CHAPTER I

INTRODUCTION, ESTABLISHMENT AND MEMBERS OF OPEC

1.1 Introduction

The basic objective of this study is to examine the role of oil sector in the OPEC member countries for the period 1960 onwards. Most of OPEC member countries and their respective economies are dependent on oil and its export. Some of these countries such as Libya, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates, produce only one commodity. But the others like Algeria, Ecuador, Gabon, Indonesia, Iran, Iraq, Nigeria and Venezuela are more fortunate because they produce more than one commodity. In any case the oil sector has a significant role in their economy. Any price fluctuation in oil market will immediately manifest itself in their national economy.

The present study attempts to test a few hypotheses and analyses some key issues in the context of economic development of OPEC economies. Some of these are: (i) How far the situation of economic dualism is relevant for the OPEC member countries and whether they would succeed, like other LDCs, in breaking away from dualism? (ii) How do the patterns of development of the OPEC member countries compare among themselves in relation to the export-led growth hypothesis especially when the country concentrates on the production of a single commodity like oil? (iii) What are the major characteristics of oil as a primary product in terms of its historical role played in the process of industrialization during the post war period? (iv) Does the industrial activity have a positive relationship with economic growth (rise in national income) in the OPEC member countries similar to the experience of the developed countries as promulgated in the writings of Kuznets? (v) Are the inter-sectoral linkages significant in the input-output framework of an oil
exporting economy in the light of integration of the oil sector with the rest of the economy existing in most of the OPEC member countries? (vi) How far internal and external dynamics in terms of domestic and foreign forces are responsible for the success of their respective economies and how far these economies could adjust themselves to world market conditions arising from the fluctuations in the price of oil?

1.2 Establishment of OPEC

Oil being a primary good, the OPEC member countries have to face situations of uncertainty and instability in the international market.

The most important feature common to all the OPEC member countries is obviously their dependence on oil as the major economic resource. Oil is the backbone of OPEC member countries. It has served their economies in many respects and ways. Oil for these oil exporting countries means income, progress and development. They are, therefore, geared or oriented to the features related with the production, consumption and exports of this material resource. The increasing use of oil in the process of industrialization of the developed and the developing countries had special repercussions on the growth and development of the OPEC member countries. Though they were successful in accumulating large amount of oil revenues, these countries have to go a long way for achieving their desired goals.

Indeed, the world of the late 20th century is essentially a world of fast economic political, social and cultural developments in different parts of the globe. Although not always determined by the behaviour of economic factors, it has been profoundly influenced by them. Most of political upheavals, social and cultural dislocations are partly rooted in a stream of social consciousness concerning the
tempo and direction of economic growth and human well-being. Economic
development in OPEC member countries has been related to oil and its revenue.
If we concentrate on the process of economic development itself in these countries,
numerous complex relationship and interdependence emerge.

OPEC, an organization of the petroleum exporting countries, owes its origin
to the protracted loss of revenue for major oil exporting countries. In 1940s three
major steps were taken in this direction when the founding countries convened
meetings in Cairo, Washington, and Caracas in 1945, 1947 and 1949 respectively.

During February 1959, the existence of a large global crude oil surplus led to
the weakening of the world market. In addition, the United States, in the same year
imposed import controls in an effort to lessen its dependency on foreign crude oil.
For the major oil companies operating in the Gulf area, this decision meant the
closure of the profitable United States market. And also during August 1960 all the
oil companies operating in the Middle East were made to revise downward the crude
oil price and its revenue.

All these events led to the establishment of the OPEC when the five founding
countries convened a conference in Baghdad during 10-14 September, 1960. OPEC
initially comprised Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela-Afterwards,
within three-four months, Qatar (joined it in 1961). In its third stage of expansion
Indonesia and Libya also joined it in December 1962. In late 1960s the United Arab
Emirates’ and Algeria also joined it, in November 1967 and July 1969 respectively.
Finally, in 1970s Nigeria, Ecuador and Gabon joined it in July 1971, November 1973

* The Emirate of Abu Dhabi had joined OPEC before to its incorporation in the United Arab
Emirates which was established in 1972. )
and December 1975 respectively, making its present status of thirteen member countries altogether.

"Organization's objective is to coordinate and unify oil policies among member countries, in order to secure fair and stable prices for oil producers; an efficient, economic and regular supply of oil to consuming nations; and a fair return on capital to those investing in the industry".!

OPEC includes thirteen full members from three continents Asia, Africa, and South America, having 7, 4, and 2 countries from these continents respectively (Fig. 1.1). The OPEC membership is not homogeneous enough to be trusted to come up with the necessary initiatives. When OPEC was created in 1960, there were only five founder member countries viz. Iran, Iraq, Kuwait, Saudi Arabia and Venezuela. Rest of its member countries joined it between early 1960s and early 1970s. At the outset, the production of oil in these member countries was undertaken by foreign oil companies, mainly western. Some Japanese oil companies, however, have recently arrived on the scene to boost up oil exploration future.

1.3 Members of OPEC

In this section, we shall throw some light on the development of oil industry with special reference to crude oil production (Table 1.1).

In case of the five founding OPEC member countries, the oil industry began in Iran in 1901 with William Knox D'Arcy, a British national. In exchange for the rights to search and for exploiting oil resources in Iran (excluding the northern

ORGANIZATION OF THE PETROLEUM EXPORTING COUNTRIES (OPEC)

Fig. 1.1
Table 1.1
Crude Oil Production in OPEC Member Countries Since its Commencement.

<table>
<thead>
<tr>
<th>OPEC Member Countries</th>
<th>Commencement Year</th>
<th>Rate of Production daily</th>
<th>Annual Crude oil production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td>1918-57</td>
<td>8800'</td>
<td>2533'</td>
</tr>
<tr>
<td>Ecuador</td>
<td>1918-27</td>
<td>3000***</td>
<td>1398</td>
</tr>
<tr>
<td>Gabon</td>
<td>1957</td>
<td>3300</td>
<td>1205</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1893</td>
<td>2000</td>
<td>730</td>
</tr>
<tr>
<td>Iran</td>
<td>1913</td>
<td>5000</td>
<td>1825</td>
</tr>
<tr>
<td>Iraq</td>
<td>1928</td>
<td>2700</td>
<td>988</td>
</tr>
<tr>
<td>Kuwait</td>
<td>1946</td>
<td>16200</td>
<td>5913</td>
</tr>
<tr>
<td>Libya</td>
<td>1961</td>
<td>18200</td>
<td>6643</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1958</td>
<td>5100</td>
<td>1862</td>
</tr>
<tr>
<td>Qatar</td>
<td>1949</td>
<td>2000</td>
<td>730</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>1938</td>
<td>1400</td>
<td>511</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>1962</td>
<td>14200</td>
<td>5183</td>
</tr>
<tr>
<td>Venezuela</td>
<td>1917</td>
<td>300</td>
<td>110</td>
</tr>
</tbody>
</table>

Notes:
* The data pertain to the year 1958.
** Production since commencement and throughout 1957 amounted to a total of 2533 thousand barrels.
*** The data pertain to the year 1928.

provinces where the Russian influence was strong), the terms of the concession required the operating company or companies to pay to the government 20,000 in cash and 20,000 in stock. Iran is one of the major oil producers and exporters and ranks second among OPEC's member countries, next to Saudi Arabia. Historically speaking production in Iran began in 1913 with six oil companies at the rate of 5000 barrels per day (b/d).

Iraq's economic development, which was still at an early stage prior to hostilities with Iran previously, has at best stagnated in recent years. Iraq is, however, most abundantly endowed with oil and gas. At the inception of its oil industry in 1928 the rate of crude oil production in Iraq was 2700 b/d. Iraq is an important oil producer and exporter of crude oil in the Middle East. In 1979 exports were at the rate of 3.477 million barrels per day (m. b/d). It is also one of the oldest producers in the Gulf area. It was one of the founding member countries of OPEC. Its methodical implementation of production and marketing strategies for its oil has encouraged adoption of similar independent policies within OPEC.

Kuwait is one of the major oil producing and exporting countries in the world. Production operations started in Kuwait in 1946 at the rate of 16200 b/d. There are three foreign companies operating in Kuwait presently in addition to the national oil company.

Saudi Arabia holds a prominent position in oil industry. It has the world's largest proven reserves of crude oil. It was the third largest oil producer after the United States and the former Soviet Union, and the biggest exporter of crude oil. It was one of the five founding member countries in 1960, and it has always played
a vital role in OPEC. Oil production started in Saudi Arabia in 1938 at the rate of 1400 b/d. There are several foreign companies operating in Saudi Arabia.

Venezuela is also one of the major oil exporting countries in the world. It ranks fifth in oil production after the United States, the former Soviet Union, Saudi Arabia and Iran. It is one of the oldest producing country in the world. It started producing oil in 1917 at the rate of 300 b/d. A large number of oil companies are operating in Venezuela.

The remaining OPEC member countries which joined in OPEC in 1960s and 1970s are Qatar, Indonesia, Libya, United Arab Emirates, Algeria, Nigeria, Ecuador and Gabon. In Qatar oil production started in the Dukhan field in 1949 at the rate of 2000 b/d. There are four foreign companies only two of them are involved in oil production as yet.

Indonesia is also one of the oldest oil producers in the world. The oil was discovered for the first time in Indonesia among all the OPEC member countries. The Indonesians used a kind of "earth oil" for bamboo torches and also used it as a weapon in warfare, especially naval warfare, as early as the eighth century. However, the development of the OPEC member countries with oil industry began at 1959\(^2\) in Indonesia by seven oil companies operating in it. The crude oil production in 1893 was at the rate of 2000 b/d.

Libya is considered to be one of the major oil producing countries because of its potentially vast production capacity, its proximity to European markets and also on account of the quality of its oil. A large number of foreign companies are

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operating in Libya. The Libyan national oil corporation, there are in all ten oil companies. The government took over 51 per cent share in all these corporations in 1974. Oil production started in Libya in 1961 at the rate of 18200 b/d.

In the United Arab Emirates oil was discovered in Abu Dhabi's Murban field in 1958. Production were started in 1962. There were six oil companies operating in the United Arab Emirates in addition to the Abu Dhabi's national oil company. production was at the rate of 14200 b/d.

Besides being a major producer of oil, Algeria is one of the world's leading producers of natural gas also. The Algerian government gained full control of its natural resources by nationalizing recently 51 per cent of the shares of all the twenty foreign oil companies operating in the country. Production in Algeria started in 1958 at the rate of 8800 b/d.

Nigeria, which joined OPEC in the Summer of 1971, is a newcomer to the oil industry. Oil production started in Nigeria in 1958 at the rate of 5100 b/d. Its oil production was impeded during the civil war. Several foreign companies are operating presently.

Ecuador joined OPEC in 1973. Its oil production started in 1928 at the rate of 3000 b/d.

Gabon joined OPEC in 1975. Its oil production started in 1957 at the rate of 3300 b/d.

1.4 Methodology

This study examines the impact of oil sector on the economy of OPEC member countries with help of the concept of dualism. National economies in the OPEC member countries, in general, comprise two distinct sectors: a highly developed raw material sector (oil), and a relatively large but underdeveloped slow-moving endogenous sector. The existence of these two sectors side by side gives rise to what may be described as a dual economy. The structural characteristics of dual economies of OPEC member countries are somewhat different from those customarily found in the existing literature. The basic problem in these dual economies is that of disseminating the growth stimulating effects of the dynamic sector throughout the traditionally backward sectors by transforming the dynamic sector into an "engine of growth".

In order to examine the future prospects of the OPEC member countries, we need to first estimate the quantum of production, consumption and exports along with the reserves availability in these countries. At the same time, we need to examine the effect of oil sector on other sectors of the OPEC economies. These partial objectives of our study are achieved by applying different tools for analyzing the economic data. Thus we have used the methods of simple share analysis, estimation of the energy consumption (demand), regression analysis of the export and import functions. Both the linear and log-linear functions have been tried. The impact of oil sector on other sectors in terms of its backward and forward linkages has been studied quantitatively with the help of input-output analysis for a representative economy of OPEC.

In our study we have used several equations and mathematical expressions as
models to handle various objectives. These models were very useful in analyzing our results. The linear and the log-linear regression models are used for estimation in the case of the total OPEC and individual countries for the period 1960-88.

Regression analysis of linear and log-linear type has also been used to show the main determinants of exports and imports of total OPEC and individual countries during 1960-89. Exports are considered as a function of crude oil prices and GDP; alternatively exports have also been considered as a function of crude oil prices and GNP.

\[
\text{Exports} = f(P, \text{GDP})
\]

\[
\text{Exports} = f(P, \text{GNP})
\]

Using the same approach imports have been examined as a function of crude oil prices, total exports and GDP; alternatively Imports have also been examined as a function of crude oil prices, total exports and GNP.

\[
\text{Imports} = f(P, E, \text{GDP})
\]

\[
\text{Imports} = f(P, E, \text{GNP})
\]

In input-output technique backward and forward linkages (direct and indirect) have been used to analyze the structure of Iraqi economy. This analysis has been undertaken to examine the impact of oil industry on the Iraqi economy as a case study. Chenery-Watanabe have defined the direct linkage indices as following:

\[
\text{Backward linkage index } u_j = \frac{\sum_{i=1}^{n} A_{ij}}{A_j}
\]
Forward linkage index \( U_i = \frac{\sum_{j=1}^{n} A_{ij}}{A_i} \)

Taking into account both the direct and indirect repercussions of the growth in a particular sector on the rest of the economy, Rasmussen has defined indirect linkage indices as shown below:

Backward linkage index \( U_i = \frac{1}{n} \sum_{j=1}^{n} \frac{Z_{ij}}{\sum_{i=1}^{n} Z_{ij}} \)

Forward linkage index \( U_i = \frac{1}{n} \sum_{j=1}^{n} \frac{Z_{ji}}{\sum_{i=1}^{n} Z_{ji}} \)

Standard deviations which also have been suggested by Rasmussen are incorporated in the analysis as shown below:

Backward linkage index \( V_j = \sqrt{\frac{\sum_{i=1}^{n-1} \left[ Z_{ij} - \frac{1}{n} \sum_{i=1}^{n} Z_{ij} \right]^2}{\frac{1}{n} \sum_{i=1}^{n} Z_{ij}}} \)

Forward linkage index \( V_i = \sqrt{\frac{\sum_{j=1}^{n-1} \left[ Z_{ij} - \frac{1}{n} \sum_{j=1}^{n} Z_{ij} \right]^2}{\frac{1}{n} \sum_{j=1}^{n} Z_{ij}}} \)

\( Z \), mentioned in the equations above is the inverted Leontief matrix and defined as following: \( Z = (I - A)^{-1} \), where I is the identity matrix and A is the input-output matrix.
The previous measure of linkages does not take into account import leakages.

To provide a complete picture of the inducement effects of different industrial activities, the linkages with imports have also been considered as shown below:

$$ R = (1 + \delta - A)^{-1} $$

Simple techniques have been also drawn upon in our analysis such as the use of percentages, ratios and growth rates to facilitate sectoral analysis of various OPEC economies.

Two main tests have been used for our regression results. These tests are Box-Cox transformation and D-W test. The first is used to test the properties of empirical equivalence, whereas the second is used for the purpose of checking the existence of autocorrelation in the linear and log-linear equations.

1.5 Chapter Scheme

Our study is divided into seven chapters in addition to introduction and conclusions. The present chapter introduces the problem, discusses the establishment of the OPEC and describes its members.

Chapter II is devoted to the discussion of the major sources of energy (oil and gas) in OPEC member countries in terms of their reserves, production, exports and consumption. The study of energy resources in OPEC member countries shall primarily concentrate on crude oil and natural gas. Since these two resources of energy constitute major portion of natural resources of OPEC member countries, as a natural consequence other resources of energy are negligible.
The oil reserves of any country indicate the potential of its oil resources which can be exploited. The production of crude oil in some of the OPEC member countries began before the thirties of this century. The foreign oil companies used to produce oil so as to serve their monopolistic interests. These companies did not take into consideration real interests of the producing countries. Their purpose of production was mainly to export. Most of the countries in the world import oil either as crude or as its products mainly from the OPEC member countries, to satisfy their increasing demand for oil. OPEC member countries, in fact, are the main source of providing oil to the world. The consumption and use of oil resources in particular and energy in general is considered to be one of the main measures of the extent of industrialization in each country. The difference in the pattern of demand in OPEC member countries and advanced countries, is due to increase in the use of advanced and modern technologies by the latter. In spite of the availability of oil in OPEC member countries, their energy consumption is quite low as compared to the advanced countries. Energy consumption differs from one country to another and from one individual to another. It also differs from one stage of development to another even in the same country.

Natural gas is another important resource of energy which occupies the second rank after oil in OPEC as well as a whole world. Gas is obtained from nature into two forms, the existence of gas in the nature is free of oil. It is also found associated with oil in oil fields. However, the attention on gas production in OPEC came much later than oil. So far, its production has been little as compared to their large reserves. In the past, gas was only a by-product and was not exported to the main areas of consumption like oil. The situation of gas trade, however, changed after 1973 when oil price raised. In OPEC, available stocks of gas are treated in three different
forms: (i) Flared or re-injected into oil fields. (ii) Liquefied and exported to external markets. (iii) Used domestically as a feed stock in the production of petrochemicals and fertilizers or used as a fuel in different uses.

Chapter III deals with international oil market and the stages of its development. The main feature of OPEC member countries is that almost whole of their earnings are derived from a single mineral resource which is exhaustible in nature. It is estimated that if no new discoveries are there, the oil in some of OPEC member countries will be finished by the end of this century. The level of production of oil in each country should be determined such that she is able to meet the domestic requirements as well as earn export revenues enough for the developmental needs.

There are three partners in the oil industry e.g. oil producing or exporting countries, oil consuming or importing countries and multinational oil companies, which are responsible for oil from the drilling up to marketing.

What makes oil different from other strategic commodities is that its reserves and production are concentrated in certain areas, while its consumption is widely spread all over the globe. The areas of production and consumption differ in their economic and political power. Most of oil exporting countries are developing countries, while developed countries other than developing ones are the major oil consumers. Like other commodities, oil price is also determined by the interactions of supply of and demand for oil, which in turn is determined by the oil price and the political economy of the world market. Oil market has undergone many distinct phases since the appearance of oil as a commodity used commercially in almost all industrial and domestic enterprises. One may classify them broadly into two periods i.e., pre and post OPEC period.
Chapter IV throws some light on the economics of OPEC member countries with the help of sectoral share and growth rates as well as the outflow and inflow of net factor income of OPEC member countries. Economic development is a process by which the per capita income of a country increases over a period of time so that the standards of living of the people are improved. The famous economist Kuznets maintains that economic growth involves, among other things, decline in the share of agriculture and related industries; and rise in the shares of manufacturing and public utilities. All these features indicate the process of industrialization. Correspondingly, a substantial shift takes place in the allocation of labour force from agriculture and allied activities to manufacturing and tertiary activities.

Industrialization is an important condition for rapid economic development. Manufacturing was the leading sector in most of the developed countries. A leading sector is one that experiences a high growth in relation to the rest of the economy and consequently, induce favourable response from the other sectors.

Chapter V deals with concept, modelling and an application of economic dualism in some of OPEC member countries. The process of economic evolution is characterized by changes in the conditions of production, consumption, investment and other related macro-economic magnitudes. Distinction is made between economic growth and economic development on the basis of whether the changes in the aggregate variables are significant or not. On the same basis, distinction is also made between the more developed countries (MDS) and the less developed countries (LDCs). However, the process of transformation from latter to the former has often been marked by the coexistence of certain economic segments and institutions which are widely different from each other. The simultaneous existence of such segments and institutions is known by the name of economic dualism. The central concern of
this study is to take a closer view of this concept and institutions in a historical perspective; to discuss how they have been incorporated in the important models of development and growth; and finally to examine the relevance of these concepts and institutions in the development process of the OPEC member countries.

Chapter VI examines the inter-sectoral linkages in the economies of OPEC member countries by taking Iraq's economy as an example with the help of Input-Output analysis. One of the typical usages of this table is to show the flows of goods and services among all the different sectors of a national economy, and to analyze the interdependence of a specific sector e.g., oil industry with the rest of the economy. This interdependence arises from the fact that the output of an industry is generally required as an input by another industry. Input-output analysis captures this inter-industry dependence of an economy in quantitative terms. Because input-output tables provide useful information regarding inter-industry flows, interaction and pattern of final demand, therefore, input-output technique has become an important tool for analyzing the structure of an economy.

Input-output analysis has found an important application in the economics of development through the hypothesis of linkages. This study deals with the application of the input-output model to examine the impact of the oil industry on the economies of OPEC member countries by taking Iraqi national economy as a representative case study. This is facilitated by the fact that structure of Iraqi national economy resembles in quality and to some extent in quantity the economies of other OPEC member countries such as Algeria, Indonesia, Iran, Nigeria and Venezuela. A quantitative measures of this impact is presented and analyzed in terms of the linkages of oil sector with the rest of the economy. Due to non-availability of detailed data on Iraqi national economy our study is limited to the examination of economic
linkages and, therefore, we have not entered into the discussion of the various multipliers.

In addition to what has been explained above about the domestic sectors, the rest of our study is devoted to estimation of energy consumption in the future and the impact of external sector on the economies of OPEC member countries.

Chapter VII is related with the estimation of energy consumption in OPEC up to 2010. Estimation of energy consumption in future, either in the whole world or in OPEC, depends upon many factors. The most important factors are GDP and size of population. These variables incorporate indirectly with other factors like per capita energy consumption and energy/GDP ratio. However, throughout the world energy consumption is continuously increasing though it varies from one country to another. The energy consumption may increase specially in the main producing and exporting countries because of their high oil revenues, resulting on the high standards of living, educational and social development, population increase and technological upgradation.

Chapter VIII analyses the effects of the external sector of the OPEC member countries. It include oil exports, non-oil exports, along with exports and imports. The main issue discussed here is that economic development of the OPEC member countries has generally been led by the so-called "growth centres" or "leading sectors". The growth sectors in some cases have been more than a single industry. In most of the OPEC member countries the leading sector is the petroleum sector. This sector had been operated by the multinational oil companies (mainly from the USA, Britain, and Netherlands). The foreign dominated oil sector can have various types of direct and indirect effects on the domestic economy.

The last chapter (IX) focuses on the main conclusions.