatives and conservation.

Prior to the major oil price increase of 1973, the advanced oil-importing countries gained the most benefits from the imports of cheap oil and the preservation of their coal resources, which later became of great strategic importance and economic value. Following the first oil shock, the industrialised oil-consuming countries formulated their national economic policies through establishing the International Energy Agency (IEA) early in 1974, which aimed to govern and regulate oil and energy policy for its members. One of its main objectives was to reduce dependence on oil through the implementation of oil conservation programmes and the development of alternative sources of energy such as natural gas, coal and nuclear power. This objective was, and is still, being achieved by imposing excise taxes on refined fuels in order to raise local incomes and reduce oil consumption (Hussein, 1998), as well as increasing energy research and development spending on new sources of energy in IEA countries (Attiga, 1987). However, Table 7.6 demonstrates that the energy consumption began to decline from 1979 to reach its lowest level of 61.9 million barrels of oil equivalent (mboe) by the end of 1983. Parallel to that, the coal and natural gas shares of consumption showed upward trends till 1986, when these began to fall (albeit their absolute values increased). This outcome was due to the collapse of the oil price in that year, which increased the share of oil. The nuclear power share increased gradually, while its absolute values declined after 1987 due to the dangers and high costs associated with building new reactors as well as opposition from anti- nuclear groups.

The combination of reducing oil consumption (due to oil conservation and substitution) and the increase in total oil production made it relatively easy for the OECD countries to implement their policy by building up huge oil stocks. According to the OAPEC report in 1984, the oil stocks in 1974 rose by 49 and 71 percent in 1978 and 1981 respectively, while the OECD consumption increased by only 5.5 and 4.5 percent for the same period. This reflected an excess demand for oil above the need for the OECD countries' consumption during the boom period, which led, along with other factors, to the rise in the oil prices. However, the main objective of building up such a stock of about 550 million barrels in 1980 was to be used for the dual purposes of security and demand management (AlSahlawi, 1998).

Table 7.6 Demand for Energy in the OECD Countries by Sectors

Year	Total Demand (m/bdoe)*	Sectors (%)			
		Oil	Coal	Natural Gas	Nuclear
1978	67.7	56.6	19.9	19.5	4.0
1979	69.7	55.2	20.7	20.0	4.0
1980	67.1	52.9	22.2	20.6	4.2
1981	64.5	50.8	23.5	21.0	4.7
1982	62.0	50.2	24.1	20.6	5.2
1983	61.9	49.6	24.5	20.3	5.5
1984	63.9	48.8	24.6	20.8	5.8
1985	64.6	47.3	25.8	20.7	6.2
1986	64.7	48.7	25.1	19.8	6.5

*Indicates one million barrels of oil equivalent.
Source: OPEC Review, Vol.XVI, No.4, Table a, Winter, (1992)

It is fair to say that there are many other factors that, to some degree, contributed to the collapse of oil prices in the mid-1980s. Mabro (1987) pointed out that the virtual demise of the old concession system in the OPEC region in 1979-80 led the developing oil-exporting countries, major and minor oil companies, independent refiners, oil traders and other trading houses to have control over trading in the oil market, thus replacing the dominant multinational oil companies. In this context, before 1980, the major oil companies had excellent information regarding supply and demand in the oil market due to the integration of their vertical and horizontal operations through their joint ownership of much of the oil supply. This information disappeared after the second oil shock and hence the demand and the supply became uncertain. With respect to the oil demand-side, the data were coming in late and were constantly being subject to revision, while uncertainity of the supply-side data reflected differences between the various secondary sources (Stevens, 1996).

Furthermore, the structural changes affecting the oil demand were accelerated by the elimination of control over domestic oil consumption and production in the United States in the early 1980s. This served to strengthen the links between the vast domestic oil market in the United States and the world oil market. So, changes in the conditions of the US oil market began to be transmitted to the markets for African, Mediterranean and Gulf crude oils. According to Mabro, this situation caused a huge imbalance between potential supplies and actual demand for oil, exacerbated by the externalisation of the oil trade in dynamic and competitive markets (Mabro, 1987).

To sum up, the fall in oil prices from 1982 onwards was generally believed to be due to the world recession itself, reduction in commercial energy consumption (through conservation and use of oil substitutes), emergence of new sources in the oil market, turmoil in the world oil market (due to the absence of cooperation between oil-exporting and oil-importing countries), fluctuation in the US dollar's exchange rate and, finally, conflict of interests among the oil producing countries. Since Saudi Arabia is the largest oil producer and exporter, it is widely agreed that it has been affected economically and politically more than other oil producers. In the light of this, the next step is to examine how the deterioration and fluctuation in oil prices during the period from 1982 to 1997 affected the Saudi Arabian economy in terms of changes in the relative prices, the real exchange rate, and allocation of resources.

7.3 The Model Specification and Empirical Results

Since the Saudi Arabian economy is characterised by the fact that it has a single source of income (i.e., oil), the decline in oil prices results in a fall in oil revenues and thus a reduction in the domestic public spending. The literature on the oil slump predicts that deterioration in oil revenues brings about a fall in the price of nontraded goods relative to traded goods and depreciation in the real exchange rate. Accordingly, a structural change occurs through an expansion of the supply of traded goods at the expense of the supply of nontraded goods.

These theoretical consequences will be tested, starting first with the implications of the fall in oil prices or oil revenues associated with one proxy of the spending effect (i.e., the government spending and the money supply) on the price of nontraded goods relative to traded goods and on the real exchange rate. This is followed by the impact of such pitfalls on the structural changes via changes in the expansion of the output of one sector at the expense of the other. Specification of the relative prices will be the first task followed by its statistical results.

7.3.1 Specification of the Relative Price

As already stated, the economic literature predicts that a decline in oil revenues and/or oil prices may positively affect the relative price of the nontraded goods sector. The justification for this outcome is related to the fact that the fall in oil revenues, as the major source of income, reflects a decline in the national and per capita incomes and thus the demand for both traded and nontraded goods. A lower demand for the latter calls for a decline in the price of nontraded goods since its price is determined domestically and thus the supply of nontraded goods is likely to contract, while a lower demand for traded goods is met by a reduction in imported goods rather than domestic production (because of depreciation in the real exchange rate defined as the inverse ratio of the relative price).

In order to trace this effect for Saudi Arabia, the first hypohtesis which needs to be checked, is that the fall in the price of oil or oil revenues leads to a decline in the spending effect which is proxied by the government spending and/or the money supply. Thus, the oil slump is expected to affect positively the relative price of nontraded goods versus traded goods, in the sense that the hypothesis can be written as follows:

Ho: β and $\lambda_t = 0$ null hypothesis

H1: β_t and $\lambda_t > 0$ alternative hypothesis

Where β_t is the coefficient of the slump represented by the spending effect proxied by government spending and money supply, while λ_t represents either the coefficient of oil revenue or oil price. The equations for the relative price of non-traded goods can be written as follows:

$$rp_t = \alpha_t + \beta gm_t + \lambda pr_t + e_t \qquad 7.1$$

Where *gm* represents either the government spending or the money supply, while *pr* represents the oil revenue or the oil price and *e* is the error term. Then the respecification of the equation of the relative price can be rewritten in the following forms:

$$rp_t = \alpha_1 + \beta_1 g_t + \lambda_1 or_t + e_1 \qquad 7.2$$

$$rp_t = \alpha_2 + \beta_2 g_t + \lambda_2 po_t + e_2 \qquad 7.3$$

$$rp_t = \alpha_3 + \beta_3 ms_t + \lambda_3 or_t + e_3 \qquad 7.4$$

$$rp_t = \alpha_4 + \beta_4 ms_t + \lambda_4 po_t + e_4 \qquad 7.5$$

7.3.1.1 Statistical Results

In Equation 7.2 as shown in Table 7.7, the relative price of nontraded goods to traded goods behaves consistently, as the theory predicts, in relation to changes in oil revenues and the government spending. A ten percent fall in the oil revenue causes the relative price to decline by about three percent. The coefficient has the right sign and is highly statistically significant. Similarly, the coefficient of the government spending has the right sign and is statistically significant at a one percent level. A ten percent decline in government spending brings about a two percent fall in the relative price.

Furthermore, the two independent variables are jointly significant, and explain 96 percent of the variation in the relative price. Thus, one can safely reject the null hypothesis of the coefficient of the oil revenue and the government spending and accept the alternative one.

Table 7.7 indicates that if the oil revenue is replaced by the oil price, both variables, namely the government spending and the oil prices, affect the relative price as expected from the economic literature. With regard to the oil prices, the coefficient of the oil price has the right sign and is statistically significant at a five percent level. A ten percent fall in the oil price leads to a 1.4 percent decline in the relative price. Similarly, the coefficient of the government

Table 7.7

Estimation of the Relative Price

	Equation 7.2	Equation 7.3	Equation 7.4	Equation 7.5
Intercept	**-1.730** (-3.135)	**1.272** (0.966)	**- 2.508** (-2.997)	**-0.266** (-0.145)
OR	**0.289** (8.747)**	-----	**0.313** (13.109)**	-------
PO	--------	**0.143** (2.555)*	--------	**0.114** (1.890)***
G	**0.210** (3.285)**	**0.217** (1.935)***	--------	--------
MS	--------	--------	**0.237** (2.891)*	**0.357** (2.443)*
R^2	**0.970**	**0.964**	**0.981**	**0.972**
Adj-R^2	**0.960**	**0.955**	**0.976**	**0.965**
F-test	**100.21**	**107.66**	**202.50**	**135.63**
DW	**1.74**	**1.73**	**2.12**	**1.76**
Diagnostic Tests: (Figures represent the probability's values)				
Normality (J-B)	**0.899**	**0.625**	**0.507**	**0.890**
Serial Correl. LM	**0.064**	**0.261**	**0.612**	**0.525**
Heteroscedasticity	**0.490**	**0.112**	**0.436**	**0.182**

Values in parenthesis are t-ratio with N =17

* Significant at 5%, ** significant at 1% and *** significant at 10%

spending also has the correct sign and is statistically significant at a ten percent level. A ten percent decline in the government spending brings about a 2.2 percent fall in the relative price. However, other statistical indicators, demonstrates that the oil price and the government spending are jointly significant and they explain 95.5 percent of the variation in the relative price. Thereby, one can reject the null hypothesis of the coefficients of the price of oil and the government spending in favour of the alternative hypothesis.

By using the money supply instead of the government expenditure as the proxy of the spending effect, one can check how the money supply accompanied with either the oil revenue or the oil price affects the relative price of nontraded goods. Starting first with the oil revenue, it is found that both the money supply and the oil revenue affect the relative price as the economic theory expects. The oil revenue has the right positive sign and is highly statistically significant at even less than a one percent level. The empirical results indicate that a ten percent decline in the oil revenue calls for about a three percent fall in the relative price. Similarly, the money supply coefficient has the correct positive sign and is statistically significant at a five percent level. A ten percent fall in the money supply causes about a 2.3 percent decline in the relative price. Furthermore, Table 7.7 shows that the variation in the money supply and oil revenue explains about 98 percent of the variation in the relative price and that these two variables are also jointly significant. Consequently, one can safely reject the null hypothesis of no correlation between the independent and dependent variables and thus accept the alternative hypothesis of positive relationship between them.

Alternatively, replacing the oil revenue with the price of oil, it is found that the oil price as well the money supply behave as the economic literature predicts. Therefore, both variables' coefficients have the right positive signs and are statistically significant at a ten percent level for the oil price and a five percent level for the money supply. A ten percent decline in the oil price and the money supply causes a fall in the relative price by about 1.1 percent and 3.5 percent respectively. These two variables are jointly significant and explain 96.5 percent of the variation in the relative price. Thus, the null hypothesis of the coefficients of the money supply and the oil price can be safely rejected.

To sum up, the empirical results of the impact of oil prices, oil revenues and the proxy of the spending effect support the theory predictions of a positive relationship between these variables and the relative price of nontraded goods to traded goods. At this stage, one can confirm the presence of one of the predictions of the reverse Dutch disease literature. However, this leads to the need to check the second prediction of the impact of the deterioration of oil revenues, oil prices and the proxy of the spending effect on the real exchange rate.

7.3.2 Specification of the Real Exchange Rate

One of the symptoms of the reverse Dutch disease is a depreciation of the real exchange rate of the domestic currency resulting from an oil slump. Since the Saudi Riyal is fixed to the US dollar, the oil revenue's slump which started in 1982 is highly likely to have a negative impact on the real exchange rate rather than on the nominal exchange rate due to the fact that the real exchange rate is defined as the inverse ratio of the relative price. Thus, the null and alternative hypothesis can be written as follows:

Ho: β_t and $\lambda_t = 0$ null hypothesis

H1: β_t and $\lambda_t < 0$

Where β_t is the coefficient of the slump represented by the spending effect proxied by government spending and money supply, while λ_t represents either the coefficient of oil revenue or oil price. The equations for the real exchange rate can be written as follows:

$$rer_t = \alpha_t + \beta gm_t + \lambda pr_t + e_t \quad 7.6$$

Where *gm* represents either the government spending or the money supply, while *pr* represents the oil revenue or the price of oil and *e* is the error term. Then the respecification of the equation of the real exchange rate can be rewritten in the following manner:

$$rer_t = \alpha_1 + \beta_1 g_t + \lambda_1 or_t + e_1 \quad 7.7$$

$$rer_t = \alpha_2 + \beta_2 g_t + \lambda_2 op_t + e_2 \quad 7.8$$

$$rer_t = \alpha_3 + \beta_3 ms_t + \lambda_3 or_t + e_3 \quad 7.9$$

$$rer_t = \alpha_4 + \beta_4 ms_t + \lambda_4 po_t + e_4 \quad 7.10$$

Where β_t is the coefficient of either the government spending or the money supply, while λ_t represents the oil revenue or the oil price.

7.3.2.1 Statistical Results

In Equation 7.7, the regression of the real exchange rate against the oil revenue and the government spending confirms the literature prediction of the negative impact of the decline in oil revenue and the government spending on the real exchange rate. Table 7.8 shows that the oil revenue, has the right

Table 7.8

Estimation of the Real Exchange Rate

	Equation 7.7	Equation 7.8	Equation 7.9	Equation 7.10
Intercept	**12.363**	**9.690**	**11.264**	**11.046**
	(13.398)	(4.225)	(9.999)	(6.740)
OR	**- 0.230**	-----	**- 0.181**	-------
	(- 3.451)**		(- 4.720)**	
PO	--------	**- 0.110**	--------	**- 0.136**
		(- 2.070)***		(- 2.481)*
G	**-0.413**	**-0.382**	--------	--------
	(-3.260)**	(-2.030)***		
MS	--------	--------	**-0.360**	**-0.479**
			(-3.476)**	(-3.910)**
R^2	**0.915**	**0.920**	**0.971**	**0.960**
Adj-R^2	**0.894**	**0.890**	**0.963**	**0.950**
F-test	**47.32**	**31.72**	**125.43**	**88.24**
DW	**2.00**	**1.61**	**2.13**	**2.04**

Diagnostic Tests: (Figures represent the probability's values)

Normality (J-B)	0.978	0.697	0.875	0.907
Serial Correl. LM	0.654	0.315	0.566	0.771
Heteroscedasticity	0.436	0.221	0.809	0.291

Values in parenthesis are t-statistic with N =17

* significant at 5%, ** significant at 1% and *** significant at 10%

negative sign, and is statistically significant at a one percent level. A ten percent fall in the oil revenue causes about a 2.3 percent depreciation in the real exchange rate of the Saudi Riyal. Similarly, the role of the spending effect resulting from the wealth decreases, behaves to reduce the price of nontraded goods, since the government spending as a proxy of the spending effect has the negative sign and is statistically significant at a one percent level. It is found that a ten percent decline in the government spending causes the real exchange rate to depreciate by 4.1 percent. As stated before, this can be explained by the fall in the price of the traded goods sector due to the reduction in the government expenditure resulting from the decline in oil revenue as the main source of national income. However, the statistical criteria show that 89.4 percent of the variation in the real exchange rate is determined jointly by the oil revenue and the government spending. Therefore, one can reject the null hypothesis of both coefficients of the oil revenue and the government spending and accept the alternative hypothesis of the presence of a negative relationship between these two variables and the real exchange rate.

Using the price of oil instead of the oil revenue with the government spending, the empirical results of the impact of the oil price and the government spending on the real exchange rate are consistent with the economic theory prediction, in the sense that both have the right negative signs and are statistically significant at a ten percent level. A ten percent fall in the oil price and the government expenditure leads to a 1.1 and 3.8 percent depreciation in the Saudi Riyal respectively. In addition, they are jointly statistically significant and their variations explain 89 percent of the variation of the real exchange rate. Consequently, the null hypothesis is rejected.

Turning to the impact of the oil revenue and the money supply on the real exchange rate, the coefficient signs of the oil revenue and the money supply are as expected in the economic literature and are statistically significant at a one percent level. A ten percent decline in the oil revenue and the money supply calls for a 1.8 and 3.6 percent depreciation in real Saudi Riyals respectively. Both variables are jointly significant and they explain about 96 percent of the variation in the real exchange rate. Hence, one can safely reject the null hypothesis of the coefficients of the oil revenue and the money supply in favour of the alternative one.

Similarly, regressing the real exchange rate against the price of oil and the money supply indicates that the oil price and the money supply act as the theory expects. This implies that the oil price and the money supply have the right negative signs and are statistically significant at five and one percent levels respectively. A ten percent decline in the price of oil and the money supply brings nearly a 1.4 and 4.8 percent depreciation in the Saudi real exchange rate respectively. The statistical indicators show that both independent variables are individually and jointly statistically significant and their variations explain 95 percent of the variation of the Saudi real Riyal. Therefore, the null hypothesis of no relationship between the dependent and independent variables is rejected and the alternative hypothesis is accepted.

To sum up, the empirical results of the impact of the deterioration in oil revenue, the oil price and the proxy of the spending effect on the Saudi real exchange rate support the theoretical prediction of the reverse Dutch disease of a negative effect on the Saudi real exchange rate.

However, the importance of analysing the impact of the oil slump on the relative price and the real exchange rate centres on their economic implications for the reallocation of resources. Therefore, it is necessary to examine the impact of the oil slump on the supply of the traded and nontraded goods sectors separately.

7.3.3 Specification of the Traded Goods Sector

The oil slump, especially for oil-dependent countries, has two main consequences. The first is that a decline in the oil revenue would be transmitted to the domestic economy through a decline in the spending effect proxied by the government expenditure and/or the money supply, which in turn, positively affect the relative price of nontraded goods to traded goods and negatively affects the real exchange rate. The second outcome is related to the first one in terms of the impact of the oil slump, in the absence of any immediate adjustment, on the reallocation of resources in the domestic economy through the expansion of the traded goods sector and the contraction of the nontraded goods sector.

Accordingly, one should determine empirically whether the Saudi Arabian economy had experienced a reallocation of resources during the sample slump period from 1982 to 1997. On the one hand, the supply of traded goods will be tested with the price of oil, the money supply, the real exchange rate and the world price index. On the other, the government spending and the oil revenue will be examined through their impacts on the relative price or the real exchange rate. Hence, the supply of the traded goods will be regressed against the oil price, the money supply, the estimated relative price, the estimated real exchange rate and the world price index. Therefore, the null and alternative hypotheses of the coefficients of the supply of traded goods can be formulated as follows:

Ho: $\beta_t, \lambda_t, \phi_t, \gamma$ and $\delta_t = 0$ null hypothesis

H1: $\beta_t, \lambda_t, \delta_t < 0$ and ϕ and $\gamma > 0$ alternative hypothesis

Where β_t, λ_t, and δ_t are the coefficients of the money supply, the oil price and the estimated relative price of nontraded goods versus traded goods respectively, while ϕ and γ are the coefficients of the estimated real exchange rate and the world price variables respectively. To examine such hypothesis empirically, the equation of the supply of traded goods should be formulated as follows:

$$T_t = \alpha_t + \beta ms_t + \lambda po_t + \phi r\hat{e}p_t + \gamma wp + e_t \qquad 7.11$$

Where *ms, po* and *wp* are the money supply, the price of oil and the world price variables respectively, while $r\hat{e}p$ represents either the estimated relative price or the real exchange rate. Hence, one can respecify this equation in the following manner:

$$T_t = \alpha_1 + \beta_1 ms_t + \lambda_1 po_t + \delta_1 \hat{r}p_t + \gamma_1 wp_t + e_1 \qquad 7.12$$

$$T_t = \alpha_2 + \beta_2 ms_t + \lambda_2 po_t + \phi_1 \hat{r}er_t + \gamma_2 wp_t + e_2 \qquad 7.13$$

Where

$$\hat{r}p_t = \alpha_3 + \beta_3 g_t + \lambda_3 or_t + e_3 \qquad 7.14$$

$$r\hat{e}r_t = \alpha_4 + \beta_4 g_t + \lambda_4 or_t + e_4 \qquad 7.15$$

7.3.3.1 Statistical Results

The empirical results of the impact of the oil slump on the supply of the traded goods sector can be demonstrated by dividing the regression results into two parts. The first part includes the impact of the oil slump on the traded goods' production through regressing the latter against the price of oil, the proxy of the spending effect (namely the money supply), the estimated relative price of nontradables to tradables goods and the world price index, while the second part includes all the above-mentioned independent variables except the relative price which will be replaced by the real exchange rate. With regard to the impact the oil revenue and the government spending, this will be inferred through their influences on the relative prices and the real exchange rate. Therefore, the empirical results of the regression can be described as follows:

1- Impact of the Oil Price, Money Supply and Relative Prices

Table 7.9 shows that the oil price, the money supply, the estimated relative price and the world price index are individually, except for the world price index, and jointly statistically significant in affecting the supply of the traded goods sector. About 89 percent of the change in the supply of the traded goods sector is explained by the variation in the selected independent variables. However, the coefficient of the oil price has the expected negative sign and is statistically significant at a ten percent level. A ten percent decline in the oil price leads to about a two percent increase in the supply of tradable goods. Therefore, one can reject the null hypothesis in favour of the alternative hypothesis.

With respect to the money supply, it is found that it behaves inconsistently with the standard reverse Dutch disease literature prediction. A ten percent decline in the money supply leads to about a five percent fall in the output of traded goods and is statistically significant at a one percent level. The justification of such an outcome is likely to be due to the role of government intervention in the form of a reduction in the subsidies provided to the local producers. Accordingly, one cannot accept the null hypothesis of the money supply but instead would conclude that it is statistically significant with a reverse coefficient's sign.

Table 7.9

Estimation of the Supply of Traded Goods

	Equation 7.12	Equation 7.13	Estimated RP	Estimated RER
Intercept	7.094	2.370		
	(3.189)	(1.121)		
OR	---------	--------	- 0.240	- 0.288
PO	- 0.191	- 0.249	---------	---------
	(-1.874)***	(- 2.250)*		
G	--------	--------	- 0.100	- 0.166
MS	0.530	0.632		
	(3.436)**	(3.857)**		
$\hat{RP}$	- 0.431	--------		
	(-3.189)**			
$R\hat{E}R$	---------	0.402		
		(2.194)*		
WP	- 0.157	- 0.191		
	(-1.690)	(-1.536)		
R^2	0.922	0.920		
Adj-R^2	0.894	0.890		
F-test	35.06	32.87		
DW	1.87	1.89		

Diagnostic Tests: (Figures represent the probability's values)

	Equation 7.12	Equation 7.13
Normality (J-B)	0.968	0.875
Serial Correl. LM	0.782	0.827
Heteroscedasticity	0.662	0.634

Values in parenthesis are t-statistic with N =17

* Significant at 5%, ** significant at 1% and *** significant at 10%

On the other hand, the coefficient of the estimated relative price is consistent with the theory expectation. Thus, it has the right negative sign and is statistically significant at a one percent level. A ten percent decline in the relative price of nontraded goods brings about a four percent increase in the supply of tradable goods. Hence, one can safely reject the null hypothesis of no relationship between the relative price and the supply of traded goods and accepts the alternative hypothesis of a negative relationship between them. In the light of this result, the oil revenue and the government spending negatively affect the supply of the traded goods sector through the relative price, in the sense that the coefficients of the oil revenue and the government spending have the correct signs and thus are consistent with the literature predictions. Table 7.9 shows that a ten percent decrease in the oil revenue and the government spending calls for about a 2.4 percent and a one percent increase in the production of tradable goods respectively. Therefore, the null hypothesis of both variables' coefficients is rejected, which supports the theory prediction of the negative relationship between the oil revenue, the government spending and the supply of tradable goods.

Finally, the empirical results indicate that the coefficient of the world price index has the wrong sign and is statistically insignificant. Accordingly, the alternative hypothesis is rejected since the coefficient of the world price index is statistically insignificant associated with a reverse coefficient sign.

One can conclude that the empirical results point to three main consequences. Firstly, the money supply positively affects the supply of the traded goods' production. It is evident that there is a strong link between the size of subsidies provided by the government and the supply of the traded goods sector. Secondly, the world price index has a weak impact on the supply of tradable goods. This is likely to be due to the fact that the world inflation resulting from the oil boom has declined and made domestic production less competitive than world production. Thirdly, the other independent variables, namely the oil revenue, the government spending and the estimated relative price, are consistent with the theory prediction.

2- Impact of the Oil Price, the Money Supply and the Real Exchange Rate

Now, it is time to examine the impact of the oil slump on the traded goods sector by replacing the estimated relative price of nontraded goods with the real exchange rate in the preceding equations. As shown in Table 7.9, the real exchange rate (RER) is acting as the theory expects. Thus, the output of the traded goods sector expands as the real Saudi currency depreciates (that is, there is a rise in the RER, which is an inverse of the relative price), in the sense that it has the right positive sign and is statistically significant at a five percent level. The depreciation of the Saudi Riyal is due to the decline in the price of nontraded goods resulting from the shrinkage in the demand for nontraded goods, accompanied by a reduction in the national and per capita incomes. Thus, one can accept the alternative hypothesis of the presence of a positive relationship between the supply of tradable goods and the depreciation of the real Saudi Riyal.

In the light of this result, the oil revenue and the government spending negatively affect the supply of the traded goods sector through the real exchange rate. This implies that the coefficients of the oil revenue and the government spending have the correct negative signs and thus are consistent with the literature predictions. Table 7.9 shows that a ten percent decrease in the oil revenue and the government spending increase the production of tradable goods by 1.0 percent for the former and 1.66 percent for the latter.

Therefore, the null hypothesis of both variables' coefficients is rejected, which supports the theory prediction of a negative relationship between the oil revenue, the government spending and the supply of tradable goods.

With regard to the impact of the oil price on the supply of the traded goods sector, it is found that it has the right sign and is statistically significant at a five percent level. A ten percent fall in the oil price calls for about a 2.5 percent increase in the production of tradable goods. Hence, the null hypothesis is rejected and the alternative hypothesis of the negative relationship between the oil price and the supply of traded goods is accepted.

On the other hand, the money supply as another proxy of the spending effect positively affects the supply of traded goods. This result contradicts the economic literature prediction. A ten percent decrease in the money supply causes the supply of tradable goods to fall by about six percent and is statistically significant at a one percent level. This positive relationship can be attributed to the link between government policy and the encouragement to produce traded goods through subsidies and incentives; when the oil revenue declines this is reflected negatively in the production of traded goods. So, the null hypothesis cannot be rejected but one would instead conclude that the coefficient of the money supply is statistically significant but with a reverse coefficient's sign.

Finally, the role of the world price index does not show any indication of its influence on the supply of traded goods in terms of its sign, coefficient and statistical significance.

However, the final diagnosis of the impact of the oil slump on the supply of the traded goods sector indicates that the oil revenue, the oil price, the government spending and the real exchange rate are consistent with the economic theory expectation, while the money supply has a strong positive effect which is in contrast to the economic literature's prediction. Again, this can be related to the reduction in the government subsidies and incentives provided to that sector. These outcomes confirm that the reallocation of resources during the slump period can lead to the expansion of traded goods' production. The question now is: How is the supply of the nontraded goods sector affected by such an oil slump? This will be examined in the following section.

7.3.4 Specification of the Nontraded Goods Sector

The fourth symptom of the standard reverse Dutch disease is the shrinkage of the output of the nontraded goods sector. The theory assumes that the reallocation of resources in favour of tradable goods at the expense of nontradable goods resulting from the oil slump takes place through three channels. The first is the decline in the relative price emerging from the lower private and public demand for nontraded goods. The short-run economic implication of the lower demand is a fall in the profitability of nontradable goods since its supply cannot be reduced to match the fall in demand. The second channel is related to the first, and is that of a potential depreciation in the domestic currency (that is because the real exchange rate is defined as the inverse ratio of the relative price). The impact of the depreciation of the currency tends to be one where the demand for tradable goods is substituted for that of nontradable goods to encourage the former at the expense of the latter. Finally, and most importantly, is the spending effect channel, which has its impact through the government spending and/or the money supply. Since the oil revenue directly accrues to the government as the main agent in the economic activity, this transmits to a fall in the national income and thus the government spending. Accordingly, the private and public expenditures will be reduced through a reduction in capital expenditure and a provision of subsidies.

In short, the supply of nontraded goods is expected to respond positively to changes in the relative price, the oil revenue, the oil price and the proxy of the spending effect, while it is expected to respond negatively to the real exchange rate and the world price index. Hence, the supply of nontraded goods will be regressed against the oil price, the oil revenue, the proxy of the spending effect and the world price index. Therefore, the null and alternative hypotheses of the coefficients of the supply of nontraded goods can be formulated as follows:

Ho: $\beta_t, \lambda_t, \phi_t, \delta_t$ and $\gamma = 0$ null hypothesis

H1: β_t, λ_t and $\delta_t > 0$ and ϕ and $\gamma < 0$ alternative hypothesis

Hence, the regression of the supply of nontraded goods will be tested against the money supply, the price of oil, the estimated relative price, the real exchange rate and the world price as shown in the following equation:

$$S_t = \alpha_t + \beta ms_t + \lambda po_t + \phi r\hat{e}p_t + \gamma wp_t + e_t \qquad 7.16$$

Where *ms, po* and *wp* are the money supply, the price of oil and the world price variables respectively, while $\hat{r}ep$ represents either the estimated relative price or the real exchange rate. Hence, one can respecify this equation in the following manner:

$$S_t + a_1 + \beta_1 ms + \lambda_1 po_t + \delta_1 r\hat{p}_t + \gamma wp_t + e_t \qquad 7.17$$

$$S_t = \alpha_2 + \beta_2 ms_t + \lambda_2 po_t + \gamma_2 wp_t + \phi_1 r\hat{e}r_t + e_t \qquad 7.18$$

Where

$$r\hat{p}_t = \alpha_3 + \beta_3 g_t + \lambda_3 or_t + e_3 \qquad 7.19$$

$$r\hat{e}r_t = \alpha_4 + \beta_4 g_t + \lambda_4 or_t + e_4 \qquad 7.20$$

Where β_t, λ_t and δ_t are the coefficients of the money supply, the oil price and the relative price of nontraded goods respectively, while ϕ and γ are coefficients of the real exchange rate and the world price index variable respectively.

7.3.4.1 Statistical Results

To test how the oil slump affects the output of nontraded goods, one should regress the nontraded goods against the oil price, the proxy of the spending effect (namely the money supply), the oil revenue, the world price index and the estimated relative prices or the real exchange rate. The role of oil revenue and government spending on the output of tradables will be inferred through their influences on the relative prices and the real exchange rate. Therefore, the empirical results of the regression can be divided into two parts as follows:

1- Impact of the Oil price, Money Supply and Relative Prices

The regression results of the impact of all the variables, except for the world price index, on the supply of nontraded goods show that they are consistent with the economic theory prediction in terms of the coefficient signs and levels of significance. Table 7.10 demonstrates that the coefficient of the oil price has a positive sign and is statistically significant at a ten percent level. A ten percent decrease in the price of oil causes about a two percent fall in the supply of nontradables. Similarly, the impact of the money supply is consistent with the reverse Dutch disease theory's prediction. Hence, its coefficient has the positive right sign and is statistically significant at a one percent level. A ten percent decline in the money supply leads to about a 6.5 percent decrease in the supply of nontradables. So, the null hypothesis of the coefficients of the oil price and the money supply can be rejected and the alternative one accepted.

Table 7.10

Estimation of the Supply of Non-Traded Goods

	Equation 7.17	Equation 7.18	Estimated RP	Estimated RER
Intercept	1.541 (0.812)	10.684 (4.566)		
OR	---------	--------	0.220	0.176
PO	0.217 (2.081)***	0.281 (2.499)*	---------	---------
G	--------	--------	0.160	0.316
MS	0.652 (3.029)**	0.440 (2.289)*		
$\hat{RP}$	0.761 (4.230)**	--------		
$R\hat{E}R$	--------	- 0.766 (- 3.253)**		
WP	- 0.518 (-1.115)	- 0.472 (-1.162)		
R^2	0.830	0.855		
Adj-R^2	0.770	0.803		
F-test	14.20	17.47		
DW	1.83	2.15		

Diagnostic Tests: (Figures represent the probability's values)

Normality (J-B)	0.948	0.659
Serial Correl. LM	0.73 9	0.713
Heteroscedasticity	0.244	0.085

Values in parenthesis are t-statistic with N =17

* significant at 5%, ** significant at 1% and *** significant at 10%

With respect to the world price index, it is found that it has a right negative coefficient sign but is statistically insignificant. This can be related to the fact that the price of nontraded goods is determined domestically rather than internationally as the influence of the decline in oil price may hamper the rise in inflation internationally.

However, the coefficient of the estimated relative price has the right positive sign and is statistically significant at a one percent level. A ten percent fall in the relative price calls for about a 7.6 percent decrease in the supply of the nontraded goods sector. Therefore, the alternative hypothesis of a positive relationship between the relative price and the production of nontradable goods is accepted. Since the impact of the oil revenue and the government spending on the supply of nontradables can be deduced through their influence on the relative price, the oil revenue and the government spending positively affect the supply of nontraded goods as the economic theory expects. A ten percent decrease in the oil revenue and the government spending causes the production of nontraded goods to fall by 2.2 and 1.6 percent respectively. As a result of such an outcome, one can reject the null hypothesis of no relationship between the oil revenue and the government spending on the supply of nontradables and thus accept the alternative hypothesis of a positive impact.

To sum up, all variables' coefficients, except for the world price index, are individually and jointly significant. They explain 77 percent of the variation in the supply of nontraded goods.

2- Impact of the Price of Oil, the Money Supply and Real Exchange Rate

The empirical results of regressing the supply of the nontraded goods sector against all regressors included in Equation 7.18 show that they are jointly and individually (except for the world price index) significant and are consistent with the economic theory predictions. Furthermore, the variation in all regressors explains about 80 percent of the variation in the supply of nontraded goods.

With respect to the oil price, its coefficient has the right positive sign and is statistically significant at a five percent level. A ten percent decline in the oil price causes the supply of nontraded goods to fall by 2.8 percent. Accordingly, one can accept the alternative hypothesis of the presence of a positive relationship between the oil price and the supply of nontraded goods and in turn reject the null hypothesis.

Similarly, the coefficient of the money supply as an alternative proxy for the spending effect has the expected right sign and is statistically significant at a five percent level. The reduction in the money supply by ten percent reduces the production of nontraded goods by 4.4 percent. Therefore, one can reject the null hypothesis and accept the alternative one, which implies a positive relationship between the money supply and the production of nontraded goods.

Table 7.10 shows that the exchange rate affects the supply of the nontraded goods sector as the economic literature predicts. Hence, the depreciation in the real exchange rate leads to a contraction in production in nontradable goods. Accordingly, the coefficient of the real exchange rate has the right sign and is statistically significant at a one percent level and thus a ten percent depreciation in the real exchange rate (i.e., a rise in the ratio of the RER) induces a 7.66 percent decline in the supply of the nontradables goods. So, one can safely reject the null hypothesis and accept the alternative one.

The impact of the oil revenue and the government spending on the supply of nontraded goods can be inferred from their impact on the real exchange rate. It is found that both the oil revenue and the government spending are consistent with the theory prediction and have the right coefficient signs. A ten percent decline in the oil revenue and the government spending calls for a 1.76 and a 3.16 decrease respectively in the production of the nontraded goods sector.

Finally, the coefficient of the world price index has the correct negative sign but is statistically insignificant. This result is likely to be due to the possibility of the weak impact of the low foreign inflation, which resulted from lower oil prices after the collapse of the oil price beginning in the first year of the sample period.

To sum up, all independent variables, excluding the world price index, are individually statistically significant in their affect on the supply of the nontraded goods sector as the economic theory of the reverse Dutch disease predicts. It is necessary now to elaborate the policies adopted by the government to mitigate the impact of the oil slump experienced during the sample period from 1982 to 1997.

7.4 Government Policy Response

As the world market turned downward in 1982, a combination of slumping oil prices and cuts in sales reduced the Saudi Arabian oil receipts. The extremely sharp drop in government oil revenues was from over SR328 billion in 1981 to SR42.5 billion in 1986. In addition, Iraq's invasion of Kuwait in 1990 exacerbated the problem and led the Kingdom to confront a series of persistent current account and budget deficits, and rising internal and external debts. In theory, a large current account deficit, which is often associated with losses of foreign reserves and capital flight, signal the need for a policy response to restore financial stability. Stabilisation is pursued through a combination of corrective fiscal, monetary and exchange rate policy[2].

Devaluation can be used as a theoretical option, and the Saudi exchange rate was devalued in the mid-1980s, which then fixed the US dollar at SR3.75. However, despite the fact that the Saudi Riyal came under periodic selling pressure in 1993 and 1994 because of concern about the Kingdom's structural current account and fiscal deficits, the government was reluctant to devalue its currency again. SAMA's strong support for a stable Riyal through its intervention in the foreign exchange market has contributed to a stable currency since then. Amuzegar (1999) attributed the government's decision to many factors: firstly, the adverse impact of high-priced imports (i.e., the bulk of household consumption); secondly, reduction of importers' profits as a result of a cut in imports; thirdly, capital losses for Saudi citizens and others who had repatriated their funds in search of higher Saudi returns; finally, the traditional prestige associated with a strong and stable currency.

On the other hand, a tightening of monetary policy alone is potentially damaging to the private sector as either the interest rate rises or, with interest rate controls, credit is rationed. As a result, this policy used on its one has been neglected by the Saudi authorities.

Since the Saudi Arabian government is the key force in the economic activity through receiving and spending the bulk of the national income, the fiscal developments strongly influence the domestic economy. Saudi public expenditures encompass the following categories: the projects' budget, which focuses largely on the capital and human infrastructure expenditures; the recurrent expenditures including salaries and subsidies; social services, operation and maintenance of infrastructure, and others. When oil revenues began to decline after 1982, the Saudi authorities began to tackle the deficits in the current account and in the budget through implementing the following measures:

7.4.1 Drawing Down from its Substantial Reserves.

As a result of the decline in both the volume of exports and prices, reduced oil export revenues which in 1985 fell to less than one-quarter of their 1980 and 1981 levels, the government of Saudi Arabia has experienced deficits in the budget and the current account every year since 1983. In that year export revenues shrank by 41 percent, which was a greater decline rate than that of imports (i.e., 2.8 percent). As a result, the current account balance shifted of a deficit by SR16.8 billion. The current account deficit was accompanied by the actual budget deficits ranging from SR23.7 billion in 1983 to SR69.7 billion in 1987[3]. During that period, the initial drop in the government spending (i.e., 0.06 percent in 1983 and 0.25 percent in 1986) was slight, as the government decided to draw down from its foreign reserves (estimated at $32.2 billion in 1981, falling to $22.68 billion in 1987)[4] rather than making stiff cutbacks in programmes and projects.

The trend of drawing down from such reserves was accelerated during and after the Kuwaiti crisis in 1990. Although, the Gulf War brought a sharp increase in oil price and production, the cost of the war made the economic situation of the Saudi Arabia economy worse. The IMF estimation was that about $65 billion was spent on the war effort, ranging from payments to the members of the UN Coalition to expenses for the Saudi military and refugees' housing (Cordesman, 1997) with another $20 billion in cash and grants or aid. It is not surprising that the foreign reserves reached their lowest level of $5.9 billion in 1992. According to the Business Monitor International report issued in 1994, the Kingdom has depleted its officially held foreign assets by the equivalent of 11 percent of national GDP for each year since 1986[5]. The initial depletion of the government foreign reserves was followed by other measures such as a reduction in the government expenditure and/or an increase in non-oil revenues.

7.4.2 Reduction of Government Expenditure

The ample reserves enabled the Saudi Arabian government to postpone adjustment till 1986, when the continuation of an extreme drop in government oil revenues led the government to take further steps to reduce expenditures. Consequently, the government instituted several cost-cutting measures. Firstly, there was a suspension and/or cancellation of some costly projects such as two new oil refineries, a lubricant base oil refinery, and several other infrastructure projects[6]. Furthermore, the government opened bidding on all new contracts rather than determining that a particular contractor would achieve a specific project, a move that reduced potential bid corruption and project costs by 50 percent (Wilson and Graham, 1994). Secondly, by increasing the import duties from 12 to 20 percent, the government aimed to achieve the dual objective of reducing imports as well as improving the balance of payments' current account and increasing its own income. Furthermore, loans provided by the government lending agencies, fell dramatically from SR 25.7 billion in 1982 to SR3.7 billion in 1991[7]. Thirdly, the government halved its advance payment to contractors from 20 percent to 10 percent aiming to distribute payments to a larger number of contractors. Because of the liquidity shortages, the contractors were forced to finish older and existing projects in order to receive the remaining payments. Fourthly, payments to contractors became subject to delay for months or years due to real or imagined shortcomings raised by the government inspectors. Fifthly, the security and defence expenditure was reduced from SR92.9 billion to SR47.9 billion in 1989[8]. However, these measures were far from sufficient to balance or even to reduce the deficit in the budget. These results can be inferred by the continuation and increasing budget deficits, which rose from SR60.9 billion in1986 to SR69.7 billion in 1987.

Moreover, the liberation of Kuwait left the country with severe budget deficits, which reached their highest level ever by about SR160.2 billion in the combined budget of 1990-1991, and were SR67.2 billion and SR64.billion in 1992 and 1993 respectively[9]. The fall in oil prices in 1994, resulting from the affirmation of the Saudi authorities that they would keep the oil output at the same levels, led to the disappointing results for the 1994 budget deficit. The estimated deficit of SR34.8 billion provided a catalyst for and an intensification of the adjustment efforts in 1995. In a significant departure from the past policy, domestic prices of petroleum products, electricity, water, telephones, visas and work permits, and air travel were increased significantly[10], with the intention of reducing the reliance on oil revenues. These measures pushed up non-oil revenue by SR7.3, SR2.33, and SR2.4 billion in 1995, 1996 and 1997 respectively, to permit a reduction in the overall deficits by 21 percent, 31 percent and 17 percent for those years in order. On the other hand, the actual expenditure for those years grew by 6.2 percent, 13.9 percent and 11.7 percent respectively due to the increases in the total population and the need for establishing new infrastructure projects and maintaining the old ones.

Although, there were considerable reductions in the overall deficits, the Saudi Arabian budget still experiences a deficit every year, which reflects the government's unwillingness to pursue additional cuts and increase revenues to offset the lower oil prices, which occurred particularly after the Asian Crisis in 1997. The economic consequence is a rise in government debts accumulated over years.

7.4.3 Borrowing

Saudi Arabia found that the momentum of public spending was hard to curb as oil revenues fell, particularly since an increased portion consisted of recurrent expenditure to service the capital investments of earlier years and subsidies to keep them in operation. The financial shortages had led the government to rely on both local and foreign borrowing to fund a wide range of spending and to reduce its deficits. The government's revenue-raising was through the creation of 'development bonds'. the Kingdom's first public borrowing in 25 years. SAMA issued SR30, SR25, SR41 and SR50 billion in the form of bonds in 1988, 1989, 1990 and 1991 respectively. However, it was recognised that the bonds could not cover all the deficits, and the government as early as 1989 borrowed \$660 million from a consortium of Saudi Arabian banks and from some government agencies, mainly pension funds[11].

Moreover, the cost of Iraq's invasion of Kuwait made the situation much worse. As mentioned earlier, Saudi Arabia had to spend nearly \$65 billion on the cost of the crisis. As a result, it had to borrow some \$7.4 billion from international syndicated loans[12] and \$2.5 billion from local banks by the end of 1992. According to the IMF and MEED, the total domestic debt rose from 53.3 percent of the GDP (equivalent to SR236.6 billion) at the end of 1992 to 83 percent (SR384 billion) at the end of 1995. Moreover, the IMF projected that domestic debt would reach to 85 percent of the GDP in 1996. The actual domestic debts were SR422 and SR468 billion of 84 and 87 percent of the GDP in 1996 and 1997 respectively[13].

However, the ever-increasing interest-payment obligations would make structural reform of the budget more and more difficult. The financial needs of the public sector would increasingly crowd out those of the private sector, putting greater pressure on foreign assets and threatening the stability of the exchange rate[14]. The reluctance to impose taxes and the downward inflexibility of government spending because of internal political and social constraints make deficits a serious problem facing the economy in the foreseeable future.

7.5 Concluding Remarks

The rise in oil prices, particularly in the 1970s was blamed for the collapse in the oil prices in the mid-1980s, which is termed the 'third oil shock'. The causes of such a collapse are attributed to many factors, some of which, are major ones such as the rise in non-OPEC suppliers, the world economic recession, energy conservation and improving energy alternatives. The first of these has contributed to an increase in the supply of oil, while the decline in world oil consumption is related to the other two factors.

Since Saudi Arabia in the largest oil producer and exporter, it has been seriously affected by the decline in oil prices. The empirical findings of the model built to test the impact of the oil slump on the Saudi Arabian economy indicate the following:

1. The relative price of nontraded goods to traded goods is positively affected by the oil revenue, the oil price and the proxy of the spending effect. The oil revenue affects the relative prices by an average of about 30 percent, while the oil price influences the relative prices by an average of almost 13 percent. The

proxies of the spending effect have an impact on the relative prices by an average of 30 percent and 21.5 percent for the money supply and the government spending respectively.

2. The real Saudi Riyal has depreciated as a result of a decline by 20.5 percent, 12 percent and 40 percent in the oil revenue, oil prices and any proxy of the spending effect respectively. The limited impact of the oil price changes can be related to the fact that a fall in oil price can be compensated by a rise in the sales of oil production.

3. The supply of the traded goods sector reacts to changes in the oil price, oil revenues, government spending, relative prices and the real exchange rate as predicted in economic theory, while the money supply does not. This confirms the serious links between the decline of the subsidies provided and the fall in the supply of traded goods. The drop in the oil revenue and the oil price reduces the supply of tradables by 26.4 percent and 22 percent respectively, while the government spending negatively affects it by 13.3 percent. On the other hand, the money supply affects it positively by 58 percent. The difference in the magnitude of the proxies of the spending effects, namely the government spending and the money supply, are due to the channels through which they affect the supply of tradables. The money supply has a significant impact due to its direct effect on traded goods, while the government spending operates through its impact on the relative prices and the real exchange rate rather than by affecting the tradables directly. However, the supply of the traded goods sector is affected by the Saudi real exchange rate and the relative prices similarly by about 40 percent.

4. The decline in the supply of nontraded goods responds to the decline in the oil revenue and the oil price by 20 percent and 25 percent respectively, while it

responds to the fall in the government spending and the money supply by 24 percent and 55 percent respectively. The decline in the relative price causes a fall in the supply of the nontraded goods sector by 76 percent, as it does with the depreciation of the domestic real exchange rate.

As a result of the oil slump since 1982, the Saudi Arabian economy has suffered and still suffers from persistent current account and budget deficits. To cope with such a problem, the Saudi officials have tried to implement several corrective measures including the first slight devaluation of the Saudi Riyal in the mid-1980s, which was followed with an objection to any further devaluation. Therefore, the Saudi government has adopted alternative policies such as drawing down from its substantial foreign reserves, a reduction of government spending, raising non-oil revenues and borrowing from local and international financial agencies. Nevertheless, these measures have been far from sufficient due to the continuation of the deficits, particularly in the government budget, since 1983.

One can conclude that the given rise in interest-payment obligations, the increase in the Saudi Arabian population[15], and the need for new infrastructure projects, the depletion of foreign assets would not only threaten the development plans but also may hit the Saudi economy severely. Consequently, structural reforms are needed to reduce reliance on one main source of income (i.e., oil). These reforms can be implemented by imposing an effective tax system, privatisation, rationalisation and reduction of the government expenditure, political reforms, sound management and information transparency. The IMF states that such continued deficits if not improved will, firstly, destabilise the economy and, secondly, seriously impact on the sustainability of the Riyal exchange rate[16].

Notes

[1] For more details, see Reynolds, D. 1999 and Stournaras, Y. 1985.

[2] For more details, see Chu and Hemming in "Public Expenditure Handbook", IMF, 1991

[3] SAMA, Annual Report, 1999).

[4] International Financial Statistics, IMF, 1994.

[5] Business Monitor International Ltd, Saudi Arabia, 1994.

[6] For more details, see MEED, March, 1994.

[7] According to SAMA Annual Report, 1999, the five government credit institutions, namely the Public Investment Fund (PIF), the Saudi Credit Bank (SCB), the Real Estate Development Fund (REDF), the Saudi Industrial Development Fund (SIDF) and Saudi Agricultural Bank (SAB), provide medium and short-term concessionary credit to vital development sectors and individuals for satisfying investment and social needs.

[8] SAMA, Annual Report, 1999.

[9] SAMA, Annual Report, 1999

[10] For more details about the measures used to increase the domestic revenues, see SAMA's Annual Report, 1996

[11] For more details, see Wilson and Graham, Chapter 5, 1994.

[12] These loans are distributed by $4.5 billion led by J.P. Morgan and secured by the Ministry of Finance in 1991, $2 billion borrowed by Saudi ARAMCO in March 1992 and Vela borrowed another $0.9 billion in March 1992, totalled $7.4 billion.

[13] For more details, see the Economic Intelligence Unit, Country Profile, Saudi Arabia, 1997-1998 and see MEED, 24 March 2000.

[14] According to the IMF, foreign assets, which include reserve money, central government deposits and other items declined from its highest level of SR472.93 billion in 1982 to SR185.6 billion in 1994.

[15] The growth rate of the population exceeds the average annual growth rates of Saudi GDP from 1982 to 1997. For more details about this issue, see the Development Plans from 1985 to 2000 and SAMA Annual Report, 1999.

[16] IMF, Staff Report for the 1994 Article IV Consultation, September 1994.

Chapter Eight

Summary and Conclusion

Despite the discovery of oil on March 16, 1938, the Saudi Arabian economy remained very limited till 1970 when the Kingdom announced its First Five-Year Plan. The plan laid the foundations for the country's future economic development and diversification given the limited resources available at that time. Three years later, political and economic events, notably the rise in oil prices, made the plan entirely irrelevant. Historically, the domestic economy passed two major stages through the period of 1973-1997, the first of which, was the boom era, while the second was the slump stage.

8.1 The Oil Boom

The sharp and unprecedented increase in oil prices in 1973 was attributed to different theoretical explanations. As a consequence, Saudi Arabia, in common with other oil-exporting countries took control of the operating companies. Johani (1980) proposed a property right theory (a low discount theory), while Moran (1982) provided political explanations for the cause of the 1970s and 1980s oil price shocks. Other theories such as those of Pindyck (1978) and Adelman (1982) theoretically showed how much cartel behaviour could raise the oil prices. However, regardless of the underlying causes of the oil price shocks, one could argue that the immediate causes were the oil boycott, which was the subsequent of the 1973 Arab-Israeli War, and the Iranian oil workers strike in 1978 followed by the Iranian Revolution.

High oil price combined later with the rising volume of oil exports raised oil revenues to unprecedented levels, allowing Saudi Arabia to record large external current account surpluses and to build up foreign reserves as well as its sizeable government spending. Public sector spending was by far the most significant determinant of development in the non-oil sector. The government used its substantial oil revenues to finance a vast and continued programme of infrastructure, agricultural and industrial development, while allocating substantial funds for the modernisation of its educational and health facilities, improving its welfare system and building up its armed forces (according to SAMA, 1976, the budget of ministry of defence increased in current prices from SR3.5 billion in 1972 to SR31.9 billion in 1976, which the later consisted of around 29% of the total budget)

However, it is becoming increasingly clear that high but temporary oil revenues may have been somewhat of a mixed blessing. Although Saudi Arabia has enjoyed sustained, rapid GDP growth resulting from the oil boom, the domestic economy was subject to some negative side-effects. The model used to examine the impact of the oil boom is based on the core Dutch disease model where the economy has three sectors: oil, tradable and nontradables. The model is amended to be relevant to the characteristics of the Saudi Arabian economy. Moreover, the model focuses exclusively on the short run (when the capital stock is fixed) taking no account of oil depletion. However, unlike earlier studies, the empirical findings of the impact of the oil boom in the short run, based on well-specified models, showed the following:

1. The oil boom positively affected the relative price of nontraded goods to traded goods through the oil price, oil revenue, money supply and the government spending, while the Saudi Riyal was subject to an overvaluation and thus the real exchange rate appreciated. These outcomes are consistent with the economic theory predictions.

2. The nontraded goods sector expanded during the boom period. This is not surprising since the main thrust of Saudi development policies was toward establishing and improving physical and human infrastructure associated with providing generous subsidies for both domestic consumers and producers.

3. In contrary to the Dutch disease predication, it was found that the traded goods sector expanded, but far below the nontraded goods sector. The explanation lied firstly in pursuing policies to promote basic industries based on kingdom's vast hydrocarbon resources and secondly in massive subsidies and heavy protection for traditional traded goods through high tariffs and quotas, which converted tradables into nontradables. However, in the context of the growing economies, the squeeze of the traded goods sector means distorted growth or slower-than-normal growth rather than the growth in the absolute values.

A large oil sector increased the public sector involvement in the domestic economy. This is due to the government ownership of the oil sector and the demand for the local population to share the benefits of increased oil revenues. Moreover, the impact of the boom operated through the spending effect rather than with the resource movement due to the nature of the oil sector as an 'enclave', which implies that the oil sector has no major linkages with the rest of the economy. Therefore, the government initiated nearly all the domestic development projects, and also it was the instigator of nearly all funds entering the private sector.

In order to mitigate the adverse side-effects of the boom, the government adopted several policies, one of which was *subsidising consumer and producer products* in order to lower the cost of domestic products to the low-income citizens as well as to stimulate the production of traded goods. *Importing foreign* *labour* was another policy executed in order to lessen the appreciation of the real exchange rate and lower the relative price of nontraded goods to traded goods. The third policy was *adjustment in government expenditure,* particularly during the early period of the boom to contain inflationary pressures, resulting from the existence of bottlenecks in domestic ports. Government expenditure continued to rise but at a much slower rate. Finally, part of oil foreign exchanges was saved or invested abroad, creating large financial reserves to be used as strategic assets to finance future economic development.

Although the Saudi Arabian economy has experienced some negative consequences of the Dutch disease, other ill-effects could be accompanied by such a boom. Firstly, there was a general relaxation of discipline over all fiscal matters, which moved increasingly toward large-scale, long-gestation projects. These included not only projects undertaken for prestige reasons or to serve conspicuous consumption, but included some projects executed in hurry without carrying out rate of return analysis (Mabro, 1985). Secondly, a lack of skills in managing large programmes led to wasteful and poorly conceived projects. Thirdly, private investors became infected with rentier values, demanding short-term high returns on investment, and concentrated on trade and urban property. Finally, the large scale of influx of foreign labour resulted in the depletion of Saudi foreign exchange earnings. According to the IMF, the recorded foreign remittances in current terms increased from $888 million in 1973 to about $11 billion in 1981.

8.2. The Oil Slump

The oil boom was followed by a gradual, and then dramatic, decline in the oil revenues. This occurred from 1982 as a consequence of a fall in world oil demand. The causes of such a fall can be attributed, broadly speaking, to three distinct factors. The first was a sharp decline in global economic activity as a result of recession, especially after the second oil shock. The second was the adoption of successful conservation and fuel-switching policies by the industrialised countries. The third was the considerable expansion of non-OPEC oil suppliers, new oil discoveries and the development of the large North Sea oil and Alaskan reserves.

Accordingly, the oil earnings of OPEC, as the residual supplier of the world oil market, fell dramatically from their peak of $282.6 billion in 1980 to about $77 billion in 1986. Since Saudi Arabia is the largest oil producer among OPEC members, it was obvious that it would be the member most harmed by such a decline in oil receipts. Therefore, Saudi Arabia agreed to cut its production as the residual supplier of OPEC in an attempt to put upward pressure on oil prices in the world oil market. Thus, the kingdom's production dropped sharply, but as it was accompanied with a fall in oil prices, this exacerbated the sharp decline in its oil revenues from $119 billion in 1981 to $18 billion in 1986. As the oil revenues accrue directly to the government, the consequences of such a decline caused deficits in both the national budget and the balance of payments' current account that severely affected the entire economy, particularly after the Kuwait invasion in 1990.

Since the oil sector is the key driver of the domestic economy, any instability in oil prices is transmitted immediately and in a strong way to the government budget.

It is worth noting that the decline in the oil price and thus oil revenues produced both positive and negative effects on the economy. Among the positive effects are: (i) a reduction in inappropriate investment and wasteful current government expenditure; (ii) a fall in oil price, if it is associated with the fall in oil production, enables the country to conserve its natural resource and to bring extraction rates close to an optimum path, as oil itself represents an implicit investment; (iii) some moves were also undertaken to save foreign exchange. The Saudi government was quick to take action in support of the private sector, by introducing open tendering on all government contracts, and the 30 percent of the government contracts awarded to foreign companies were to be provided by Saudi companies. Hence, a greater involvement of the private sector in the overall GDP has taken place.

By using the amended Dutch model to examine the impact of the oil in the Saudi Arabian economy, the empirical findings indicate some negative and positive outcomes as follows:

1. The relative price of nontraded goods to traded goods is positively affected by the oil slump proxies: the oil revenue, the oil price and the spending effect. In other words, the decline in all variables has contributed to a fall in the relative price of nontraded goods versus traded goods as expected in the economic literature.

2. The real Saudi Riyal has depreciated as a result of a decline in the oil revenue, oil prices and any proxy of the spending effect respectively. The limited impact of the oil price changes can be related to the fact that a fall in oil price can, to some extent, be compensated by a rise in the volume of sales of oil production.

3. The supply of the traded goods sector reacts to changes in the oil price, oil revenues, government spending, relative prices and the real exchange rate

as predicted in economic theory, while the money supply does not. This confirms the serious links between the decline of the subsidies provided and the fall in the supply of traded goods. The difference in the magnitude of the proxies of the spending effects, namely the government spending and the money supply, are due to the channels through which they affect the supply of tradables. The money supply has a significant impact due to its direct effect on traded goods, while the government spending operates through its impact on the relative prices and the real exchange rate rather than by affecting the tradables directly.

4. The supply of nontraded goods contracted as a result of the decline in the oil revenue, the oil price, the government spending and the money supply. This outcome was expected in theory and in practice in Saudi Arabia since the major infrastructure projects were completed or suspended, hence government spending, as a dominant factor in the economy, was reduced.

However, the extremely sharp drop in government oil revenues and Iraq's invasion of Kuwait in 1990 exacerbated the situation, leading the kingdom to confront a series of persistent current account and budget deficits, and rising internal and external debts. A large current account deficit, which is often associated with losses of foreign reserves and capital flight, signal the need for a policy response to restore financial stability.

The last devaluation of the Saudi nominal exchange rate was used as a corrective measure in the mid-1980s. However, despite the fact that the Saudi Riyal came under periodic selling pressure in 1993 and 1994 due to high current account and fiscal deficits, the government was reluctant to devalue the currency again. SAMA's strongly supported the local currency through its intervention in the foreign exchange in order to a stabilise it.

Since the Saudi Arabian government is the key force in the economic activity through receiving and spending the bulk of the national income, the Saudi authorities began to tackle the deficits in the current account and in the budget through implementing the following measures:

(i) D*rawing down from its substantial reserves.*

This due mainly to the Saudi authorities optimistic expectations towards the rise in the oil prices in the early and middle years of 1980s. As a result of the decline in both the volume of exports and prices, the government of Saudi Arabia has experienced deficits in the budget and the current account every year since 1983. In that year, export revenues shrank by 41 percent, while imports were decline by 2.8 percent. The current account deficit was accompanied by the actual budget deficits. Since the drop in the government spending was slight (i.e., 0.06 percent in 1983 and 0.25 percent in 1986), the government decided to draw down from its foreign reserves rather than making stiff cutbacks in programmes and projects.

The trend of drawing down from such reserves was accelerated during and after the Kuwaiti crisis in 1990. Although, the Gulf War brought a sharp increase in oil price and production, the cost of the war made the economic situation of the Saudi Arabia economy worse. The IMF estimation was that about $65 billion was spent on the war effort. It is not surprising that the foreign reserves reached their lowest level of $5.9 billion in 1992. According to a Business Monitor International report issued in 1994, the Kingdom has depleted its officially held foreign assets by the equivalent of 11 percent of its national GDP for each year since 1986.

(ii) A *reduction in the government expenditure.*

This resulted from the continuation of an extreme drop in government oil revenues, which led the government to institute several cost-cutting measures such as a suspension and/or cancellation of some costly projects, opening bidding on all new contracts, a move that reduced potential bid corruption and project costs by 50 percent (Wilson and Graham, 1994). Reducing loans provided by the government lending agencies from SR 25.7 billion in 1982 to SR3.7 billion in 1991, the government decreased its advance payment to contractors from 20 percent to 10 percent aiming to distribute payments to a larger number of contractors as well as to enforce them to finish older and existing projects, and finally reducing the security and defence expenditure from SR92.9 billion to SR47.9 billion in 1989. However, these measures were far from sufficient to balance or even to reduce the deficit in the budget. These results can be inferred by the continuation and increasing budget deficits, which rose from SR60.9 billion in1986 to SR69.7 billion in 1987.

Moreover, the liberation of Kuwait left the country with severe budget deficits, which reached their highest level ever by about SR160.2 billion in the combined budget of 1990-1991, and were SR67.2 billion and SR64.billion in 1992 and 1993 respectively. The fall in oil prices in 1994, resulting from the affirmation of the Saudi authorities that they would keep the oil output at the same levels, led to the disappointing results for the 1994 budget deficit. The estimated deficit of SR34.8 billion provided a catalyst for and an intensification of the adjustment efforts in 1995. In a significant departure from the past policy, domestic prices of petroleum products, electricity, water, telephones, visas and work permits, and air travel were increased significantly with the intention of reducing the reliance on oil revenues. These measures pushed up non-oil revenue by SR7.3, SR2.33, and SR2.4 billion in 1995, 1996 and 1997 respectively, to permit a reduction in the overall deficits by 21 percent, 31 percent and 17 percent for those years in order. On the other hand, the actual expenditure for those years grew by 6.2 percent, 13.9 percent and 11.7 percent respectively due to the increases in the total population and the need for establishing new infrastructure projects and maintaining the old ones.

Although, there were considerable reductions in the overall deficits, the Saudi Arabian budget still experiences a deficit every year, which reflects the government's unwillingness to pursue additional cuts and increase revenues to offset the lower oil prices, which occurred particularly after the Asian Crisis in 1997. The economic consequence is a rise in government debts accumulated over many years.

(iii) Borrowing resulting from the continuos financial shortages.

This meant the government relied on both local and foreign borrowing to fund a wide range of spending and to reduce its deficits. The government's revenue-raising was through the creation of 'development bonds', which amounted SR146 billion during the period from 1988 to1991. Furthermore, the government as early as 1989 borrowed $660 million from a consortium of Saudi Arabian banks and from some government agencies, mainly pension funds.

Moreover, the cost of Iraq's invasion of Kuwait made the situation much worse. As stated earlier, Saudi Arabia had to spend nearly $65 billion on the cost of the crisis. As a result, the total domestic debt rose from 53.3 percent of the GDP at the end of 1992 to 87 percent at the end of 1997.

However, the ever-increasing interest-payment obligations, which rose from $13.8 billion in 1992 to $28 billion in 1997, made structural reform of the budget more and more difficult. The financial needs of the public sector increasingly crowded out those of the private sector, putting greater pressure on foreign assets and threatening the stability of the exchange rate. The reluctance to impose taxes and the downward inflexibility of government spending because of internal political and social constraints make deficits a serious problem facing the economy in the foreseeable future.

One can conclude that the rise in interest-payment obligations, the increase in the Saudi Arabian population, the need for new infrastructure projects and the depletion of foreign assets has not only threatened long term development plans, but has also affected the Saudi economy adversely in the short run. The IMF stated that such continued deficits, if not improved, will firstly, destabilise the economy and, secondly, seriously impact on the sustainability of the Riyal exchange rate.

8.3 Structural Reforms

Structural reforms are urgently needed to eliminate or at least to reduce deficits and to lessen reliance on the main source of income (i.e., oil). The quality of economic reforms could be enhanced through the following suggestions, which may pave the way to improve the current economic situation:

1. Reducing unproductive expenditures, including military spending movement toward market-based pricing of utilities and reducing subsidies to the minimal

level consistent with political stability. Budgetary allocations for different ministries or sectors in terms of expenditures may provide a poor distributive mechanism. Relatively low current and capital expenditures, particularly in education and health sectors in favour of other unproductive expenditure, are indicative of inefficiency and an unsound management of the existing resources.

2. Rationalisation of expenditure by giving the priority to the human resource development would enhance productivity. Cutting productive capital spending and essential operations and maintenance spending are liable to be damaging to growth. Unnecessary expenditures either recorded in the budget or off-budget should be eliminated completely. In line with this strategy, serious government support has to be given to the development of the manufacturing sector in order to diversify the economy. Although the main objective of the Sixth Development Plan is to increase the contribution of the private sector in the national economy, privatisation was and is still very slow and it is time to diversify the economy through increased private sector investment and encouragement of foreign participation. The government owns a portion of 37 companies traded in the Saudi stock exchange with total value of $50 billion. It can reduce its shares in these companies and privatise some other owned-state agencies in order to rationalise its spending, increase its revenues from privatised operations and create an economic environment that will encourage investment and competition.

3. Imposing an equitable tax system that serves the low and medium income citizens through a redistribution of the wealth. In addition, the elimination of exemptions must be applied and reliance on non-tax revenues, such as fees and charges should be limited, as an efficient tax system is preferable.

Implementing an equitable tax system seems to be a helpful instrument to avoid the pro-cyclical crude oil price and revenue fluctuations.

5. Lowering dependence on oil revenues by changing the structure of revenues. This can be done through taking into account the comparative advantage of some domestic products (e.g., natural gas, oil-related products, and minerals specifically) and services such as religious tourism (because of the presence of the Two Holy Mosques), traditional tourism for ancient sites, desert, sailing and diving in the two sea ports. In the context of such policies to increase the non-oil exports, devaluation is likely to be a useful remedy. Devaluation has some advantages such as: (I) it immediately increase the domestic purchasing power of oil revenues, perhaps enough to eliminate deficits, without the need for a spending cut that might throw the economy into recession; (ii) in terms of the income distribution consequences of devaluation, cutting the value of the Riyal may boost the competitiveness of Saudi exports, while the price of imports would be driven up which would stimulate the domestic demand for local products (a strong Riyal makes it hard for local manufacturers to compete with foreign imports and break into overseas markets). A generous system of industrial incentives can offset at least part of the competitive disadvantage caused by a hard Riyal. Lower imports can reduce the depletion of domestic hard currency and improve the balance of payments' current account. On the other hand, it is quite clear that the government remains bitterly opposed to the devaluation and it is not imminent, due to its side-effects expectations such as: (i) a reduction in living standards for the average Saudi citizens; (ii) putting up the price of imports would hit the profits of the business community, most of which is heavily dependent on income derived from

importing foreign goods; (iii) investors who have repatriated capital since the early 1990 as dollar interest rates fell would experience a substantial capital loss.

In total, devaluation would benefit government and the Kingdom's trading counterparts but at the expense of the income and savings of Saudi households and businessmen. It cannot be ruled out at later stages if the financial problems still exist and much will depend on whether the government can bring spending under control.

These policies offer the possibility of reducing deficits by generating additional income, reducing expenditure and altering the way the economy operates.

5. Financial sector reform. The key element of the reform in the financial sector includes a rationalisation the rate of return structure supporting the mobilisation and the allocation of loanable funds. A particular feature of the nine Saudi banks is the high volume of interest-free deposits, which helps these banks to record solid annual profit increases, continuing the trend of recent years. Despite the fact that the current growth in interest bearing accounts is far greater than in non-interest bearing accounts, the net profits of the nine Saudi banks rose from SR5.72 billion in 1996 to SR6.59 billion in 1997, an average of 15.8 percent, giving a return on assets of 1.71 percent, an extremely healthy figure by international standards (MEED, Vol. 42. No. 24, 1998). On the other hand, lending (loans and advances) accounts for more than one-third of the total assets (that is SR130.9 billion to SR385.9 billion), and a high proportion of loans was in the form of investment securities, namely government bonds (the later is about SR 120.8 billion out of the total lending of SR130.9 billion).

Although there are persistent appeals from small-scale industries for banks to take a more positive attitude to lend funds for new industrial ventures, the commercial banks are still generally reluctant to finance such private sector activity (i. e., SR10.1 billion out of total lending of SR130.9 billion). Loans to industry are very small proportion of commercial lending and the recent trend has been downwards due to the government borrowing which crowds out the loans to private sector. Other foreign banks should be allowed to enter the Saudi market to compete with the domestic banks in terms of financial support and banking services. It is now necessary to consolidate banks in face of new globalisation trends and World Trade Organisation (WTO) demands for free capital movements.

Finally, a package of economic reforms needs to move faster, with encouragement at the very highest levels. In the light of the earlier suggestions, it is recognised that Saudi Arabia needs to put greater emphasis on a serious reduction in budget and current account deficits, with steps to reduce the adverse short-term side effects associated with certain reform policies.

With regard to the policy implications, there are several policy lessons that can be drawn from this study:

- Almost all economies of the developing oil-exporting countries are heavily influenced by oil revenues, which are subject to exogenous world price volatility. This study suggests that the governments need to have strong commitments to diversify their sources of income, which can be achieved via establishing industrial bases and/or adopting diversified primary exports.
- When massive public sector spending occurs during the period of an oil boom, it is often difficult to reduce this when world oil prices decline. The

policy makers should be aware of the "ratchet effect". Hence, the governments need to stabilise their spending in the face of fluctuating oil revenues. The investments and accumulation of foreign exchange assets during the boom period can be a prudent policy. This approach would maintain the quality of capital formation and avoid a severe recession as well as losses in output and growth resulting from downward movements in oil revenues.

- The oil windfall is often associated with unproductive and waste expenditures. To avoid an unsustainable situation, the policy makers need to pursue appropriate conservative fiscal policy based on the priority and size of projects and transfer expenditure needed for enhancing the domestic economy.

8.4 Further research

The research carried out in this thesis could indicate a number of areas worthy of further investigation. These include the following:

- the separation between the direct and indirect subsidies and how each of them affects the supply of each sector in the economy;
- a comparison between the impact of the subsidies and that of devaluation on the supply and competitiveness of the traded goods sector;
- how to measure the impact of the foreign labour supply on the production of both the traded and nontraded sectors in terms of wages, the demand for both categories of goods and the role of remittances to mitigate and exacerbate the spending effect in the boom and slump stages;

- the impact of military expenditure during both periods (the boom and the slump) on the production of goods, employment rates, the surplus or deficit on both the budget and the current account of the balance of payments;
- whether the technology can reduce the price of domestic traded goods to compete with foreign goods through concentrating on the capital-intensive industries to reduce the volume of foreign labour.

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Appendix (A)

Table A1. Unit Root Tests for all variables

Tables A2. The Estimation of the Traded Goods Equation, Including All Potential Independent Variables as an Example.

Table A1 Phillips-Perron Unit Root Test, (trend and intercept)

Variable	Level	First difference	Second difference
G	**- 0.509**	**- 3.816***	**- 9.037****
Ms	**- 0.467**	**- 1.940**	**- 5.172****
Po	**- 1.490**	**-5.542****	**9.702****
RP	**- 1.423**	**- 3.470**	**- 6.162****
RER	**- 1.231**	**- 3.700***	**- 6.648****
REV	**- 1.572**	**- 4.484****	**- 8.413****
S	**- 0.455**	**- 2.696**	**- 7.002****
T	**- 0.290**	**- 2.229**	**- 6.672****
WP	**- 2.943**	**- 3.969***	**- 7.144****

* 5% significant level
** 1% significant level

Table A2 **Estimation of the Supply of Traded Goods**

	Coefficient	Standard Error	t-test	Probability
Intercept	12.686	1.3580	9.341	0.000
LREV	- 0.110	0.0382	- 2.882	0.008
LG	- 0.161	0.0697	- 2.326	0.029
LRP	-0.087	0.0584	-1.499	0.147
LPo	0.122	0.0355	3.455	0.002
LMs	0.185	0.0798	2.326	0.029
LTOT	0.021	0.0411	0.515	0.610
LWP	0.085	0.5556	1.531	0.139

R^2	0.998
Adj. R^2	0.997
S. Error	0.039
F-test	1377.5
D.W.	1.821

These statistical results show the existence of multicollinearity due to the low values of t-Statistics associated with relatively high R^2 as well as reverse sign of some coefficients

Appendix (B)

Sources of Data

The data collected are drawn mainly from the following sources.

1. The Saudi Arabian Monetary Agency (SAMA), annual reports.

2. The Ministry of Planning, Saudi Arabia, Achievements of the Development Plans, (1970-1996).

3. Ministry of Planning, Saudi Arabia, Centeral Department of Statistics.

4. The Ministry of Finance and National Economy, Saudi Arabia, Statistical Reports.

5. OPEC Annual Statistical Bulletin.

6. OAPEC Annual Statistical Reports.

7. International Monetary Fund's Statistical Publications.

8. World Bank Statistical Publications

9. International Energy Agency, Middle East Oil and Gas, OECD.