



If you have discovered material in AURA which is unlawful e.g. breaches copyright, (either yours or that of a third party) or any other law, including but not limited to those relating to patent, trademark, confidentiality, data protection, obscenity, defamation, libel, then please read our [Takedown Policy](#) and [contact the service](#) immediately

AN INVESTIGATION OF THE EMERGING SYSTEM
OF HOST GOVERNMENT PARTICIPATION
IN THE INTERNATIONAL OIL INDUSTRY
WITH PARTICULAR REFERENCE TO LIBYAN
PARTICIPATION ARRANGEMENTS

by

MOKHTAR ALI ABOZRIDA
B.Comm., M.S. (Business)

A Thesis Submitted for the Degree of
DOCTOR OF PHILOSOPHY

MANAGEMENT CENTRE
THE UNIVERSITY OF ASTON IN BIRMINGHAM

JUNE 1981

To My Family

AN INVESTIGATION OF THE EMERGING SYSTEM OF HOST
GOVERNMENT PARTICIPATION IN THE INTERNATIONAL
OIL INDUSTRY WITH PARTICULAR REFERENCE TO LIBYAN
PARTICIPATION ARRANGEMENTS

MOKHTAR ALI ABOZRIDA

DOCTOR OF PHILOSOPHY
JUNE 1981

SYNOPSIS

This study has been conceived with the primary objective of identifying and evaluating the financial aspects of the transformation in country/company relations of the international oil industry from the traditional concessionary system to the system of governmental participation in the ownership and operation of oil concessions. The emphasis of the inquiry was placed on assembling a case study of the oil exploitation arrangements of Libya.

Through a comprehensive review of the literature, the socio-political factors surrounding the international oil business were identified and examined in an attempt to see their influence on contractual arrangements and particularly to gauge the impact of any induced contractual changes on the revenue benefit accruing to the host country from its oil operations. Some comparative analyses were made in the study to examine the viability of the Libyan participation deals both as an investment proposal and as a system of conducting oil activities in the country. The analysis was carried out in the light of specific hypotheses to assess the relative impact of the participation scheme in comparison with the alternative concessionary model on the net revenue resulting to the government from oil operations and the relative effect on the level of research and development within the industry.

A discounted cash flow analysis was conducted to measure inputs and outputs of the comparative models and judge their revenue benefits. Then an empirical analysis was carried out to detect any significant behavioural changes in the exploration and development effort associated with the different oil exploitation systems.

Results of the investigation of revenues support the argument that the mere introduction of the participation system has not resulted in a significant revenue benefit to the host government. Though there has been a significant increase in government revenue, associated with the period following the emergence of the participation agreements, this increase was mainly due to socio-economic factors other than the participation scheme. At the same time the empirical results have shown an association of the participation scheme with a decline of the oil industry's research and development efforts.

Key words: Libya, oil contracts, oil revenue, participation,
petroleum accounting.

Acknowledgements

First of all, Praise be to God, without Whose willingness none of this work could have been accomplished.

I am very grateful to my supervisor, Professor E W Davis, Lloyds Bank Professor of Business Finance and Head of the Finance and Accounting Group, for his diligent supervision, constructive comments, inspiring encouragement, and active interest throughout the course of this study. I, similarly, owe a considerable debt of gratitude to my associate supervisor, Dr J B Coates, Senior Lecturer in the Finance and Accounting Group, for the honest, down-to-earth advice which was always available when needed.

My special thanks are due to Mr R Buckland, Lecturer in the Finance and Accounting Group, for his valuable comments on my data and his critical examination of some parts of this thesis. The same gratitude is also extended to Dr K A Yeomans, Senior Lecturer in Statistics, for his invaluable assistance in the choice of some of the analytical techniques employed in this study.

A special word of appreciation goes to Mrs J Davis for her admirable skills in typing the preliminary and final drafts of this work.

I am also very grateful to the many helpful officials in the Libyan oil industry, particularly in the National Oil Corporation, The Ministry of Petroleum and other oil companies and in the

Central Bank of Libya, the Auditor General's Office and the Libyan Bureau of Statistics, without whose cooperation and assistance much of the data needed for this research would have been impossible to obtain.

Last, but by no means the least, I would like to thank my wife Fawzia and our two sons, Osama and Ali, who have accepted many hours of my preoccupation with the affairs of this thesis rather than with those of the family. Without their patience, sacrifices and encouragement, this study could not have been completed. Needless to say, any errors or imperfections in this work are mine.

TABLE OF CONTENTS

	<u>Page</u>
SYNOPSIS	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	vi
LIST OF TABLES	x
LIST OF FIGURES	xiv
CHAPTER	
I. INTRODUCTION	1
Objective and scope of the study	
Significance of the study	
Plan of the study	
II. DEVELOPMENT OF HYPOTHESES AND DISCUSSION OF METHODOLOGY	14
Background of the oil industry in Libya	
Posted prices of Libyan oil	
Royalty and tax structure	
Emergence of the participation agreements	
The Hypotheses	
Hypotheses about revenues from oil	
Hypotheses about exploration and development activities	
Summary of Hypotheses	
The Methodology	
The data	
Limitations of the study	
III. DEVELOPMENT OF PETROLEUM ARRANGEMENTS IN THE MIDDLE EAST	41
Nature of early concessionary agreements	
Financial arrangements under early concessions	
Development of financial arrangements during the second stage	
The introduction of equal sharing of profits	
Introduction of "posted prices" in the Middle East	
Establishment of OPEC	
OPEC's efforts to stabilize prices during the 1960's	
The expensing of royalties	
Reduction of marketing allowances	

III. (continued)

- Adjustments of posted prices during the early 1970's
- The shift of power in the international oil industry
- Evaluation of the participation system
 - OPEC's efforts towards participation
 - Participation agreements in the Gulf States
 - Participation agreements in Libya
 - Main differences of participation arrangements in Libya and the Gulf States
- Developments in the structure of company/country relations after participation

IV. REVENUES FROM THE OIL INDUSTRY AND THE RELEVANT ACCOUNTING PRINCIPLES

100

- Forms of the government's revenues from the oil industry
- General basis of determining government revenues under the concessionary formula
 - The volume of petroleum production
 - The volume of petroleum exports
 - The posted price
 - Royalty
 - Income tax
 - Costs
- Nature of activities involved in the oil industry
- Cost allocation problems in the oil industry
 - in general
 - Choice of the cost centre
 - The allocation of pre-production costs
- General controversies about varying accounting practices in the oil industry
 - Position of professional accounting bodies - the American Institute of CPA's
 - Position of the American SEC
- Cost allocations for income tax purposes
 - Pre-drilling exploration costs
 - Intangible drilling costs
 - Costs of developing and equipping oil wells or fields
 - Production and operating expenses
 - Summary of costs deductible for income tax purposes

V. DEVELOPMENT OF GOVERNMENT'S REVENUES UNDER THE
CONCESSIONARY FORMULA 148

Changes in the concessionary formula and their
impact on the per barrel revenue
The original concessionary formula
The Amendment of 1961
Impact of the 1961 changes on per barrel
revenue
The 1965 Amendments
Developments of 1967
Major developments of the early 1970's
Tehran Agreement (February 15, 1971)
Tripoli Agreement (March 20, 1971)
Devaluation of the dollar and oil price
settlements
The second devaluation of the dollar
and subsequent adjustments in the structure
of posted prices
Developments after the October War of 1973
Impact of post-October 1973 War price
increases on the government's revenue
Analysis of the government's annual revenues
under the concessionary formula
Period 1962-1970
Decline in deductible cost of production
Improvements in the concessionary model
Period after 1970

VI. ANALYSIS OF GOVERNMENT REVENUES UNDER THE
PARTICIPATION FORMULA 213

The original participation agreements
in Libya
Structure of the government's revenues
under the participation scheme
Income from the NOC's share of participation
oil
Marketing and pricing of participation oil
Comparative analysis of the government's
revenue from participation crude - under
the first agreed buy-back price
Changes in oil pricing structure after the
October War
Developments of buy-back prices after the War
Comparative analysis of the government's per
barrel revenue under the participation
and the concessionary formulas from 1973
to 1979

VI. (continued)

Discounted cash flow analysis of the
 participation model
 Major assumption of the discounted cash
 flow tables
 The interpretation of results
 Conclusion

VII. IMPACT OF PARTICIPATION ON EXPLORATION AND
DEVELOPMENT ACTIVITIES

262

Importance of the exploration and development
 effort in the oil industry
 Evaluation of exploration and development
 efforts in the Libyan oil industry
 The environmental setting
 Empirical analysis of exploration and
 development activities
 The indicators
 Per cent of capital expenditures to
 total expenditures
 Seismic exploration activities
 Number of wells drilled
 The method of analysis
 The regression model
 The model for pre/post-participation
 analysis
 The model for cross-sectional analysis -
 post-participation
 Results of the analysis and interpretations
 Results of pre/post-participation analysis
 Regression of capital expenditures
 Regression of seismic exploration activities
 Regression of drilling activities (total
 wells drilled)
 Results of cross-sectional analysis - post-
 participation period
 Regression of capital expenditures
 Regression of seismic exploration
 Regression of total wells drilled
 Regression of exploration wells
 Regression of development wells
 Summary of regression results and conclusions

VIII. SUMMARY AND CONCLUSIONS

323

APPENDIX A

338

APPENDIX B

352

APPENDIX C

356

BIBLIOGRAPHY

364

LIST OF TABLES

TABLE		Page
II-1.	Reductions of posted prices of 1959 and 1960	58
IV-1.	Libyan oil production (1961-1979)... ..	107
IV-2.	Libyan oil exports (1961-1979)	111
IV-3.	Posted prices of Libyan crude oil 40 ⁰ API Gravity	117
V-1.	Impact of the 1961 Amendment on the government's revenue per barrel	157
V-2.	Computation of the government's revenue per barrel after the introduction of OPEC formula in 1965	161
V-3.	Computation of the government's revenue per barrel after the elimination of OPEC allowances in July 1967	163
V-4.	Increases in the posted price of Libyan (40 ⁰ API) crude as agreed in the 1970 settlement	165
V-5.	Impact of the 1970 Agreements between the Libyan government and the oil companies on the government's revenue per barrel	166
V-6.	Impact of the March 20, 1971 settlement on the government's revenue per barrel	171
V-7.	Impact of the January 20, 1972 currency settlement on the government's revenue per barrel	176
V-8.	Impact of the second currency settlement on the government's revenue per barrel	180
V-9.	Impact of changes in the post-War posted price on the government's revenue per barrel	186
V-10.	Government's annual revenues from the oil industry and crude oil sales 1962-1979	191
V-11.	Annual crude sales by foreign companies and total revenues received by government under the concessionary formula 1962-1979	192

TABLE	<u>Page</u>
V-12. Per barrel analysis of sales price, costs and government's revenue 1962-1970	195
V-13. Relative effect of cost decline on the government's income per barrel 1962-1970	197
V-14. Government's revenues per barrel broken down to royalty and income tax 1962-1970	199
V-15. Per barrel analysis of sales value, cost and government's revenue 1970-1979	209
VI-1. The status of ownership of major Libyan oil concessions before and after participation	221
VI-2. Illustration of comparative government revenue per barrel under the first agreed buy-back price	229
VI-3. Comparison of posted price and buy-back price per barrel of 40 ^o API since the introduction of participation until 1980	237
VI-4. Comparative analysis of the government's net revenue per barrel (of 40 ^o API) from concessionary crude and participation crude 1973-1979	247
VI-5. Comparison of the cost to the oil companies of concessionary oil and participation oil 1973-1979.	252
VI-6. Discounted cash flow of the participation formula 1973-1983	260
VI-7. Discounted cash flow of capital commitments under the participation formula 1973-1983	261
VII-1. Multiple regression analysis - dependent variable : capital expenditures (over all companies) pre/post-participation	292
VII-2. Multiple regression analysis - dependent variable : seismic crew/months (over all companies) pre/post-participation	294

TABLE		<u>Page</u>
VII-3.	Multiple regression analysis - dependent variable : total wells drilled (over all companies) pre/post-participation	296
VII-4.	Multiple regression analysis - dependent variable : capital expenditures by groups of companies	299
VII-5.	Multiple regression analysis - dependent variable : seismic crew/months by groups of companies	303
VII-6.	Multiple regression analysis - dependent variable : total wells drilled by groups of companies	307
VII-7.	Multiple regression analysis - dependent variable : exploration wells by groups of companies	310
VII-8.	Multiple regression analysis - dependent variable : development wells by groups of companies	313
VII-9.	Summary of regression results - over all companies. Pre/post-participation	317
VII-10.	Summary of regression results - cross-sectional analysis. Pre/post-participation	318
A-1.	Companies surveyed - listed according to their total revenues in 1974	351
B-1.	Calculation of supplementary tax payments 1973-1979	353
B-2.	Average per barrel cost of Libyan crude 1962-1979	354
B-3.	The average rates of exchange of the Libyan Dinar in US Dollars	355
C-1.	Annual total and capital expenditures of the oil industry in Libya 1962-1978	357
C-2.	Percentage capital expenditures to total annual spending by groups of companies 1974-1978	358
C-3.	Total seismic exploration activities in Libya 1962-1978	359

TABLE		<u>Page</u>
C-4.	Seismic exploration activities during 1974-1978	360
C-5.	Annual drilling activities - number of total wells drilled 1962-1978	361
C-6.	Annual exploration drilling activities - number of exploration wells drilled 1962-1978	362
C-7.	Annual development drilling activities - number of development wells drilled 1962-1978	363

LIST OF FIGURES

FIGURE	<u>Page</u>
IV-A. Annual production and exports of crude oil from Libyan fields 1961-1979	112
V-A. Effect of the cumulative decline in cost on government's per barrel revenue 1963-1970	198
V-B. Development of per barrel price, cost and government's revenue from oil 1962-1970	202
V-C. Crude oil exports by foreign companies and government's income under the concessionary formula 1970-1979	207
VI-A. Comparative illustration of buy-back prices and posted prices 1973-1979	244
VII-A. Behaviour of capital expenditures by groups of companies 1974-1978	301
VII-B. Behaviour of seismic crew/months by groups of companies 1974-1978	304
VII-C. Behaviour of total wells drilled by groups of companies 1974-1978	308
VII-D. Behaviour of exploration wells by groups of companies 1974-1978	311
VII-E. Behaviour of development wells by groups of companies 1974-1978	315

CHAPTER I

INTRODUCTION

The international oil industry has developed within a unique and interesting set of characteristics. These characteristics have been unique for a number of reasons; First, oil is a vital strategic commodity, the importance of which has grown with the increasing dependence on oil as a source of primary energy in modern societies.¹ Second, oil is an international commodity in the sense that few countries in the world enjoy an equilibrium between their production and consumption, consequently, the gap has to be bridged by importing the shortage and exporting the surplus - a matter which has made oil become, in recent years, the largest traded item in the world economy. Third, oil resources are found, mainly, in the non-industrial areas of the world with the exception of the United States and the Soviet Union. Development of these resources requires vast amounts of capital and skills which have to come from corporations belonging to the industrial world who have capital and skills to spare. Fourth, because the large investments needed in the oil business and the high degree of risk associated with its operations, only a few companies traditionally grew and became dominant in the international

¹World's total primary energy consumption has increased more than sixfold since the turn of the century. The share of oil and gas of this energy consumption has grown from 5.3% in 1900 to 22.5% in 1940, 45.8% in 1960 and 58.2% by 1970. See E N Tiratsoo, Oilfields of the World, (Beaconsfield, England : Scientific Press Ltd, 1976), pp 8 and 342.

oil industry. These companies who were generally referred to in the petroleum industry literature as "the Majors"² have traditionally controlled most of the international oil industry and trade. Being enormously huge in size and vertically integrated, and operating through a network of jointly owned subsidiaries and affiliated companies, the "majors" have managed for over half of this century to control most of the world's petroleum business. This high degree of concentration was not only limited to controlling oil exploration and production operation, but also to most of the world's refining and processing, transportation and product distribution and marketing facilities.³ Perhaps, the best and most authoritative description of this situation was the US Federal Trade Commission's which wrote, in its 1952 report to the Subcommittee on Monopoly in the US Senate:

²The term "Majors" has generally been used in the oil industry to refer to the largest international oil companies who controlled most of the oil business throughout the free world. Among these companies seven stand out as giants and they have also been referred to as the "seven sisters". They include: (1) Exxon Corp. (previously named Standard Oil Co of New Jersey); (2) Standard Oil Co of California; (3) Mobil Oil Co; (4) Texaco Inc; (5) Gulf Oil Corp; (6) British Petroleum Co; and (7) The Royal Dutch/Shell Group. For an interesting discussion of how these companies developed and became dominant in the oil business, see: Anthony Sampson, The Seven Sisters - The Great Oil Companies and the World they Made, (London : Hodder and Stoughton Ltd, 1975).

³For example, in 1960, the share of the major oil companies known as the "seven sisters" in total oil production outside the US and the communist block was 84 per cent. In the same year, these companies owned 74 per cent of refining capacities and 70 per cent of marketing facilities. See: Zuhayr Mikdashi, The Community of Oil-Exporting Countries, (London : George Allen and Unwin Ltd, 1972), p 49.

"The seven international companies operate through dozens of jointly owned subsidiaries and affiliated companies. Through this corporate complex of companies, they control not only most of the oil but also most of the world's foreign petroleum refining, cracking, transportation and marketing facilities. Thus, control of the oil from the well to the ultimate consumer is retained in one corporate family or groups of families.

... The significance of this high degree of concentration for the cartel problem lies in the fact that concentration facilitates the development and observance of international agreements regarding price and production policies."⁴

This concentration of the international oil industry in the hands of a few giant companies was facilitated by the existence of the conventional concessionary system as the pattern of oil exploitation arrangements in most of the major producing areas of the world. In a concession agreement of the conventional type, the state - as owner of the nation's natural resources - entrusts a company (usually one of the majors or a consortium of a number of them) with the right to search for, develop, extract, and export freely hydrocarbon resources (oil and gas) from large areas (sometimes the whole area of a country) over a long period of time (several decades) in return for certain financial payments, in the form of royalties and taxes, to the state.⁵ The conventional concessions offered a large measure of freedom to the oil companies in such important matters as the setting of prices, determining production levels and budgeting for investments.

⁴US Federal Trade Commission, The International Petroleum Cartel, (Washington, DC : US Government Printing Office, 1952), p 33.

⁵Zuhayr Mikdashi, The Community of Oil Exporting Countries, op. cit., p 43.

Decisions concerning these matters were determined solely by the concessionaire companies, usually in accordance with their overall international strategies and with little or no regard to the needs of the local economies of individual host countries.⁶

Control of the international oil business by the few major companies has been the case at least until recently - when new elements have been added to this complex network of relationships causing the degree of international oil dominance by the "majors" to be somewhat curtailed. Such new elements included mainly the entrance of a number of smaller "independent" companies in the international oil arena and the wave of recent nationalist reaction against the major companies in the petroleum producing/exporting countries who wanted to regain control over oil activities in their territories. These elements will be further delineated in sections to follow in this study. However, their influence has resulted in an important shift of power in the international oil industry and a significant transformation of the structural relationships between the oil producing countries and the operating foreign companies. One aspect of this structural transformation is the recent change in the petroleum exploitation arrangements from the traditional system of concessionary agreements, whereby petroleum operations were wholly entrusted to the international oil companies, to a system of host government "participation" in such operations through a partial ownership

⁶Fadel Al Jalabi, "Basic structural changes in the international oil industry", Selected Studies in the Oil Industry, (Kuwait : OAPEC, 1979), (published in Arabic), pp 23-27.

in existing oil concessions. By participation the status of host governments changed from mere collectors of taxes and royalties on petroleum production from concessions totally owned, managed, and financed by the oil companies, to a partner in the concessions entitled to a share in production as well as the obligations of capital commitments needed for the operations and the risks involved in such operations.

The system of host governments' participation in the ownership and operation of oil activities which emerged in the major oil producing and exporting countries during 1972-1973, evolved from the growing national grievances in these countries against the long-held privileged status of the foreign oil companies secured to them by the traditional concession agreements. It came, presumably, in response to the national desire in the host countries to control the activities of this, their vital industry from within and secure the maximum national benefits from oil operations in terms of financial revenues as well as other economic benefits from the industry.

However, participation came at a time when the whole international energy market structure was undergoing a process of transformation from a buyers market to a sellers market. Total world energy needs had gradually increased with a growing dependence on oil as a major source of it. During the period 1960-1970 alone, total world energy consumption rose from 3,058 million tons of oil equivalent to 4,916 millions with an

average annual growth of about 4 per cent.⁷ While oil and gas sources were reported to have supplied only about 38.5 per cent of total energy consumption in 1950,⁸ this rate had increased to 45.8 per cent by 1960, 58.2 per cent by 1970⁹ and by 1974, it reached 63.9 per cent.¹⁰ During the ten year period 1963-1973, world consumption of all petroleum products increased by an annual average rate of 8 per cent.¹¹ The excessive supplies of oil production during the 1960's and its relative cheapness compared with alternative sources of energy had contributed to this increased dependence on oil in the global energy consumption. But by the early 1970's, the supply surplus began to disappear from the international oil market. Prices started to rise sharply and the whole world began to realize the depletable nature of hydrocarbon resources. This situation was further accelerated by the events of the Middle East War of late 1973 and the oil embargo and production cut-backs which

⁷Peter Hill and Roger Vielvoye, Energy in Crisis, (London : Robert Yeatman Ltd, 1974), pp 18, 19.

⁸Shell Oil Co, Seminar on Oil Affairs, (London : Shell International Company, 1970), pp 1-2.

⁹E N Tiratsoo, Oil Fields of the World, op. cit., pp 8, 342.

¹⁰H Malti, "Developments in oil production and major oil reserves", Fundamentals of Oil and Gas Industry, Vol 1, (Kuwait : OAPEC, 1977)(in Arabic), p 15.

¹¹OPEC Bulletin, (September 17/27, 1979), p 23.

followed. Such events created the conditions whereby the governments of oil exporting countries became able to assume the prerogative of determining all the essential financial and economic matters concerning their relationships with the operating oil companies.

In view of these developments, the questions arise as to the viability of the participation system in terms of its financial and economic benefits generated to the host country, and how these benefits compare and rank with those extracted from a continued but an improved concessionary scheme? What impact have the participation arrangements had on the level of oil activities in the host country? Does the functioning of the oil industry under the participation formula, during the last number of years since its adoption, provide a genuine basis for assuming that such formula will be the norm of future relationships in the international oil industry at least in the intermediate future?

Objective and Scope of the Study

The aim of this study is broadly to examine aspects of the financial and economic implications of the emerging participation system for the oil producing country in comparison with the alternative concessionary arrangements. In particular, however, it is concerned with the main hypothesis that the benefits to the producing country's national economy of revenues derived from oil would have been greater under the concessionary formula

than under a participating basis. The principles to be considered here are of general relevance to all scarce commodity producers.

The scope of the investigation is limited in two respects; First, it is restricted to the consideration of oil industry in Libya - one of the major oil producing and exporting countries who experienced both forms of oil exploitation arrangements, concession contracts and participation agreements. Second, although the transformation of oil exploitation arrangements from the concessionary form of arrangements to the governmental participation system may have had far-reaching influences on several interrelated variables pertaining to the oil business in its national as well as international perspectives, the initial concern of this study is confined to certain financial and economic aspects. These are particularly, the relative impact on revenues accruing to the host country from its oil operations and the influence on exploration and development activities.

Significance of the Study

The significance of this study is in that it offers a unique opportunity to examine a practical example of the emerging system of government participation in the oil industry. Such system has become in recent years the pattern of petroleum exploitation arrangements in the major producing countries who are supplying most of the internationally traded crude oil and natural gas. The workability or otherwise of this emerging system in the example investigated by this study, namely that of the Libyan case, is

of wider implications for a number of reasons which make the findings of the present enquiry important both locally and in an international perspective.

First, as the Libyan-participation arrangements evolved in concurrence with a similar pattern of company/country relationship in the other major oil producing countries, the similarities of the general features of these arrangements make the implications of analysing the Libyan example largely applicable to most of the other host countries who followed this pattern. The importance of these implications, on the local level, springs from the mere fact that the oil industry in Libya and in almost all of the major oil producing/exporting countries represents the dominant sector in their national economies and the principal source of revenues needed for their spending on economic development projects.

Second, the oil industry itself is vitally important not only to those countries or concerns who are directly involved in its operations, but to the international community in general for whom oil represents a major source of energy with all the economic, social, political, and strategic connotations attached to it. Such vitality of oil will very likely continue to be the case for some time in the foreseen future. With oil being as such, the oil industry in its international perspective has always been a field of conflicting interests. The divergence of interests involve the producing countries' concern that their oil resources should be efficiently developed and exploited and that they receive an adequate share of the ultimate oil revenues. For the

operating oil companies, they are interested in maximizing the returns on their investments in the industry and in securing the future of these investments. To this correlation of interests, must be added the interests of consumers in the international oil market which call for steady oil flows, stable prices, and increased future oil supplies to satisfy the growing demand.

In the past, the major conflict that persisted in the international oil industry relationships was between the oil producing/exporting countries and the operating multinational oil corporations over the division of oil revenues and consequently over prices and production policies. Relationships between the two parties were structured for some time by the contractual arrangements of the traditional concessionary system which, though, served to develop the oil industry in host countries, were rather lopsided in favour of the operating international companies. However, factors were at work to gradually shift this situation and allow the oil producing/exporting countries to dictate their terms in their relationships with the operating companies. The participation agreements were among the manifestations of this transformation.

The importance of the emergence of the participation system, therefore, is that it was the result of the interaction of those conflicting interests in the international oil industry and the product of attempts to find a balancing formula of relationships between the parties concerned. Whether the new formula of relationships is capable of achieving the sought balance of

interests, and, thus, could be thought of as the continuing pattern, for at least the intermediate future, in the oil industry, depends, among other things, on the extent to which the participation arrangements have actually satisfied certain objectives that were presumably pursued by the host countries when the arrangements were considered and then adopted.

By analysing the Libyan example of government participation in the country's oil industry, it is hoped that this study will provide at least a modest contribution to the proper understanding of the workability and viability of the participation formula in terms of satisfying certain basic objectives for the host country. It is also hoped that the study will be of some value in throwing some light on the wider implications of such system for the future relationships in the international oil business.

The general concern with the international oil business has resulted in a growing body of scholarly literature on various aspects of the oil industry. The majority of these works, however, focus on the international consequences of prices, supplies, demand, and the growing wealth of oil exporting countries and neglect the influential elements of contractual arrangements at work in these countries themselves. To the best of the researcher's knowledge, few, if any, comprehensive in-depth studies have so far been published in English or Arabic on the issue of government participation in the oil industry. None, however, has appeared utilizing original data from the experience of a particular oil exporting country who adopted the participation

system. To this end, it is hoped that the present work will fill a gap in existing literature and carry forward the continuing broad investigation in the oil business topics.

Plan of the Study

The hypotheses of this study, the methods of research and some of the limitations of the study are presented in the next chapter. Chapter III reviews the major developments of international oil industry arrangements in an historical perspective and lays the environmental background of the changing patterns of company/country relations affecting oil revenues.

Chapter IV discusses the general structure of government revenues from the oil industry under the concessionary formula and examines some of the relevant accounting concepts.

The material in Chapter V deals with the various changes that have been introduced into the traditional concessionary formula and their relative impact on the Libyan government's income from oil activities in the country.

The analysis of the Libyan participation arrangements and their relative impact on revenues from the oil industry are presented in Chapter VI. A discounted cash flow analysis is utilized to provide a comparative evaluation of inputs and outputs of the participation system with the alternative concessionary formula.

A regression analysis model is employed in Chapter VII to

investigate influences of the alternative oil exploitation arrangements on the exploration and development effort of the oil industry. The discussion of the model, the analysis and their results are reported in the said chapter.

The findings of the study are summarized in Chapter VIII and some conclusions are drawn with respect to the viability of the participation scheme in the Libyan oil industry and the general implications to future company/country relationships in the international oil business; discussion in the final chapter also deals with the need for additional research in this area of such a vital industry.

CHAPTER II

DEVELOPMENT OF HYPOTHESES AND

DISCUSSION OF METHODOLOGY

The aim of this chapter is to develop proper hypotheses for the present study, to describe the methodology used in examining these hypotheses and to draw attention to some of the limitations of the enquiry. As the main concern of this study is to evaluate the emerging system of governmental participation in the oil industry through the assembling of a case study of the participation arrangements in Libya, certain criteria have to be applied for the assessment of this system. These have to be drawn from the background of the oil industry in the country where the investigated participation arrangements were adopted and from the objectives that such arrangements sought to achieve. Before such criteria for the assessment are established, therefore, and proper hypotheses for the investigation are developed, a brief reference must be made to the Libyan oil industry setting in which the participation arrangements evolved.

Background of the oil industry in Libya

The Libyan oil industry is relatively a newcomer compared with other major oil producing and exporting countries, particularly in the area of the Middle East where the history of oil exploration and production goes back to the early decades

of the present century. The first serious activities of exploration for oil in Libya began during the middle of the 1950's after the promulgation of the country's first comprehensive petroleum legislation - the Petroleum Law No 25 of 1955.¹ When these activities started, the traditional concessionary framework was the norm of exploration and production contracts throughout the oil producing countries of the Middle East. Concession contracts of the traditional type contained rather attractive features in favour of the concessionaire oil companies. Such features as described by a United Nations report "give the foreign companies a freedom of action which substantially insulated them from the economy of the Middle East countries."² However, the Libyan exploration and production arrangements followed the same pattern, by inviting the international oil companies to enter into concessionary agreements with the government, assimilating the standard characteristics of the older Middle Eastern concessions. The provisions of such agreements and the conditions under which they were granted were provided for in the original Petroleum Law of 1955 which adopted a uniform arrangement applicable to all companies wishing to operate in the country.³

¹Petroleum Law No 25 of 1955, issued April 21, 1955, published in the Libyan Official Gazette, (Tripoli, May 1955).

²United Nations, Review of Economic Conditions in the Middle East, E/1910, (New York, 1951), p 25.

³The standard form of concessionary agreements was annexed to the Petroleum Law No 25/1955, schedule 2.

A large number of companies (including the majors and a number of independent companies) entered the country accordingly, carrying out vigorous exploration programs which resulted in huge discoveries of oil reserves within a few years. With the completion of development of the first discovered fields, crude oil production started from Libyan concessions late in 1961 and began its flow into the world's oil export market in September 1961 with an initial average daily export of 40,000 barrels. During the following years, additional discoveries were made, and developments as well as exploration programs continued, increasing production and export volumes with unprecedented rapidity, until Libya became one of the world's largest oil producing and exporting countries. With a production and export volume of over 3.2 million barrels per day reached by the end of the decade, Libya ranked as the world's third exporter and sixth producer.

With this growth of production and exports of Libyan crude oil, grew the government's total revenues from the oil industry, and grew the importance of oil income in the country's economy. Government revenues under the concessionary form of petroleum arrangements were derived mainly from royalties and income taxes which the government was entitled to within this system. Payments of royalty and income tax due to the government were dependent, on the one hand, on posted prices which according to the concessionary formula were the basis of valuing crude oil sales, and on the other, on the structure of royalty and income tax provided for in the concessionary agreements.

Posted prices of Libyan oil

When oil production from the Libyan fields commenced during the first half of the 1960's, the prerogative of determining posted prices, which are basically a tax reference prices, in the international oil industry was totally in the hands of the oil companies, especially those known as the "majors" who were in firm control of the international oil market. It was in the interest of maximizing the companies' profits, to keep posted prices at the lowest possible level in order to minimize their payments to their host governments in the oil exporting countries and secure the flow of crude to their affiliates at low tax-paid costs. For this reason, the international companies had already effected the famous price cuts of 1959 and 1960 in other Middle Eastern concessions when Libyan production started. Such reductions, as will be discussed in more detail in a following section of the study, created a wave of protests in the host countries and were the direct cause leading to the establishment of the Organization of Petroleum Exporting Countries (OPEC) in the latter part of 1960, of whom Libya became a member.

In posting a price for their newly discovered crude, the producing companies used the reduced prices of certain Middle Eastern crudes (the Gulf crudes) as a basing point and fixed the Libyan posting accordingly with certain allowances for the specific differences in quality and geographical location of the Libyan oil. The result was a price for Libyan crude of \$2.23 per barrel (of 40⁰ API). This price was considered undervalued

even on the basis of the Middle East prices, because the allowances for quality and geographical differences were not adequately calculated.⁴ The Libyan government rejected the price posted by the oil companies, but due to the strong and dominant position of the oil companies at that time it could do nothing more than launch a series of protests to the oil companies each time it received a payment from the companies.⁵ In spite of these protests, the Libyan basic posted price remained frozen at the same level throughout the whole decade of the 1960's. Furthermore, the oil companies were entitled according to the original concessions to make unrestricted discounts and allowances from the officially declared posted price. These discounts and allowances were provided for in the original concessionary agreements, in Libya and elsewhere in the Middle East, as "marketing allowances" intended to encourage exports of crude from the host countries. But they were vaguely defined and the producing companies took full advantage of the situation. Crude oil, particularly Libyan crude, was transferred by the operating companies to their affiliates and other buyers at heavily discounted prices, and payments to the host government were made on the basis of these discounted prices. In effect the government was receiving its revenues from the companies not on the basis of the already undervalued posted price but on the basis of a still lower price, ie the realized price (which was the posted

⁴ S M Ghanem, The Pricing of Libyan Crude Oil, (Malta : Adams Publishing House, 1975), p 158.

5. Ibid, p 70.

price minus the marketing discounts). The marketing discounts allowed from the Libyan posting reached in some companies 30 per cent (about 67 cents per barrel).⁶ Although these marketing discounts were eliminated since the middle of 1965 through the efforts of OPEC, problems related to oil prices remained a major area of dispute between the concessionaire companies and the host government in Libya and elsewhere in the oil producing countries.

Royalty and tax structure

The structure of royalty and tax payments to the government were in the original concessions based on the so-called "50-50 profit sharing principle" which was the norm of financial arrangements in the international oil industry when the Libyan production started. This system specified the royalty payment as 12.5 per cent of oil production and provided for the government's right to receive 50 per cent of the companies' profits from oil operations in the country. However, the amount of royalty receivable by the government was considered as a partial payment of its 50 per cent share of profits. The 50 per cent of profits was therefore the maximum revenue of the government.

The only improvement in this system came in 1965 as a result of applying a new formula advanced by OPEC. This formula changed the treatment of royalties from considering it as a partial payment of the government's 50 per cent share of profits to its

⁶Ibid, p 126.

treatment as a part of the costs deductible from taxable income. Therefore, the government became entitled to the royalty in addition to the 50 per cent income tax payment.

The introduction of this formula together with the elimination of the marketing discounts off the posted price resulted in a significant increase in the Libyan government's per barrel revenue from oil companies. According to official sources, these changes increased the total government revenues in 1965 alone from Libyan pounds 87.5 millions (that would have been received if the changes were not applied) to 135.5 millions.⁷ But their implementation by the operating companies was not easily achieved for the existence of a provision in the oil concessions which prevented the government from the enforcement of any revision in petroleum legislations without the prior consent of the concession holding companies.⁸ The objection came mainly from the independent companies who benefited most from the marketing discounts allowed in Libya. They argued that the acceptance of the new formula would hinder their ability to compete with the major companies in selling Libyan crude.⁹ For the independent companies, the use of the posted price in calculating government's

⁷Ministry of Petroleum, Libyan Oil, 1954-1967, (Tripoli, 1968), p 37.

⁸Concession Agreement, Annexed to the Petroleum Law No 25 of 1955, Clause 16, paragraph 2.

⁹George Stacking, Middle East Oil, (Nashville, Tenn. : Vanderbilt University Press, 1970), pp 377-378.

income would make them pay about 35 cents per barrel more compared with only 5 cents per barrel which was the average additional cost of the majors.¹⁰

Although it was true that the above mentioned changes had resulted in significant improvements in the Libyan government's revenues from oil production, they were basically an application of the principles that have already been in practice in the other Middle Eastern countries for some time, in particular the pricing practices. The application of these principles in Libyan concessions brought these concessions in line with the other producers and helped in the standardization of the Libyan agreements with the various operating companies. Many issues related to the still privileged status of the foreign oil companies in the country, however, remained unchanged, and aside from the above mentioned adjustments in the treatment of royalties and marketing discounts, no major changes were made to affect this status during the rest of the 1960's decade. The basic issue of fixing posted prices, which was the main cause leading to the creation of OPEC, remained totally in the hands of the oil companies who kept the posted prices in Libya and in all Middle Eastern countries frozen at their reduced level of 1960. Furthermore, the freedom of action granted to the oil companies by the original concessions in conducting their petroleum activities deprived the government of its sovereign right of regulating petroleum policies in

¹⁰The Economist, January 15, 1966, p 232.

accordance with the needs of the national economy. Petroleum production policies for example were determined by the oil companies according to their worldwide petroleum strategies with little or no regard to the needs of the local economy.

This situation created psychological tensions as the nationals of the country remained spectators, while the foreign oil companies developed their country's natural resources and behaved as states within a state. They felt that the country was not receiving a fair share of its oil profits in reference to the returns realized by the oil companies. The latter were reported to have been receiving a return of about 70 per cent from their Libyan investments.¹¹ Therefore it was not a surprise when the Libyan pro-Western monarchical regime was ousted in September 1969 by a group of young nationalist military officers, that one of the prime targets of the new revolutionary government was to centre its efforts on remedying this situation and achieve the national objectives regarding the oil resources. A new petroleum policy with definite objectives was formulated. The main objectives of this policy as stated by the Petroleum Minister include the following:¹²

¹¹"Libya : The Young Movement", Newsweek, (October 20, 1969), pp 56-61. Newsweek was quoting a US Government confidential report made at that time.

¹²Ministry of Petroleum, Libyan Oil : 1954-1971, (Tripoli : The Republic Printing Press, 1972), pp 5-6.

1. "Applying effective and direct national control on all aspects of the operations of foreign oil companies."
2. "Obtaining the highest level of revenues for national economy development and an increase in the nation's standard of living."
3. "Providing opportunities to Libyan workers and employees to acquire experience in the oil industry with a view to the creation of a new generation of national technicians who would be fully capable of replacing foreign technicians and who would eventually assume the responsibility for the exploitation of their own country's resources."
4. "Providing for effective coordination and integration between the oil and gas industry and other industries within the framework of the national development plan."

In pursuance of these objectives, the Libyan government concentrated its efforts during the first three years following the revolution, on negotiating with the oil companies (both individually, and collectively through OPEC) certain improvements in the financial arrangements of the oil concessions. These negotiations resulted in a number of favourable adjustments, during 1970-1973, in the tax structure and posted prices, both in Libya and in the other members of OPEC. The income tax payable by the concession holding companies to the government was raised from the old 50 per cent rate to a 55 per cent, effective from July 18, 1971. The agreed adjustments in the posted price had also gradually brought the Libyan posting up from the \$2.23 per barrel level which prevailed from the beginning of production until August 1970, to around \$4.50 by the middle of 1973. Details of these adjustments will be discussed later on in this study. However, their significance was not in the magnitude of the increases obtained, but was more in the fact that the essential

financial aspects of the oil concessions had become determinable by negotiations between the international oil companies and the host governments. Prior to that such matters were the prerogative of the companies. Furthermore, this change in the process of decision making concerning oil prices and the distribution of revenues opened the door for a new era in the international oil industry enabling the governments of the oil producing countries not only to ask for more benefits from their oil concessions, but also compelling the oil companies to yield to their requests.

Emergence of the participation agreements

In concurrence with the above mentioned developments, the participation system emerged as an alternative to the old regime of oil concessions. The arrangements of the new system in company/country relationships were negotiated and adopted in a number of oil producing countries during the early part of the 1970's. In the case of Libya, the major participation deals emerged during August-September 1973 when a number of decrees were issued by the government providing for acquisition by the state of a minimum of 51 per cent of the existing oil concessions held by the international oil companies. Agreements were signed by the main operating companies to this effect, and a new era of country/company relationships started and continued to be the norm of petroleum arrangements for the rest of the decade.

According to the new system of relationship, the government,

through its wholly owned National Oil Corporation (NOC), became a partner to the foreign companies in all assets and operations in the Libyan concessions. Compensation was paid to the foreign companies for the acquired share. Expenditures needed for operating the concessions and capital commitments were to be shared by the partners according to their respective ownership shares. The same applied to petroleum produced from the concessions, with each partner entitled to lift his corresponding share of crude oil and natural gas produced.

It must be noted that the participation system has not completely abolished all the arrangements of the old concessionary scheme. The basic financial arrangements of royalty and income tax payments remained to be applicable to the share of the foreign oil companies to the extent that it had not been taken over by the government's corporation. The foreign partner's share of production continued to be subject to royalty and income tax levies on the basis of the posted price as provided for by the concessionary formula. In relation to the NOC's share of production which the government's corporation became entitled to according to the participation deals, this production would be marketed by the National Oil Corporation at whatever prices it could obtain in the market, with a preferential right given to partner companies to buy it. The NOC was considered by law as an independent business entity, whose proportionate share in each participation venture was made subject to the usual

payments of royalties, income taxes, and other dues¹³ provided for in the Petroleum Law applicable to all companies, though, this point is not of practical importance. Since the corporation is part of the government, the ultimate result is the same concerning the overall income from the corporation's share of production. Thus, the net income to the government from the participation share of production represents the realized profits from marketing this production whether these profits were paid to the government in taxes and royalties or retained in the corporation.

The Hypotheses

As previously pointed out (in Chapter I), this study is concerned with the evaluation of the emerging participation system in comparison with the concessionary arrangements in two respects; First, the resultant net revenues to the government; Second, the relative impact on exploration and development efforts of the oil industry.

Hypotheses about revenues from oil

At the time when the Libyan participation decision was considered and finally taken, the international oil market was gradually but steadily moving to become a "sellers market" in which market prices for crude oil were assuming an upward trend.

¹³Law No 44 of 1973, "Nationalizing 51% of Occidental Libya, Inc", (issued August 11, 1973), Article 10; and Law No 66 of 1973, "Nationalizing 51% of the Operating Oil Companies", (issued September 1, 1973), Article 11.

On the other hand, the function of determining the posted price which was the basis of determining government's income from the oil concessions was that of negotiation between the government and the oil companies. Although the Libyan posted price had been subject to a number of upward adjustments between 1970 and 1973, it was below the rising market level. There was an obvious opportunity for the government to sell any crude oil received from the participation deal at prices higher than its posting. When the participation deals were concluded, the government succeeded, in fact, in selling its share of crude back to the companies at an agreed buy-back price of \$4.980 per barrel which was 39.8 US cents higher than the posted price prevailing at the time of concluding the participation agreements. According to these prices the participation scheme was to give the government a significant increase in revenues compared with revenues received under the concessionary formula based on the prevailing tax and royalty rates of 55 per cent and 12.5 per cent respectively.

However, this situation has significantly changed since the period immediately following the conclusion of the Libyan participation agreements. These changes were a result of new developments in the international oil situation created on the one hand by the Arab Israeli War (of October 1973) and its aftermath including the oil embargo and the shortage of oil supplies, and on the other, by the complete shift of power in the oil industry in favour of the oil exporting countries. These countries have assumed, for the first time, the function of determining their posted prices unilaterally. Posted prices

became determinable by the governments of the oil exporting countries at whatever levels they saw fit and were kept generally at levels higher than the market prices. This power of the governments of exporting countries was also extended to unilateral adjustments of tax and royalty structures, and the rates of these tax and royalties were raised effecting significant improvements in revenues due to each government under the concessionary formula still applicable to the foreign companies' share of production.

Review of these developments leads to establishing the first criterion to be used in this study in the way of evaluating the emerging participation scheme. It is the amount of net revenue benefits generated by the participation arrangements and how they compare with the alternative scheme of concessionary arrangements. Apparently, there have been a significant increase in government's total revenues from the oil industry following the introduction of the participation system. But one must be careful here to isolate the increased oil revenues generated by a rising demand in the oil market and consequently higher oil prices, from those revenues which owe their increase to better terms secured by the participation agreements. With the above mentioned shift of power in the oil industry, the oil producing countries also introduced significant improvements on the traditional concessionary formula which remained the basis of determining government's revenues from the oil companies' equity oil. The question which arises here is whether or not the emerging participation scheme

has resulted in net revenues that justify its viability in terms of government's capital commitments called for by participation arrangements and in relation to a continued concessionary scheme with improved royalty and tax structure.

The main hypotheses to be tested in this connection are the following:

1. Although the participation system has resulted in better government's revenue than the traditional concessionary arrangements, it has been less remunerative in terms of net revenues to the government than a continued concessionary formula which accommodates improved royalty and tax structure.
2. Introduction of the participation system has resulted in a significant increase in government's revenue from the oil industry over the traditional concessionary arrangements prevailing prior and up to the time when the participation scheme emerged.
3. The participation formula has produced a profit margin over the concessionary formula, that does not justify its viability in relation to the amounts of compensations and capital expenditures paid by the government.
4. Income derived by the government from the oil

industry under the concessionary formula has significantly improved in recent years as a result of improving the structure of the formula.

Hypotheses about Exploration and development activities

The second yardstick to be applied in evaluating the emerging participation scheme is the impact of the participation arrangements on the level of exploration and development activities in the oil industry. As oil reserves in discovered fields are depletable, the continuous efforts of searching for new oil resources should be an important objective of every successful oil venture. Assessment of the emerging exploitation arrangements, therefore, should not be limited only to examining their impact on revenues derived from current producing resources. But it should also include the measurement of the effect of these arrangements on exploration and development efforts and the efficiency of such efforts in adding new reserves which will eventually contribute to future revenues from the oil industry.

It has already been mentioned previously that the traditional form of concessionary agreements had given the oil companies rather attractive incentives for investing in the Libyan oil industry. As a result vigorous exploration and development programs were carried out under these agreements. But developments which had taken place in company/country relations in Libya as well as in other oil producing countries during the early part of the 1970's created an atmosphere of uncertainty for the

operating oil companies. One would naturally expect under these conditions that the companies would be hesitant to continue their extended activities in the country. Exploration and development activities were eventually kept at a minimum level during the period of uncertainty. However, when the participation agreements were concluded, the position of foreign oil companies was placed on a rather stable basis, as partners to the government in the oil concessions. This new position seemed to be acceptable to both the companies and the government. It gave a clear clue to their expected future relationship and removed a great deal of the uncertainty in regard to the position of the oil companies in the country's oil industry.

With the government taking a controlling share in the ownership and operation of the oil concessions as a result of the participation agreements, the question arises as to what extent it has been able to stimulate the exploration and development activities within the participation system. Therefore, the hypotheses to be examined in this connection are the following:

1. The introduction of the participation system in the Libyan oil industry has significantly affected the level of exploration and development efforts in the country's industry.
2. The level of exploration and development activities after participation has been significantly below that achieved under the old concessionary arrangements.

3. The growth of exploration and development activities in companies operating under the participation scheme has been significantly slower than that of companies operating under different arrangements.
4. Companies operating under the concessionary scheme have been more concerned with extracting the already discovered reserves than with the finding and development of new oil resources in the country.

Summary of Hypotheses

1. The participation system has been less remunerative in terms of net revenues to the Libyan government than a continued application of the concessionary formula - accommodating improved royalty and tax structures.
2. Introduction of the participation formula has resulted in a significant increase in government revenues from the oil industry over the traditional concessionary arrangements prevailing prior to/ and up to the time when the participation scheme emerged.
3. The profit margin accruing to the Libyan government from applying the participation formula rather

than the concessionary model does not justify the viability of the participation system in terms of the amounts of compensations and capital expenditures paid by the government.

4. Income receivable by the government from the oil industry under the concessionary formula has significantly improved in recent years as a result of changes in the structure of the formula.
5. Introduction of the participation arrangements has significantly influenced the level of exploration and development efforts in the Libyan oil industry.
6. The level of exploration and development activities of the Libyan oil industry after participation has been significantly below that achieved under the old concessionary arrangements.
7. Since the introduction of participation, the growth of exploration and development activities have been significantly slower in participation companies than in those companies who have been operating under different arrangements.
8. Companies operating under the participatory system have been more concerned with producing known reserves than in creating new reserves in the country.

The Methodology

In the study of an industry such as the oil industry one cannot possibly carry out an adequate investigation of the particular aspects chosen for the study without a sufficient reference to the institutional elements that shape the environmental surrounding in which the oil industry operates. This is perhaps true not only in inquiries related to the oil industry but in all fields of inquiry. However, coverage of the environmental background is particularly important when dealing with patterns of contractual arrangements which govern relationships in the international oil industry between the oil producing/exporting countries and the operating international corporations. Such arrangements and relationships are highly affected by the interaction of political, economic and social factors and by the relative bargaining positions of the parties concerned, within the correlation of these institutional forces.

For these reasons, though the scope of the present study was limited to investigating the behaviour of revenues from the industry and of exploration and development activities as affected by the transformation from the concessionary system to the participation system in the case of Libya, attempts were made, as much as possible, to view the Libyan developments within the framework of the international oil industry surrounding, particularly within the context of the patterns of developments in the oil industry of the Middle East where most of the world's crude oil business is concentrated. Therefore, extensive library

research was made in the course of this study to probe the wider background material of the oil exploitation systems. This background material was tackled particularly from the angle of aspects related to the financial arrangements between the operating international companies and the host governments in order to shed some light on the important institutional factors affecting the determinants of revenues from the oil industry.

Revenues accruing to the government from the production and sale of oil are a function, on the one hand, of the contractual arrangements between the government and the operating companies which determine the forms of government's take and the methods of computations, and on the other, on the level of oil prices and production volumes. Oil prices are also generally dependent on the bargaining position of the host countries vis-a-vis the international oil companies in view of the general conditions in the international oil market. Since the system of government participation in the oil industry emerged as an alternative to the traditional system of concessionary arrangements, it was thought appropriate for this study to carry on the investigation by a comparative analysis of government's revenues from oil under the two systems. Various changes that have been introduced on the concessionary formula of computing government revenues were surveyed and analysed to enable the comparison of the two systems to be based on an improved concessionary model vs the adopted participation model.

To filter out the impact of changes in the volume of

production, the comparative analysis of government revenues under the two systems were first pursued on a per barrel basis. Then, in evaluating the participation arrangements as an investment proposal a discounted cash flow analysis was made utilizing the related figures of additional revenue resulting from participation and the volume of crude oil sales and the required capital commitments by the government.

In analysing the impact of the transformation of the concessionary system to the participation system on exploration and development activities, an empirical investigation was carried out. The investigation utilized a regression model of analysis in which the differing oil exploitation systems were represented by dummy variables to examine whether these have any significant relationships with the behaviour of a number of indicators measuring the exploration and development effort. The indicators chosen for the analysis were mainly the capital expenditures of the Libyan oil industry, the number of exploratory and development wells drilled by oil companies in the country, and the seismic exploration work carried out by the oil companies. The patterns of behaviour of these indicators over time pre/post-participation, and for groups of companies operating under different exploitation system post-participation are then assessed to see what weight the participation companies have had in relation to the effort of creating new oil reserves in the country and what implications this may have for future oil arrangements and the role of foreign operators.

The data

The basic data for this research were obtained from a number of sources dealing with oil industry statistics in Libya. These include materials published by official agencies such as the Libyan Ministry of Petroleum, the Libyan National Oil Corporation, the Central Bank of Libya, Office of the Libyan Auditor General as well as materials available in the general literature on the international oil industry. Data dealing with the subject of participation in the generally available literature are very limited and when available they are of a general nature. Accordingly, the examination in this study of such published materials was more concerned with the establishment of the environment of the petroleum industry within the time period or periods that the various investigated changes in oil contractual arrangements took place.

Data available from publications of governmental agencies, on the other hand, are also in many cases incomplete - due to the uneven appearance of figures throughout time series. When attempting to overcome this deficiency by depending on several sources, there is always the problem of inconsistency of data from differing sources. With these conditions in mind, a great effort has been made in the course of this research to collect and carefully evaluate and screen the data utilized for this analysis. When more than one source was available comparisons were made to detect the basis of any existing variations and the most plausible data were adopted for use here. In this connection, the researcher

was helped by a number of field visits in Libya through which most of the information for this research were obtained. During these visits the researcher conducted interviews with a number of oil industry officials in the country which were helpful in verifying whatever data was publicly available and in filling many gaps in such data.

Limitations of the Study

One major limitation of the approach used in this study deals with the coverage available. The study attempts to infer certain implications of the adoption of the participation system from the experience of one oil producing/exporting country who introduced such a system. Perhaps, a better approach would have been by examining a sample of cases from more than one country for the results could have been substantiated by an advantageous wide sample of data which allows for the use of some powerful statistical tests. But this approach is practically difficult because of the extensive amount of time and resources needed and because of the unavailability of reliable and consistent data which are needed for its execution. Data about oil operations are not always publicly available and when they are, there is usually the problem of inconsistency and uneven appearance of figures through time. Only through personal contact and extensive verification of information, one could obtain an adequate data from the oil producing and exporting countries. However, there is no reason to believe that wider coverage would change the conclusions reached in this study since changes in the petroleum

arrangements follow a pattern generally consistent in the international oil industry.

Even in the case chosen for this investigation where the researcher acquired a great deal of the data through personal contacts in the Libyan oil industry, the limitations of data have shaped the format of the research. No consideration was given to sample size or to the randomization of the selection method, since data on a company by company basis were not available. Rather, aggregate data which were available for companies operating under the participation system or companies operating otherwise are used in this research. This approach is perhaps the appropriate one since the purpose of this research is to study general effects of specific changes in accounting methods.

Another limitation of this study is related to the many points which may be related directly or indirectly to the variables under investigation here and which have not been covered or have been treated only partially in this study. Considering the wide and variable spheres which subjects in the international petroleum industry, such as the participation issue, comprehend, there will always be relevant topics and by-topics which will require special and separate investigations. For this reason, the present work cannot claim to extend to every conceivable point which may be relevant to the subject of participation arrangements investigated in this study. Thus, the present work cannot be a final or complete analysis of the participation system in the Libyan oil industry. Rather, it is an analysis of some limited aspects of

—
this system to assess the developments that have been associated
with its adoption thus far.

CHAPTER III

DEVELOPMENTS OF PETROLEUM ARRANGEMENTS

IN THE MIDDLE EAST

Before proceeding with the examination of the effects of the Libyan oil industry's transformation from the concessionary arrangement to the participation system, it is appropriate to devote the present chapter of this study to reviewing the background of this transformation in a rather wider perspective. As the Libyan oil industry arrangements have generally developed within the concurrent pattern in the oil producing countries of the Middle East, it is perhaps the proper approach to trace these developments within the general context of the Middle Eastern oil industry. This is especially appropriate since the Libyan oil industry is relatively a newcomer compared with the other oil producing countries of the Middle East, and its relationships with the international oil companies have followed the norm of relationships prevailing in the older oil producers in the area.

The Middle Eastern oil industry, which represents a sizeable and important proportion of the international oil business,¹

¹The term Middle East means different things to different people. But for the sake of this study it includes the Arab oil producing countries east of Suez, Iran and North Africa. These countries are known to possess about 70% of the world's total petroleum reserves estimated in 1970. Their contribution to world oil supply in 1972 was 41.1%. See: Shell International Petroleum Co, Seminar on Oil Affairs, Charts and Maps, (London : Shell Oil Co, 1971), p B2/40; and BP, Statistical Review of the World Oil Industry, (London : BP, 1972), p 6.

started under concessionary agreements granted by governments in the area to international oil companies, mainly to the "majors", in order to search for oil in the respective countries, develop its resources, produce it, and share the outcome of this production with the host countries. Due to the long-term nature of these agreements and because of the dynamic nature of the socio-economic and political environment surrounding their operations, a special government/company relationship was created - a relationship that necessarily poses problems of renegotiations, of revisions, and of modifications of the agreed arrangements. This has naturally been the case with arrangements embodied in the oil concessions of the Middle East, which have undergone several changes and amendments since the original (or early) concessions were granted in the area. An attempt is made below to discuss the main features of the early concessionary agreements and the important changes that have been introduced into them. The emphasis will be placed particularly on the financial arrangements of such concessions.

Nature of Early Concessionary Agreements

At the early stage of oil industry development in the Middle East, particularly during the first half of this century, granted concessions were basically designed to encourage investments by international companies in host countries. The commitment of large amounts of capital and efforts in the risky search for oil in unknown foreign lands needed generous conditions to be embodied

in the early concessions granted to the pioneering operators in the Middle East. The attractive features of these concessions included several privileges given to the companies, such as the freedom of companies in conducting their petroleum activities in host countries, exemptions from import and export duties, and more significantly, the companies' free hand in setting their investment and production policies in host countries and in the selling and pricing of their oil production.²

Financial arrangements under early concessions

Generally, no systematization was apparent in the various oil concessions granted during the early stage of oil operations in the Middle East. Such concessions were different from one host country to another and from one operating company to another. Provisions of each individual concession were determined by negotiations between the host government (or ruler) and the individual company concerned.

As far as the financial arrangements were concerned, these concessions usually provided for the following main payments to

²For more details on early oil concessions in the Middle East, see: Sam H Schurr and Paul T Haman, Middle Eastern Oil and Western World, (New York : American Elsevier Publishing Co, Inc, 1971), Chapter 9; Benjamin Shwadran, The Middle East, Oil and Great Powers, (New York : Frederick A Praeger, 1955); George Lenczowski, Oil and State in the Middle East, (Ithaca, New York : Cornell University Press, 1969); Leonard M Faning, Foreign Oil and the Free World, (New York : McGraw-Hill Book Co, 1954); and Stephen Longrigg, Oil in the Middle East, (England : Oxford University Press, 1954).

be made to a host government by a concession holder:³

1. An initial payment is usually made to the host government upon the granting of each concession in the form of "acquisition fee or bonus";
2. Certain annual rentals are also paid by the concession holder to the government for areas covered by a concessionary agreement;
3. When oil is found and developed in a concession area, and the production of petroleum commences, a share of the outcome of such production is usually paid to the host government by the producing company. This share ranged from a fixed amount of cash on each unit (ton or barrel) of crude oil produced and sold, to a certain percentage of the company's net profits from its operations in the host country, depending on the provisions of each individual concessionary agreement.

However, at this stage of the Middle Eastern oil industry development, host governments were practically satisfied with whatever share of oil outcome the foreign companies gave them. For most of the host countries, they were newly independent nations, just emerging from foreign colonialism with devastated economies lacking the technical expertise and the financial

³S Toriguian, Legal Aspects of Oil Concessions in the Middle East, (Beirut, Lebanon : Hamaskaine Press, 1972), pp 52-53.

resources needed for their development. To build their economies, the prime objective of these emerging nations was to attract the sorely needed foreign capital and skills to be invested in the locating of any hidden natural resources and to have new industries started. The problem of maximizing their share of oil profits was, therefore, of a secondary importance. The "immediate needs" of the host countries at this stage of the oil industry development in the Middle East had in fact "placed them in a weak bargaining position vis-a-vis foreign oil companies. Thus, the result ... was inequitable agreements, characterized by long leases, a high degree of foreign control, and relatively moderate royalties."⁴

Eventually, with the discovery of huge oil reserves in the area, and as the number of oil concessions increased, and as the countries of the Middle East as a whole advanced towards a more mature and sophisticated status, the host countries started pressing for improvements in their concessionary arrangements with the oil companies. With the producing countries' success in incurring certain favourable changes on the financial arrangements of the oil concessions, the Middle Eastern oil industry entered into what might be considered the second stage of its development.

⁴L Donald Fixler and Robert L Ferrar, "An Application of Economic Theory to Middle Eastern Oil Pricing", Arab Oil Impact on the Arab Countries and Global Implications, N A Sherbini and M A Tessler, eds, (New York : Praeger Publishers Inc, 1976), pp 21-22.

Developments of the Financial Arrangements during the Second Stage

Unlike the early stage, one important feature of the second stage of the Middle Eastern oil industry is that systemization became noticeable in the host countries' dealings with the oil companies. In some countries petroleum laws were enacted in order to organize the procedures of granting oil concessions and subject these concessions to a uniform system, with standardized agreements specifying the rights and obligations of both the host government and the concession-holders. In other countries, the pattern of oil concessions remained basically that of negotiated agreements between host governments and individual companies without an enacted petroleum law. However, even in the latter countries, "... the pattern of negotiated concessions ... crystallized into a more or less standard form, with almost identical provisions recurring in every new concessionary agreement."⁵

Perhaps the most apparent signs of systemization in oil arrangements throughout the Middle East were manifested in the adoption of similar principles related to the determination of taxes and royalty payments due to host governments from the activities of oil companies. The first of these principles was the "equal sharing of profits", realized from petroleum production, between the host government and the operating company. Such

⁵ S Toriguian, op. cit., p 45.

principle was introduced in various concessions in the Middle East during the early 1950's. It was followed by the adoption of "Posted prices" as the basis for calculating the host government's share of profits. Another principle, that also was adopted by various countries in the area on a similar basis, was "the expensing of royalties". The introduction of this principle in oil concessions was called for by the Organization of Petroleum Exporting Countries (OPEC) after its formation in 1960 and was actually embodied in the various oil concessions during the middle 1960's. A more detailed discussion of these developments is presented below.

The introduction of "equal sharing of profits"

An important stage in the development of oil concessionary arrangements of the Middle East started with the adoption of the so-called 50-50 company/country profit sharing system. It was first introduced in the area by Saudia Arabia in 1950 (following its earlier adoption by Venezuela in South America in 1948).⁶ Prior to this, payments by oil companies to host governments varied in different countries and even in different concessions

⁶ S H Schurr and P T Haman, op. cit., p 120.

within the same country.⁷ In most cases, these payments were determined on the basis of a specified amount of royalty per each ton or barrel of crude oil produced or sold, with some concessions guaranteeing a minimum annual revenue to the host government. The specified royalty was payable either in gold, pounds or other currencies or, in some cases, delivered to the government in crude oil. Few concessions gave the host country the right to receive a certain percentage of the companies' profits.⁸

⁷ For example, Saudia Arabia's concession granted to California Arabian Oil Company (predecessor of ARAMCO) in 1933, gave the Saudi government 4 shillings (gold) per ton of oil produced. The Kuwaiti concession to Kuwait Oil Co in 1934, the Qatar concession to the Anglo-Persian Oil Co in 1935, the Muscat and Oman concessions in 1937, and the Abu Dhabi concession in 1939, each gave the local government 3 gold Rupees per ton. The Bahrein concession in 1934 gave the government 3.80 Rupees per each ton produced.

In the case of Iraq's agreement of 1931 with IPC, the Iraqi government was entitled to a royalty of 4 gold shillings per each ton of crude oil produced, with a minimum guaranteed income of 400,000 pounds in gold each year. Another Iraqi concession (granted to the Basra Petroleum Co in 1938) entitled the government, in addition to the specified royalty of 4 shillings per ton, "to receive free of cost at well-head 20% of all petroleum won and saved by the company."

See: Zuhayr Mikdashi, A Financial Analysis of Middle Eastern Oil Concessions : 1901-65, (New York : Praeger, 1966).

⁸ An example of this case was the original Iranian concession with the Anglo-Persian Oil Company (1901), which gave the Iranian rulers a royalty of 16% of net profits realized by the company. However, this arrangement was later amended in 1933 when a royalty of 4 shillings per ton was adopted, with a guaranteed minimum income to the Iranians of 750,000 pounds a year. The amendment also stipulated the payment of a certain percentage of profits if dividends to the company's stockholders exceeded a certain amount.

Under the 50-50 profit sharing system, payments by operating oil companies to a host government should be equal to 50 per cent of a company's net profits from petroleum produced in the country. This share which was referred to as "income tax" payment is inclusive of all other payments such as royalties, rentals, and any other taxes or commitments by the producing company to the host government. If such payments of royalties, rentals, or other taxes were made to the government, they were treated as a credit in arriving at the government's 50 per cent share of profits which represented the maximum income of the government.⁹ The significance of considering this payment (of 50 per cent of net profits) to host government as income tax was that the operating companies could credit it to their tax liability in their home countries following the recognized principle of avoiding double taxation of income. That was the case at least for the American companies who, prior to their agreement to the 50-50 profit sharing system, secured "permission from the US Treasury to treat payments to the Saudi government as a credit against ... (their) liability under the US corporation tax laws."¹⁰ Thus, the new profit sharing system increased the revenue of the host country without much cost to the concessionaire companies because of the US tax credit.

⁹ S H Schurr and P T Haman, op. cit., p 120.

¹⁰ David G Edens, Oil and Development in the Middle East, (New York : Praeger Publishers, 1979), p 112.

Following its adoption by Saudia Arabia, the 50-50 profit sharing arrangement soon spread to other oil producing countries in the Middle East and became the standard formula of government payment in the area; Kuwait adopted the formula in 1951; Iraq, Qatar and Bahrein did the same in 1952; Iran and Libya followed suit in 1954 and 1955 respectively.¹¹ Oil concessions were amended in various host countries to incorporate the new system of profit sharing without much hesitation from the concessionaire companies. For them, it was highly acceptable because it would reduce friction between them and the producing countries and fortify their relations with host governments without costing the companies much. For the host governments, the profit sharing system was advantageous to their previous financial arrangements with the oil companies.

However, the administration of the 50-50 profit sharing system itself was not without difficulties. Unlike the former arrangements, which based the government income on a royalty per ton of production and the official interest tended to be focused on output as the government's revenue varied with the volume of production, under the new profit sharing system, government income became influenced by costs and prices, as well as the volume of production. This gave rise to friction between the firms and the host governments as the latter now had an economic stake in

¹¹ S M Ghanem, The Pricing of Libyan Crude Oil, (Malta : Adams Publishing House, 1975), p 241.

decisions related to these matters. At times disputes arose over the firms' cost accounting methods which were used in arriving at taxable income, as these methods influenced the allocation of sizeable overheads and other costs of integrated oil companies between a host country and other regions and between current and future periods.¹² The question of price was even more fundamental.

Introduction of "posted prices" in the Middle East

The adoption of the 50-50 profit sharing system in the Middle East was accompanied by similar adoption of the "posted price" concept. Calculation of the oil companies' profits for the above mentioned purpose was to be "on the basis of posted prices (with some agreed discounts)."¹³

Posted prices in the oil business were traditionally known to mean:

"... the prices published by oil companies whenever they discover or refine oil, at which those companies are willing to sell their crude oil or refined products 'in cargo lots to all comers at the tanker terminal all around the world from which they are prepared to sell'."¹⁴

¹² George W Stocking, Middle East Oil, (Nashville, Tenn. : Vanderbilt University Press, 1970), pp 205-209.

¹³ Sam Schurr and Paul Haman, op. cit., p 120.

¹⁴ S M Ghanem, op. cit., p 26, quoting the Economist, (August 5, 1961), p 561.

The term "posted price" itself owes its origin to the early days of the oil industry in the United States, when any producer who discovered oil used to post a price on his rig at which he was willing to sell his crude to interested buyers (in most cases the posted price was fixed by the refiners who controlled the market in those days). Because those prices were posted on the rigs, people referred to them as "posted prices".¹⁵ When oil companies replaced the early adventurers and became integrated and dominant in the industry, they kept the idea of posted prices which became an integral aspect of the oil business. Ever since, whenever an oil company has discovered oil, a posted price was established for such crude,¹⁶ and various formulas were used from time to time for fixing posted prices, usually linking the price of crudes produced from different locations to each other and taking into account the quality and freight differentials of each crude.

The reason for each company having a posted price for crude oil, as pointed out by one writer on petroleum affairs, was that "there is no other way of establishing crude oil values since there is no exchange market for petroleum."¹⁷ Most of the crude

¹⁵ Ibid.

¹⁶ Posted prices are published in certain specialized journals of the oil business. The most important of which is the Platts Oilgram Price Service. A daily price report issued in New York, Chicago, and Houston by McGraw-Hill Book Co.

¹⁷ Owais Rikabi Succari, International Petroleum Market : Policy Confrontation of the Common Market and the Arab Countries, (Universite Catholique de Louvain, 1968), p 82.

oil produced was utilized by refining affiliates of the producing companies, and simply had "transfer prices" for internal integrated accounting purposes. The rest was mainly exchanged among the major companies at negotiated prices, often on long term contract. Very little was sold at arm's length bargaining to outsiders so that there did not exist what could be considered a "market price" for crude oil. Thus the need for a "reference price" or a "posted price" was imminent. Posted prices, however, acquired more importance in the international oil business from 1950 after it became the basis for calculating royalties and income taxes payable by the oil producing companies to the host countries under the 50-50 profit sharing principle.

When the 50-50 profit sharing formula was first adopted in Middle Eastern oil concessions, the practice of "posting" crude oil prices was at the discretion of the companies operating these concessions in each of the producing countries. Most of the operating companies were, as pointed out earlier, affiliates of the majors (or the seven sisters) who were in firm control of the oil business not only in the Middle East but throughout the free world. In the Middle East alone the majors owned over 90 per cent of the area's total crude production during the early 1950's.¹⁸ Although most producing companies fixed posted prices for their Middle Eastern crudes, posted prices to be applied in determining

¹⁸Shell International, Seminar on Oil Affairs, op. cit., pp B2-B3.

host governments' income were loosely defined. This was due to the inclusion in most of the concessionary agreements of certain clauses giving the oil companies the right to some discounts from the officially declared posted price. These discounts were generally allowed in the agreements within the context of "marketing allowances" or "selling expenses allowances" and were "originally intended as an incentive to increase exports" of crude oil from the host countries.¹⁹ But they, also, were vaguely defined that allowed the producing companies to sell the crude or transfer it to their affiliates at unlimited discounts and deduct them from the official posted prices in calculating the host government's take. The discounts off the posted price were not much of a problem during the early 1950's when posted prices were close to market prices; but later on, when crude oil was sold at prices much below the official posting, the discounts from the posted price became a serious issue in country/company relations as will be elaborated on in a following section of this chapter.

The host countries on the whole were well satisfied with the results under the new 50-50 profit sharing as calculated from posted prices prevailing during the early and middle 1950's. The adoption of profit sharing itself brought a great boost in their revenues initially. In addition to that, "production was rising

¹⁹ Zuhayr Mikdashi, The Community of Oil Exporting Countries, op. cit., p 25.

rapidly and the tendency of posted prices was upward, presumably somewhat in relation to market forces."²⁰ Governments' income from oil production grew, both in per barrel revenue and in total receipts. ARAMCO's per barrel payments to the Saudi government, for example, rose from around 17 cents (prior to 1950) to 28 cents in 1951 and to 67 cents and 80 cents in 1954 and 1957 respectively.²¹ The growth in total receipts could be sensed from the fact that daily production went up from 579,000 barrels in 1950 to 990,000 barrels in 1957 for Saudia Arabia, and from 1.750 million barrels to 3.440 million barrels for the whole Middle East producers in the respective years.²²

The relatively cheap cost of producing Middle Eastern oil encouraged the oil companies to extend their exploration activities and enlarge their production capacities in the area. With increased oil discoveries and the growth of production and with the stability of prices, host governments became used to the idea of each new year being better than the previous one as regards their revenues from oil activities. The existence of a small number of companies (the majors) working together to control most of the world's markets for oil guaranteed this situation through most of the 1950's. They did this:

²⁰ S Schurr and P Haman, op. cit., p 121.

²¹ M Adelman, The World Petroleum Market, (Baltimore, Maryland : The John Hopkins University Press, 1973), p 208.

²² based on daily production of five producing countries, (namely Iraq, Iran, Qatar, Kuwait and Saudia Arabia), Ibid, p 80.

"... by manipulating production levels in more than a dozen countries, with each company behaving as a cartel member, even without a cartel. ... in this way (they) could ... assure that just enough crude oil came onto the market to keep the price stable or rising gently. When demand slumped, the companies temporarily produced less and let inventories climb. When demand surged, production increased and inventories depleted. The companies shared proportionately in prosperity and depression and in seasonal adjustments."²³

But later in the decade, a market situation was developing that was less than satisfactory to the major oil companies; with large reserves and excess producing capacity beginning to overhang the market, the majors stiffened their competition in product markets.²⁴ A number of independent producers also entered the international oil field and attempting to gain a foothold in the market, they were lifting Middle Eastern crude at prices below the "posting" level; new quotas were imposed in the United States on imported crudes to encourage domestic exploration and development,²⁵ this policy "served to screen off the US market from cheaper Middle Eastern crude oil and to buttress excess supply conditions in the eastern hemisphere".²⁶ All these factors;

²³Loring Allen, OPEC Oil, (Cambridge, Massachusetts : Oelgeschlager, Gunn and Hain, Publishers, Inc, 1979), p 45.

²⁴S Schurr and P Haman, op. cit., p 121.

²⁵US oil import restrictions started "voluntarily" in the middle of 1957, and were made "mandatory" in March 1959, allowing only 13% of US domestic needs to be imported. See: Z Mikdashi, The Community of Oil Exporting Countries, op. cit., p 46; and Anthony Sampson, The Seven Sisters, op. cit., p 147.

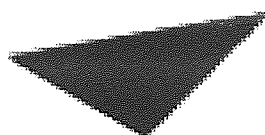
²⁶David G Edens, Oil and Development in the Middle East, op. cit., p 114.

together with attempts of the Soviet Union to force some quantities of its crude oil into the oil market outside the Soviet block and the starting of production from newly discovered fields of Algeria (1957) and Nigeria (1958), caused a glut in the international oil market and realized market prices for crude oil declined. The producing affiliates of major companies were under pressure to reduce prices in true sales and exchange of crude oil, and also to reduce transfer prices to their refining affiliates. Crude oil thus moved in recorded transactions at various discounts from posted prices.

As discounts mounted and the spread between the posted price and the market price of crude oil widened, the 50-50 profit sharing deal that had seemed so advantageous in the beginning began to hurt the major companies. These companies paid royalties and taxes on the basis of fixed posted prices, but now received their incomes on heavily discounted market prices, the percentage of net income going to the host governments rose while companies' profits declined. In this situation, the major producers in 1959 and 1960 started to revise their posted prices downward to get them into closer conformity with the realized prices in sales and transfer transactions, thus reducing their tax commitments to the host governments. In February 1959, posted prices were reduced by nearly 9 per cent. A further reduction in posted prices of about 5 per cent was implemented in August 1960. Both decisions were taken unilaterally by the oil companies. The magnitude of these reductions and their effects on a number of Middle Eastern

crudes are shown in Table II-1 below.

Table II-1
Reductions of Posted Prices
of 1959 and 1960



Aston University

Illustration removed for copyright restrictions

Source

OPEC Annual Statistical Bulletin of 1972, (OPEC : Vienna, 1973),
pp 99-111.

These price cuts caused a strong reaction in the host countries who resented the companies' unilateral action of depressing their public revenues by changes in the posted price. As a direct result of the price cuts, the host governments of the Middle Eastern producers, together with Venezuela, began consultations for concerted actions to combat the companies' practices of unilaterally administering prices and other petroleum policies in the host countries. These consultations soon resulted in the establishment of the Organization of Petroleum Exporting Countries (OPEC) which later on, played an important role in reshaping the structure of

the international oil industry and changing the contractual arrangements between oil companies and the producing countries. Such a role warrants the devotion of the following sections of this chapter to discussing developments of the Middle Eastern oil industry through OPEC. Most of the major developments in the financial arrangements which is the main concern here, during the last two decades, have, however, been initiated directly or indirectly through this organization.

Establishment of OPEC

The Organization of Petroleum Exporting Countries came into existence in September 1960 with the aim of "co-ordinating and unifying" the policies of its member countries.²⁷ Its original members were Iran, Iraq, Kuwait, Saudia Arabia and Venezuela. Subsequently, they were joined by Qatar, Libya, Indonesia, The United Arab Emirates, Algeria, Nigeria, Ecuador, and Gabon. One of the main objectives of OPEC when it was formed was to stabilize oil prices in member countries. Article 2, Paragraph B of the Statute of the organization stated that: "the organization shall devise ways and means of ensuring the stabilization of prices in international oil markets with a view to eliminating harmful and unnecessary fluctuations."²⁸

²⁷ Zuhayr Mikdashi, The Community of Oil Exporting Countries, op. cit., p 33.

²⁸ OPEC, The Statutes of OPEC, (Vienna, 1968), Article 2/B, p 3.

OPEC's efforts to stabilize prices during the 1960's

It was the intention of the OPEC founding fathers to attempt to restore the posted prices of crude oil to the levels prevailing before the reductions of 1959. OPEC's Resolution No 1, which was adopted in the first meeting of the organization stated that: "... members shall endeavour, by all means available to them, to restore present prices to the levels prevailing before the reductions."²⁹ One of such means which OPEC members had in mind was through production controls. This was clearly stated in the organization's first resolution: "Member countries ... shall study and formulate a system to ensure the stabilization of prices by, among other means, the regulation of production, with due regard to the interests of the producing and of the consuming nations."³⁰ A production programme was thought by national experts at that time to be the proper course of action if posted prices of oil were to be restored to the sought levels, because the international oil market was characterised by excessive supply of crude.³¹ However, no agreed production programme was adopted by OPEC because of the lack of agreement

²⁹OPEC, Resolution No I.1, Adopted at the first Conference of OPEC held in Baghdad, September 10-14, 1960, paragraph 2.

³⁰OPEC, Resolution No I.1, paragraph 3.

³¹Ashraf Lutfi, OPEC Oil, (Beirut : Middle East Research and Publishing Centre, 1968), p 64.

among member countries as to how such a programme should be designed and implemented,³² and because of the rather different aims of individual countries.

Although no agreement was reached by OPEC members concerning a production programme which could have been effective in raising crude oil prices during the 1960's, the oil producing countries were able, through OPEC to unify their efforts in dealing with the major oil companies regarding a number of other issues. Through collective action, they gradually secured better arrangements of profit sharing between the companies concerned and the host governments, thus improving the governments' receipt from oil activities in their territories. As far as the posted prices were concerned, member countries succeeded, during the next ten years following the establishment of OPEC, in preventing further deteriorations of these prices (which in themselves were the direct cause leading to the creation of the organization).

As far as the financial arrangements of the oil concessions were concerned, members of OPEC had, during this period, managed to extract two major improvements in the method of calculating governments' revenue. The first was a change in the treatment of royalties (the expensing of royalties). The other was a reduction in the discounts which the oil companies were previously allowed to deduct from the posted price to compensate them for marketing crude oil at prices below the official posting. The

³² Shukri Ghanem, The Pricing of Libyan Crude Oil, op. cit., pp 113-121.

introduction of these changes in various member countries had brought in more standardization in the concessionary arrangements of the oil producing countries.

The expensing of royalties

Perhaps one of the major achievements of the Middle Eastern oil producing countries through OPEC during the first decade of its existence was in the treatment of royalties payable by oil companies to producing countries as costs deductible from taxable income rather than as a partial payment of the 50 per cent tax payment. In its Resolution Number IV.33, the Organization of Petroleum Exporting Countries called for such treatment to be implemented in member countries. It stated that:

"... each member country affected should approach the company or companies concerned with a view to working out a formula wherein royalty payments shall be fixed at a uniform rate which members consider equitable, and shall not be treated as a credit against income tax liability."³³

This Resolution called, first, for the fixing of royalty payments at a uniform rate in member countries. Royalty rates were previously different from country to country, and in many cases, they differed within the same country between the different operating companies. For example, in Libya it was

³³OPEC, Resolution No IV.33, (April 1962).

12.5 per cent of the value of total field production.³⁴ In Kuwait, royalty was fixed at the rate of eleven shillings per ton of crude oil exported. Saudia Arabia was getting different rates of royalties from different companies; for ARAMCO the royalty rate was four shillings per ton of produced crude, but for some other companies it was 20 per cent of the value of produced crude.³⁵

To unify the rates of royalty among producing countries was not a matter of great importance as far as the increase of revenues to producing countries is concerned. However, its importance lies in the fact that it was a step towards the standardization of contractual relationships between producing countries and oil companies. Such standardization eventually helped the producing countries to act more harmoniously in their dealings with the companies in later years.

The most important point of OPEC's Resolution No IV.33 was the recommendation that members should approach the oil companies with a view that royalties "shall not be treated as a credit against income tax liability." It meant that royalties payable to host governments should be considered as a cost deductible from taxable income rather than as a partial payment of the 50

³⁴ Royal Decree Amending Certain Provisions of the Petroleum Law No 25/1955. Published in the Official Gazette of the United Kingdom of Libya, (Tripoli, July 15, 1961), Article 13-C.

³⁵ S Ghanem, op. cit., p 129.

per cent income tax due to a government. The justification which OPEC gave to such a demand was that royalties were paid to the producing countries as a compensation for the depletion of their national resources. The governments of producing countries received such payment in their capacity as owners of these resources. Therefore, royalties should be treated independent of the 50 per cent share of profits which was received by the governments as tax collectors.³⁶

After prolonged negotiations between OPEC member countries and the oil companies, an agreement was reached providing for the expensing of royalties and the fixation of the royalty rate at 12.5 per cent of production valued at posted prices. The application of this arrangement started in the various countries of the Middle East during 1964 and 1965. In return for the companies' acceptance of the "expensing of royalty" principle, host governments agreed to moderate the cost of the new formula on oil companies by allowing them certain discounts from the current posted price applied in calculating their income tax payments. These discounts off the posted price were set at 8.5 per cent in 1964, 7.5 per cent in 1965 and 6.5 per cent in 1966, for heavy crudes of 27° API or below. Crudes of higher grade were allowed additional discounts expressed in certain cents per barrel for each grade above 27° API.³⁷ The intention was the gradual

³⁶OPEC, Preamble of Resolution IV.33.

³⁷Zuhayr Mikdashi, The Community of Oil Exporting Countries, op. cit., p 143.

reduction in these allowances until they were completely eliminated within a period of 5-7 years. But allowed discounts after 1966 were to be determined by negotiations between the host governments and the oil companies with consideration of market conditions. All allowances were, however, actually eliminated in all producing companies by the end of 1970 as will be seen later on in this chapter.

Reduction of marketing allowances

When OPEC came into existence, most of the member countries were nominally levying the 50 per cent income tax on the basis of posted prices. But, in practice, there was the problem of unrestricted discounts which the companies were allowed to deduct from the posted prices as "marketing allowances". Such allowances were provided for by most of the concessionary agreements between the oil companies and the host countries, but were loosely defined. For example, Libyan concessions gave the concession holding companies the right to base the income tax calculation on "... posted price ... less marketing expenses as defined by regulation ...". In defining these "marketing expenses", Petroleum Regulation No 6 stated that:

"'Marketing expenses' means the sum of expenses wherever incurred, of each concession holder which are fairly, properly and necessarily attributable to the selling, servicing, co-ordinating and arranging for the lifting of crude petroleum for export from Libya divided by the number of tons of crude petroleum so exported. 'Marketing expenses' include the sum total of rebates if any from the posted price which the concession holder is obliged to grant for the purpose of meeting

competition, in order to sell Libyan crude petroleum to affiliated or non-affiliated customers."³⁸

From this definition, it is clear that there was no limit on marketing allowances deductible from the posted price. The oil producing companies could deduct any discounts which they chose to grant to their affiliates or customers under the claim of meeting competition in the crude oil market.

Some operating companies, in Libya and elsewhere in the host countries of the Middle East, made full use of the marketing allowances provisions provided for the concessionary agreements. They lifted crudes to their affiliates and other buyers at heavy discounts and were deducted from the posted price, making the latter no more than a "realized price". In some cases, such as in Saudia Arabia, the producing companies gave discounts as high as 18 per cent off the current posted price.³⁹ In the case of Libya, discounts off the posted price reached an even higher level (about 30 per cent by some companies).⁴⁰

³⁸"Petroleum Regulation No 6", Article 15-1, published in the Libyan Official Gazette, No 18, December 23, 1961.

³⁹Abdullah Tariki (a former Minister of Petroleum and Mineral Resources of Saudia Arabia), "Minutes of the 4th Meeting", Second Arab Oil Congress, Beirut, October 21, 1960), quoted by: Zuhayr Mikdashi, The Community of Oil Exporting Countries, op. cit., pp 25-26.

⁴⁰S Ghanem, The Pricing of Libyan Crude Oil, op. cit., p 126.

The problem of marketing allowances was dealt with by OPEC in the organization's Resolution No IV.34. After mentioning that the marketing expenses chargeable by the producing companies had been in many cases fictitious since "the bulk of the crude oil produced by the operating companies is moved in integrated channels or on long-term contracts with no brokerage charges being incurred", the Resolution recommended that:

"... the Member Countries affected should take measures to eliminate any contribution to the marketing expenses of the Companies concerned."⁴¹

Through negotiations with the oil companies, marketing allowances were reduced to $\frac{1}{2}$ cent per barrel of crude oil sold. The application of this reduced rate started in most of the producing countries of the Middle East with the introduction of the royalty expensing formula during 1964. This marketing allowance together with the agreed allowance granted to the oil companies for the "expensing of royalties" became the only discounts deductible from the posted price in calculating the host governments' income tax on oil exports. Such allowances were applicable in most Middle Eastern countries until the early 1970's when major changes were introduced in the financial arrangements of the oil concessions affecting the structure of payments to host governments. These changes will be discussed in detail below.

⁴¹OPEC, Resolution No IV.34.



However, when the first decade of OPEC's life had elapsed, the fundamental objective of OPEC - to restore pre-1960 posted price levels - had resulted in no definite achievements aside from preventing any further deteriorations in such prices. Yet member countries were able to increase their total revenues as well as their revenue per barrel by royalty expensing and the reduction of marketing allowances, as well as by increasing their production. The limited success of OPEC during this period, however, demonstrated to its members the advantages of collective action by member countries against the cartel of the major oil companies. The fact that the organization had continued to exist during this period itself had at least persuaded the oil companies that they could no longer take unilateral decisions to reduce prices or to effect any financial arrangements reducing the revenues of their host countries.

Adjustments of Posted Prices During the Early 1970's

With the beginning of the second decade of OPEC's life it became clear that the organization "came to represent an important element in the growing sophistication of the oil-producing world."⁴² The first positive steps towards increasing posted prices came from Libya whose new military government entered into a series of tough negotiations with the oil companies early in 1970 with the aim of adjusting the posted prices of Libyan

⁴²Peter R Odell, Oil and World Power, (Harmondsworth, Middlesex, England : Penguin Books Ltd, 1974), p 94.

crudes. The Libyan negotiations were lengthy and met strong resistance from the oil companies to agree to a rise in posted prices. But, faced with the similarly tough stand of the Libyan government and because Libyan crudes were in fact underpriced compared with Middle Eastern levels, the individual companies finally agreed (late in 1970) to increase the Libyan posting by 30 US cents per barrel of 40⁰ API (or about 13.5 per cent of the prevailing posted price of \$2.23). This increase was meant to bring the Libyan posting in line with the level of crude prices in other Middle Eastern countries.⁴³

The conclusion of these price agreements between the Libyan government and the oil companies sparked similar demands by other producing countries for increases in their posted prices. Posted prices were adjusted in most countries following the Libyan example. However, the first joint action of OPEC members concerning increased posted prices and adjustment in the tax structure came as a result of the famous conference of OPEC held in Caracas in December 1970. OPEC collective agreement in this conference presented a joint demand to the oil companies by member countries for a further increase in posted prices and the payment of income tax at a minimum rate of 55 per cent (instead of the old 50 per cent rate) as well as the elimination of all discounts and allowances previously deductible from the posted price. Resolution of the "Caracas Conference" called for member

⁴³ S Ghanem, The Pricing of Libyan Crude Oil, op. cit., pp 150-159.

countries to establish negotiations with oil companies with a view to achieving these demands, stating that:

"... in the case such negotiations fail to achieve their purpose, the conference shall determine and set forth a procedure with a view to enforcing and achieving the objectives as outlined in this resolution (the Caracas Resolution) through a concerted and simultaneous action by all member countries."⁴⁴

Immediately after this conference, negotiations started between a group of OPEC members (namely, the Gulf States) and the oil companies to establish new uniform prices and improve the tax structure. These negotiations⁴⁵ resulted in the signing of a five year agreement between the countries concerned and the operating companies. On February 14, 1971 the companies agreed to grant the Gulf countries the following improvements, effective from February 15, 1971 until December 31, 1975:⁴⁶

1. An immediate increase of 33 US cents per barrel in the posted price, raising the basic price of the Arabian light crude (of 34° API) from the long held level of \$1.80 per barrel to \$2.13 per barrel.

⁴⁴OPEC, Resolution No XXI.120, (Caracas Resolution), December 1970. For full text of this Resolution see: Middle East Economic Survey, Supplement, (January 1, 1971), pp 1-3.

⁴⁵For the details of proposals and counter proposals presented in these negotiations see: Middle East Economic Survey, Supplement, (February 19, 1971); and Petroleum Press Service, (February 22, 1971).

⁴⁶For full text of the agreement see: Middle East Economic Survey, (February 19, 1971).

2. An annual upward adjustment in the posted price amounting to 2.5 per cent to compensate the producing countries for inflation, plus 5 cents per barrel as an annual increase for the five years of the agreement. These adjustments were agreed to take place on June 1, 1971 and on January 1 for the years 1973 through 1975.
3. Certain adjustments in the prices of various Gulf crudes for the freight and quality disparities which added, in the case of Saudia Arabia's light crude of 34⁰ API for example, a further increase of 5 cents per barrel. When added to the above mentioned increase of 33 cents, these adjustments raised the posted price of Arabian light crude from the long held level of \$1.80 per barrel to \$2.18 per barrel on February 15, 1971.
4. The rate of income tax payable to the host governments was fixed by the agreement at 55 per cent of net profits instead of the old 50-50 arrangement.
5. The agreement also eliminated the marketing allowances and the royalty expensing discounts previously in effect.

The "Tehran Agreement" between the Gulf countries and the oil companies was followed by a similar agreement between the Libyan government and the companies operating in that country. It was signed in Tripoli on March 20, 1971 and became effective on

March 21⁴⁷ providing for identical improvements in the tax rate and posted prices in addition to certain allowances for the gravity and geographical advantages of the Libyan crudes.

Both Tripoli and Tehran agreements were meant to apply until the end of 1975. But neither agreement made provisions to deal with problems which might result from a possible fall in the value of the US dollar which was the currency used for quoting oil prices and for making payments to the host governments. When the international monetary situation deteriorated in the latter part of 1971 and the US dollar was floated (August 15) and then devalued (December 1971),⁴⁸ revenues of the oil producing countries suffered in real terms. As OPEC members felt the adverse effects of these developments on the purchasing power of their oil revenues, they approached the oil companies for a further increase in posted prices to compensate for the declining dollar. Collective negotiations of the OPEC governments with representatives of the oil companies resulted in reaching a settlement signed in Geneva on January 20, 1972. This settlement, which became known as the Geneva I Agreement, was meant to be a supplement to the Tehran Agreement and provided for the following main points:

⁴⁷ Middle East Economic Survey, Supplement, (April 9, 1971).

⁴⁸ The dollar was officially devalued on December 18, 1971 when the official price of gold was increased from \$35 an ounce to \$38 which meant an increase in the price of gold by 8.5% and an actual devaluation of the dollar by 7.9%. See: The Economist, December 25, 1971, pp 67-69.

⁴⁹ For full text of the Agreement, see: Middle East Economic Survey, Supplement, (January 21, 1972), pp 2-8.

1. An immediate increase in the posted prices of 8.49 per cent which approximated the drop that occurred in the value of the dollar.
2. Linking the posted price to a basket of key currencies and adjusting this price quarterly on the basis of fluctuations which may occur between the US dollar and the other currencies.
3. The Agreement became effective on January 20, 1972 and was to apply until December 31, 1975 (the expiry date of the Tehran Agreement).

After the Geneva I Agreement, the position of the US dollar continued to weaken, the currency basket protected OPEC members to some degree. But the United States again reduced the value of the dollar (on February 13, 1973) as other main world currencies increased once again in value.⁵⁰ This devaluation of the dollar was about 10 per cent and was followed by an almost universal floating of leading world currencies which led to major changes in the exchange rate of different currencies against the dollar. As the terms of the Geneva I Agreement were unable to offer enough compensation to the oil exporting countries for the latest dollar devaluation, OPEC called for another round of negotiations with the oil companies to correct the situation.

⁵⁰S Ghanem, The Pricing of Libyan Crude Oil, op. cit., p 203.

Representatives of both the oil companies and OPEC members came back to Geneva and reached an agreement on June 1, 1973. The Geneva II Agreement provided for an immediate increase of 11.84 per cent⁵¹ in the posted price and monthly adjustments of the price based on a more favourable formula utilizing a basket of eleven currencies.⁵²

The shift of power in the international oil industry

The collective agreement of OPEC countries in Caracas to present joint demands for the rise of posted prices and tax rates, their willingness to support these demands by collective action, and the culmination of such demands by the signing of the Tehran and the subsequent Tripoli and Geneva agreements with the oil companies, were positive indications that the balance of power in the international oil business was moving away from the oil companies and in favour of the producing countries. Furthermore, the outbreak of hostilities in the Middle East between Israel and its Arab neighbours in October 1973 gave the Arab oil producing countries (who represent the majority of OPEC members) the incentive to cut back on their deliveries of oil to the pro-Israeli Western oil importing countries. This cut-back in exports

⁵¹This increase was applicable to crudes of the Arabian Gulf countries. For Libyan crude the increase in posted price was 12.5% which was decided in a subsequent agreement between the oil companies and the Libyan government. See: Petroleum Intelligence Weekly, (June 11, 1973), p 3.

⁵²Full text of the Geneva II Agreement was published in the Middle East Economic Survey, Supplement, (June 1, 1973), pp 6-12.

of oil from the Arab countries, which was implemented during the latter part of 1973, created a shortage in world oil supplies which were already short of meeting the increasing world demand for energy. Out of this shortage arose the opportunity for the prices of oil to be raised to whatever levels the exporting countries chose to ask, giving a significant three-fold price increase in the posted prices between October 1973 and January 1974.

The decisions to implement these increases were taken for the first time unilaterally by the oil producing countries. The complete shift of power had, therefore, finally materialised, by the oil producing countries of the Middle East becoming firmly in control of crude oil production and price policies in their oil concessions.

This shift of power over production and price policies in the oil concessions was accompanied by the perhaps even more significant notification of the countries' intentions to disregard the agreements they had previously reached with the oil companies in respect of all essential arrangements of profit sharing and royalty payments, and furthermore to participate in the ownership and operations of the oil industry in their respective territories.

Evolution of the Participation System

The previous discussion has shown that, since the establishment of OPEC and until the early part of the 1970's, the oil producing

countries had been able to make relatively great progress in the way of increasing the benefits to which they became entitled under the concessionary agreements respectively in force in their territories. Over and above the 50-50 profit sharing formula, which they had already obtained before the formation of OPEC, they had during this period succeeded not only in remedying the problem of posted price erosion (itself directly leading to the creation of OPEC), but also in extracting such important improvements as the expensing of royalties, the abolition of allowances from posted prices, and the increases of the applicable tax rates.

These changes were related in the most part to the fiscal aspects of the activities of the foreign oil concessionaire companies. Furthermore, the statutory and regulatory power of the state had from time to time been brought into play, to a limited extent to regulate the activities of the oil companies within the territories of the host countries. However, these regulatory efforts as well as the ability of host governments to make the above mentioned changes in the concessionary financial arrangements were limited to government control of the activities of oil companies from outside.

For this reason, control of the activities of foreign oil companies from within was soon beginning to be the prime target of the oil producing countries of the Middle East. The principle of producing countries controlling their industry from within had long been a cherished goal among nationals of the oil producing

countries of the Middle East and elsewhere. When OPEC was created in 1960, the oil producing countries had already started to show signs of dissatisfaction with the conventional regime of petroleum concessions under which the exploitation of their oil resources was completely dominated by the major oil companies. To regain control of this vital but exhaustible national wealth and resource, had been a sentimental national demand reflecting the many grievances for long held by the peoples of oil producing countries against the privileged and dominant status of foreign oil companies in relation to all petroleum activities.

Some radicals in the producing countries went as far as calling for an immediate and complete nationalisation of the oil industry to regain a full effective control of its activities from within.⁵³ But the idea of immediate nationalisation was dismissed by the major producing countries in the Middle East as impossible in an industry where refining and marketing outlets were controlled by the major oil companies. It was feared that nationalisation, if it was taken by producing countries when supply was more than demand (which was the case during the 1960's), the major oil companies who controlled the refining and marketing facilities would become crude buyers instead of crude sellers, and they would be no longer interested in keeping crude prices

⁵³ Abdullah Tariki, Is it possible to Nationalize Oil in the Arab World? a pamphlet published in (Baghdad : Dar al-Jamahiria Press, 1967). See also Middle East Economic Journal, (November 1, 1968), p 7.

free from deterioration. Competition between oil producing countries would become imminent and this would lead to a drastic collapse of the crude oil price system.⁵⁴ Furthermore, nationalisation of oil companies was dismissed because it was an extremely unfriendly gesture against nationals and subjects of the mainly industrial countries whose expertise and investment were still needed in the oil producing countries. It was also feared that nationalisation might lead to economic and political retaliations, the consequences of which would be harmful to the interests of the oil producing countries and the world in general.

The idea of "participation" was advanced by moderates in the Middle Eastern oil producing countries as an alternative to full nationalisation of the oil industry. The concept of participation itself is not totally new in the oil producing countries. Some forms of participation were already present in the old concessionary agreements between some producing countries and the oil companies.⁵⁵ Such participation provisions were in most cases in the form of an

⁵⁴ These were the views of Ahmen Zaki Yamani, Saudia Arabia's Minister of Petroleum and Mineral Affairs, delivered in a lecture in Beirut, June 1968, entitled "Participation versus Nationalization : A Better means to Survive" reproduced in Z Mikdashi, S Cleland, I Seymour, eds, Continuity and Change in the World Oil Industry, (Beirut : Middle East Research and Publishing Centre, 1970), pp 211-233. Yamani's views on nationalisation were also shared by Ashraf Lutfi, an official of the Kuwaiti government and one time Secretary General of OPEC. See: A Lutfi, OPEC Oil, (Beirut : Middle East Research and Publishing Centre, 1968), pp 39-52.

⁵⁵ Manaa Saeed Al-Otaiba, OPEC and the Petroleum Industry, (London : Croom Helm Ltd, 1975), p 161.

optional right to the host country to acquire a certain percentage of shares in the interests of companies operating within its territory, depending on certain circumstances. But the experience of those countries who had adopted some participation formula in one or more of their concession agreements had not all been on the credit side. In most cases, this was due to the reluctance of oil companies in creating the conditions under which such participation formulas could become effectively practicable.

OPEC's efforts towards participation

It was not until the middle of 1968 that the subject of host countries' participation in the ownership and management of oil activities was adopted by OPEC as a principle of collective official policy for all its member states. OPEC's famous Resolution No XVI.90 was adopted on June 25, 1968 embodying the organization's "Declaratory Statement of Petroleum Policy in Member Countries". In this statement, OPEC stressed:

"... the inalienable right of all countries to exercise sovereignty over their natural resources in the interest of their national development is a universally recognized principle of public law and has been repeatedly reaffirmed by the General Assembly of the United Nations."

"... in order to ensure the exercise of permanent sovereignty over hydrocarbon resources",

OPEC's Resolution states:

"... it is essential that their exploitation should be aimed at securing the greatest possible benefit for Member Countries."

"... this aim can better be achieved if Member Countries are in a position to undertake themselves directly the exploitation of their hydrocarbon resources, so that they may exercise their freedom of choice in the utilization of hydrocarbon resources under the most favourable conditions."⁵⁶

Further, Resolution XVI.90 recommended that:

"Where provisions for governmental participation in the ownership of the concession-holding company under any of the present petroleum contracts has not been made, the government may acquire a reasonable participation, on the grounds of the principle of changing circumstances.

If such provision has actually been made but avoided by the operators concerned, the rate provided for shall serve as a minimum for the participation to be acquired."⁵⁷

It was on the basis of this particular resolution that the next concrete steps began to be taken by OPEC for making a living reality out of the participation issue. Such an issue became a regular item on the agenda of the following OPEC conferences. The basis of participation which OPEC was seeking were not clear until OPEC established a ministerial committee in July 1971, the mandate of which was: "To draw up the basis for the implementation of effective participation by member countries in existing concessions and to submit its recommendation to an extraordinary meeting of the Conference."⁵⁸

⁵⁶ OPEC, Resolution XVI.90, (Vienna, June 25, 1968).

⁵⁷ OPEC, Resolution XVI.90.

⁵⁸ OPEC, Resolution XXIV.135, (Vienna, July 12, 1971). The Committee was composed of the Petroleum Ministers of: Iran, Kuwait, Libya and Saudia Arabia.

The committee laid down the general basis for participation as to give the host countries a share in the ownership and management of the oil concessions already in force in their territories. It recommended that compensation should be paid for the acquired share on the basis of the net book value. Regarding the host countries' share of crude oil produced, the committee recommended that the participation deals should arrange for the lifting of this crude by concession holding companies at a "buy-back" price which should be half-way between the posted price and the tax paid cost.⁵⁹

The ministerial committee submitted its recommendation to the OPEC's XXVth Conference, which was reconvened on September 22, 1971. On this date OPEC's member countries adopted Resolution XXV.139 which reaffirmed their determination to "take immediate steps towards the implementation of effective participation" and called for member countries to "establish negotiations with the oil companies, either individually or in groups, with a view to achieving effective participation on the bases proposed by the Ministerial Committee."⁶⁰

Neither the different OPEC conferences, nor the ministerial committee specified what percentage of participation host countries should seek in the oil concessions. However, other

⁵⁹ Middle East Economic Survey, (January 28, 1972), pp 1-3 and (March 10, 1972), p 2.

⁶⁰ OPEC, Resolution XXV.139, (Beirut, September 22, 1971).

sources indicated that the producing countries had in mind at that time an initial participation target of 20 per cent as a minimum, rising to an ultimate maximum of 51 per cent share in oil concessions.⁶¹

Participation agreements in the Gulf States

The first initiative of negotiation with the oil companies in pursuance of Resolution XXV.139 was taken by the Arabian Gulf States⁶² represented by the Saudi Oil Minister as their chief negotiator. After protracted negotiations with representatives of the oil companies holding concessions in these States, an agreement was initialled in New York on October 5, 1972, over the general principles of government participation in oil concessions in those countries, subject to approval by individual countries concerned. This agreement was mainly over the general principles of participation relating to such matters as the level of participation to be acquired by producing countries, the basis of compensation to be paid to the oil companies, share in capital expenditures required to be contributed by the producing countries, the methods of disposition of the producing countries' share of crude oil and the methods of pricing such a crude. Certain detailed matters were left to be determined by each individual country in direct agreement with the oil company or companies concerned.

⁶¹Middle East Economic Survey, (January 28, 1972), p 3.

⁶²They include Saudia Arabia, Kuwait, Abu Dhabi, Qatar, Iraq and Iran.

Eventually, the above "General Agreement on Participation" was accepted by the governments of Saudia Arabia and Abu Dhabi when the two countries signed the agreement on December 20, 1972. This was followed by Qatar and Kuwait who signed the agreement in January 1973. The agreement became effective in these countries from January 1, 1973.

The general features of the participation agreement that was accepted by the four Gulf States and the oil companies operating in these countries are summarised in the following:⁶³

1. The agreement gave each producing country an initial participation share of 25 per cent in the oil concession held by the oil companies in the country. Such share would escalate annually by 5 per cent from January 1, 1978 allowing the participation level to reach the maximum of 51 per cent by January 1, 1982. (Article III).
2. Compensation to be paid to the oil companies for the acquired participation share should be calculated on the basis of the net book value corresponding to such share in each concession. Definition of this net book value in the agreement provided for an up-dating of the net book value of a company's assets, taking into consideration the rising price level through the period since the assets were acquired. (Article IV).

⁶³"The General Agreement on Participation", The Middle East Economic Survey, Supplement, (December 22, 1972).

3. By the terms of the General Agreement, governments of the participating countries concerned will each have to share with the oil companies the exploration, development and operating expenditure needed to maintain or expand the existing concession capacities. The burden of these expenditures will be according to the participation share. This covers decisions relating to development programmes, capital and operating expenditure, the sale and disposition of assets, the selection of key personnel, and employee-benefits and compensation.

4. The governments of producing countries are entitled, according to the agreement, to a share in the crude oil produced. The quantity of this share is determined according to the percentage of their participation. (Article II, paragraph b). As far as the disposition of this share of crude was concerned, the agreement derived a complicated formula to be applied. According to this formula the government's share of crude oil was divided into three categories as follows:

a. "Bridging Crude" which applies to the proportion of the government's share of crude needed by the oil companies in order to fulfil their already assumed commitments to different clients in the world oil market. The government is obliged to sell this proportion, during the first three years of the agreement, to the oil companies

concerned at a price determined according to an agreed formula. This proportion was specified by the agreement as 75 per cent of the government's share in 1973, 50 per cent in 1974, and 25 per cent in 1975. These are percentages of the government's share each year, (Article V, paragraph d). The pricing formula for "Bridging Crude" places the price to be paid to the government for such crude at a "quarter way" distance between the "tax paid cost" and the posted price for each brand of crude oil, plus a certain number of cents above the quarter way price. According to this formula the per barrel "bridging crude" price (X) is calculated as follows:

$$X = \text{tpc} + 0.25 (P - \text{tpc}) + n \text{ cents}$$

where tpc = tax paid cost which is equal to the royalty paid to the government plus income tax plus cost of production per barrel. P = posted price.

- b. "Phase in Crude" represents the part of the government's crude oil which the oil company is obliged to buy from the government at the latter's request. The government is given the option to sell the "Phase in Crude" to the oil company in case it finds it difficult to dispose of such quantities directly. The quantities of "phase in crude" were limited to 15 per cent in 1973, 30 per cent in 1974, 50 per cent in 1975 and 70 per cent in 1976 of

the government's share. The price of such quantities will be slightly less than the "Bridging Crude" price. It is determined on the basis of the tax paid cost plus a number of cents agreed upon for each brand of crude (between 21-52 cents per barrel). (Article V, paragraph 3).

- c. "Free" crude oil. This is the amount of crude oil which is to be left at the disposal of the state concerned. It represents what is left of the state's share after deduction of both the "Bridging" and "Phase in" crude oil. Such crude will presumably be marketed by the government at whatever price it can realise from the market.

The significance of the conclusion of the General Agreement on participation between the Gulf States and the oil companies was that it was the first time a number of major oil companies collectively agreed to the participation principle. The fact that this agreement was reached by official talks between the companies' representatives and a negotiation team formally designated by OPEC (in pursuit of the organization's Resolutions calling for participation) was also of great significance. It was the first occasion on which the oil companies were willing to openly and formally recognise OPEC and acknowledge its representative role in relation to the course of petroleum affairs in member countries. Such a role had long been rejected by the oil companies who formerly refused to deal with OPEC

except on a de facto basis.

OPEC's resolutions on participation which were mentioned above were originally meant to apply to all interested member countries, in the sense that they were not intended to be confined to any one state or group of states. Participation thus being made optional, and not obligatory, it was left to each member country at its own discretion and against the background of its own special circumstances, to adopt the attitude which it deemed appropriate in this respect. The Conclusion of the "General Agreement on Participation" in the Gulf States opened the way for other producing countries to pursue negotiations for participation with their concessionaries on an individual basis. With the drastic changes which had taken place in the international oil market throughout 1973 (mainly during the second half of 1973) strengthening the bargaining position of the producing countries, such countries saw the opportunity of formulating better conditions in their participation schemes than those embodied in the "General Agreement" between the Gulf States and the oil companies. One of the oil producing countries who did this was Libya. Major participation agreements between the Libyan government and the oil companies holding concessions in the country were concluded during the latter half of 1973.

Participation agreements in Libya

The pattern of Libya's major participation agreements emerged when the government declared on August 11, 1973 a partial

nationalisation of 51 per cent of Occidental Corporation's concessions in the country.⁶⁴ The company immediately declared its "acquiescence" to the government's decision, signing on the next day an agreement with the government. However, the government's nationalisation decision was no more than a participation formula which had already been negotiated by the two parties, and although its announcement came in the form of a nationalisation decree, it was, in fact, a participation agreement.⁶⁵

According to the "decree/agreement",⁶⁶ the Libyan government acquired 51 per cent ownership of the company's concessions in the country and the acquired share was assigned to the government-owned National Oil Corporation. Compensation for this acquired share was paid to Occidental on the basis of the "net book value" of the company's assets. Such compensation amounted to \$135 million and was paid in cash. According to the agreement, the company had the right to purchase all the Libyan share of crude production for the duration of the original concession agreements for a "buy-back" price which was to be determined periodically (every six months) by mutual agreement and on bases of prevailing market

⁶⁴Law No 44/1973, "Nationalizing 51 per cent of Occidental of Libya Inc", issued in Tripoli, August 11, 1973.

⁶⁵Middle East Economic Survey, (August 17, 1973), p 3.

⁶⁶An expression used by The Middle East Economic Survey to refer to the Libyan participation agreement. Full text of the agreement appears in the MEES, Supplement, (August 17, 1973).

conditions. For the first six months following the agreement the "buy-back" price was agreed to be \$4.90 per barrel (of 40° API). This price was at the time of the agreement higher than the posted price (which was \$4.582 per barrel) mainly because posted prices were lower than market prices for crude oil.⁶⁷

According to the agreement, Occidental continued to be the operator of the concessions, and a management committee was established to supervise the operations in which the Libyan partner was to be represented by two members including the chairman, while the foreign company was to be represented by one member. Although decisions of the committee were to be taken by majority, the foreign partner had the right, according to the agreement, to dissociate itself from any new exploration or development operations in the oil concessions if such an operation was initiated by the Libyan representatives.

This agreement between Occidental and the Libyan government set the pattern for the participation deals which were to follow with other international companies operating in Libya.

On August 17, 1973, three more companies signed similar participation agreements with the Libyan government. These companies were Marathon Petroleum Libya, Continental Oil Company

⁶⁷"Key crude oil price posting around the world", Petroleum Intelligence Weekly, (December 31, 1973), p 11.

and Amerada Petroleum Corporation. By September 1973 the government had nationalised 51 per cent of the rest of the oil companies operating in Libya and the majority of them signed similar participation agreements with the government. A few companies who refused to accept the government participation deal were completely taken over by the Libyan government raising the level of government share in the oil industry above 51 per cent.

The main features of the participation scheme in Libya are summarized in the following:

1. The Libyan participation scheme gave the government the right to acquire through its National Oil Corporation (NOC) a minimum of 51 per cent ownership interest in the crude oil and natural gas facilities of foreign oil companies operating in Libya. Because of the rejection of this participation scheme by some of the companies, their interests were completely taken over by the government through subsequent nationalisation decrees raising the government share in some concessions to levels higher than the original 51 per cent level sought by the government. The facilities acquired by the government's NOC included the specified share in all exploration, development, production, pipelines, storage, delivery and export facilities owned by the concession holders in Libya.
2. Compensation payable to the concession holders for the

acquired share was to be calculated on the basis of the net book value of the companies' assets. However, the methods of payment were negotiated with individual companies and differed from one company to another.

3. By the term of the participation agreements, the National Oil Corporation would have to share with the international oil company or companies concerned all the expenditures needed to maintain or expand existing facilities. Such share depended on the participative level acquired by the government in each company. Furthermore, the government's share of this burden might increase when the decision of making an expenditure was initiated by the government's representatives in the managing board of directors and when the foreign partner chose to dissociate itself from such a decision (a privilege provided for by the agreements).
4. The Libyan government was entitled by the terms of the agreements to receive a share of crude oil produced from the concession. This share was determined according to the participation percentage. However, the government's share of crude oil was to be sold back to the foreign partner at a buy-back price determined from time to time by mutual agreement with regard to market conditions.
5. The foreign companies' share of crude oil (49 per cent) would be subject to royalty and income tax payments on the basis of the original concessionary scheme. Under the

traditional concessionary formula royalty and income taxes were determined on the basis of posted prices applicable to each type of crude at the time of exporting such crude. This formula as it applied to the foreign companies' share of crude remained unaffected by the participation agreements.

Main difference of participation arrangement in Libya and the Gulf States

The pattern of the Libyan participation agreements was little different from those previously agreed in the Gulf countries as might be noticed from the above discussion. Such differences were mainly in two areas:

1. The government share: while the Gulf countries started with 25 per cent shares in 1973 and the participation agreements provided for a gradual increase to reach 51 per cent by 1973, Libya acquired the 51 per cent share immediately.
2. The base of compensation: the Libyan agreements set the compensations to be made to the oil companies according to the net book value of the companies' assets, while in the Gulf countries the compensation was more than that. It was based on the updated book value of the companies' net assets.

The participation agreements both in Libya and in the Gulf States guaranteed to the oil companies the continuous supply of crude oil on a preferential basis. However, after the Libyan

participation deals emerged, the Gulf countries soon began negotiations with the oil companies to modify the participation arrangements in accordance with the Libyan deals. As a result of these negotiations Kuwait raised its participation share from January 1974 to 60 per cent and the companies agreed to receive their compensation on the basis of the net book value instead of the updated book value provided for by the original "General Agreement on Participation". Similar agreements between the companies and Saudia Arabia and the rest of the Arabian Gulf States followed, raising each government's share in the oil industry to 60 per cent.⁶⁸ The trend is perhaps towards a complete takeover by the host governments of the remaining share of the international companies with some arrangements for the continuous flow of crude oil to these companies.

Developments in the Structure of Company/

Country Relations after Participation

Participation as described above has not completely abolished the old regime of petroleum concessions. This is true in Libya as well as in the other oil producing countries who entered into similar arrangements providing for the continued existence of the original concessionaire-companies as partners to the host government. Although, by participation the host

⁶⁸Fadel Al-Jalabi, "Basic structural changes in the international oil industry", Selected Studies in the Oil Industry, (Kuwait : OAPEC, 1979(in Arabic), p 33.

government acquired a share in the assets and production of oil concessions held in the country and the income from the government's interest became determinable on a different basis, the provisions of the old concessionary system continued to be applicable to the companies' share of operations to the extent not taken by the government. The companies' share of oil production, therefore, remained subject to royalty and tax payments and the use of posted prices for their calculations in accordance with the old concessionary arrangements. Provisions of the participation agreements themselves did not stipulate any changes in the rates of royalty or income taxes payable to the government, nor did they touch the question of how "posted prices" would be determined. However, certain developments that followed the introduction of the participation system have resulted in remarkable changes in royalties, taxes, prices and in the whole structure of company/country relations in the oil industry.

At the time when the participation system was seriously considered and subsequently adopted up until September 1973, the norm of determining posted prices and other financial arrangements between the oil producing countries and the operating international companies was that of negotiations and mutual agreements. Previous agreements between the companies and their host governments had set the royalty and tax rates at 12.5 per cent and 55 per cent respectively. The posted prices were fixed by the previously reached agreements (Tripoli, Tehran and Geneva Agreements) at levels which although allowed for certain adjustment, could not

keep pace with the increasing market prices for crude oil. The oil producing countries, feeling that these agreements were "no longer compatible with prevailing market conditions"⁶⁹ started approaching the oil companies for revisions of the pricing structure but failed in getting a positive response from the companies.⁷⁰

By October 1973, the structure of company/country relationships started to take a new shape. This was a direct result of the dramatic changes which took place in the international oil situation following the Arab Israeli War which broke out on the Sixth of October. Oil was used by the Arab oil producing countries as a political weapon against countries who supported Israel. This included a cut-back on their production and an embargo on oil exports to certain countries. Such action created havoc in the international oil market and raised the market prices of crude oil to an unprecedented level. The oil exporting countries, who were already attempting unsuccessfully to reach an agreement with the oil companies over increases in their posted prices, found this situation a suitable opportunity to take the decision of such an increase unilaterally for the first time. On October 16, 1973 posted prices were raised by 70 per cent. Additional increases followed during the latter part

⁶⁹ OPEC Communique issued September 16, 1973. Middle East Economic Survey, (September 21, 1973), p 4a.

⁷⁰ S Ghanem, The Pricing of Libyan Crude Oil, op. cit., p 218.

of 1973 and by early 1974 the posted prices in all oil exporting countries reached three-fold its level of early October 1973.

Although the War and the embargo may be considered as the direct cause for the new level of posted prices, it should be noted that the increase of the price of oil was expected to take place even if the War and the embargo had not materialised. A few weeks before the War, OPEC held an extraordinary meeting in Vienna on September 15-16, 1973. In their communique, the member countries decided that the level of posted prices and the annual escalation provided for by previous agreements with the oil companies were "no longer compatible with prevailing market conditions as well as the galloping world inflation". They urged the member countries "to negotiate individually or collectively" with the oil companies with a view to revising prior arrangements and adjust the structure of posted prices.⁷¹ For this reason, representatives of the oil exporting countries in the Gulf area were to meet with oil company representatives on October 8, 1973 in Vienna.⁷²

The Vienna meeting between oil companies and producing countries of the Gulf took place on October 8, 1973 - two days after the outbreak of hostilities in the Middle East - without reaching an agreement. Shortly after this meeting, the oil

⁷¹Text of OPEC Communique, Middle East Economic Survey, (September 21, 1973), p 4a.

⁷²New York Times, (September 17, 1973), pp 1 and 50.

ministers of the Gulf States met in Kuwait (October 16, 1973) and took the first unilateral decision of raising the posted prices of crude oil exported from the Gulf area by 70 per cent from the price that had prevailed on October 1, 1973. In effect, the Ras Tanura crude of Saudia Arabia which was used as a base for posting other crudes was raised from \$3.011 per barrel on October 1, 1973 to \$5.119 effective October 16, 1973.⁷³ All other crudes were raised accordingly.

Although this increase in posted price was a sizeable one, it was less than the OPEC experts had expected before the War.⁷⁴ Therefore, the new posted prices did not last long. However, the importance of this price increase was not in its magnitude but in establishing a new and very important principle. For the first time in the history of oil concessions, producing countries in the Middle East assumed the function of establishing posted prices unilaterally. This principle of unilateral fixing of posted prices by producing countries was a precedent which has influenced the relationships between the oil companies and the host countries during the following years. Producing countries became able to extract additional benefits from crude oil produced in their territories by the international companies through adjustments in posted prices as well as in other financial arrangements. They

⁷³Text of the Gulf States Communique, Petroleum Intelligence Weekly, (October 22, 1973), p 9.

⁷⁴Petroleum Intelligence Weekly, (October 15, 1973, p 1, and (October 22, 1973), p 10.

became able to force the oil companies to pay increased taxes and royalties which they did in the following years.

The ability of the oil producing countries to dictate their terms was a result of new realities in the international oil market. The October War took place at a time when the oil market had been gradually but steadily, since the beginning of the decade, undergoing a process of transformation from a "buyers market" to a "sellers market".⁷⁵ This transformation was coupled with the increasing dependence of the international market on supplies coming from OPEC. Furthermore, an increasing proportion of internationally traded oil became marketable outside the traditional dominance of the major oil companies. Although this proportion was small at the beginning, it opened the door for a free market in the international oil industry in which the oil producing countries successfully tested their ability to market crude oil placed at their disposal by the participation agreements.⁷⁶ When the embargo of exports and the cut-backs of the Arab oil production were instituted, the supplies of crude oil fell short of meeting demand in the international oil market. Oil companies needed the crude oil badly, and competing against each other,

⁷⁵ Geoffrey Chandler, "Oil in the Seventies", Middle East Economic Survey, Supplement, (August 6, 1971). See also: "End of buyer's market", Petroleum Press Service, (January, 1971), pp 2-3, and Fadel Al-Jalabi, "Basic structural changes in the international oil industry", op. cit., pp 38-50.

⁷⁶ Fadel Al-Jalabi, op. cit., p 55.

thus, sending the market prices for crude oil sky high, found themselves in no position to challenge the producing countries. This situation gave the oil producing countries unprecedented power to dictate their terms to the oil companies. Such power was manifested by the ability of producing countries to introduce significant increases in posted prices to keep pace with the escalating market prices. The oil producing countries were also able to acquire additional benefits through the introduction of higher royalty and tax rates, a higher royalty rate of 14.5 per cent was adopted in July 1974 and from October 1, 1974 this rate was increased again to 16.67 per cent which is still effective up to the present. Tax rates were also raised to 60 per cent of companies' net profits. These rates apply to the foreign companies' share of production and, together with the applicable posted prices, they form the basis of determining the government's net revenues from the foreign companies' share of crude oil (a feature of the concessionary scheme still applicable to such crude).

CHAPTER IV

REVENUES FROM THE OIL INDUSTRY AND

THE RELEVANT ACCOUNTING PRINCIPLES

The aim of this chapter is to study the structure of the Libyan government's revenues from oil under the concessionary form of country/company relationships and to discuss some of the general accounting principles relevant to the computation of income in the oil industry. The financial benefits accruing to a host country, in general, from petroleum operations may include, in addition to revenues derived by the state, other incomes received by local workers, contractors, suppliers, etc for services rendered by them to the industry. But the emphasis in this inquiry is placed on government's income which has been the major area of disputes between the operating oil companies and host countries.

As the government is the sole receiver within the country of royalties and levies on the outcome of petroleum production and sales, the government's income in these forms represents the main financial reward to a host nation from petroleum concessions. This position stems from the fact that the ownership of all underground hydrocarbon resources, in Libya and in most of the oil producing countries, is being commonly vested in the state; the exploitation of these resources has generally been entrusted under the concessionary system to foreign

companies whose prime objective is presumably to maximize returns transferred to their owners is the home country. In Libya, the Petroleum Law stipulates that:

- "A - All petroleum in Libya in its natural state in strata is the property of the Libyan state.
- B - No person shall explore or mine or produce petroleum in any part of Libya unless authorized by a permit or concession issued under this law."¹

Libyan petroleum activities began, as previously pointed out, in the middle of the 1950's within the framework of the traditional concessionary arrangements which were the norm of the petroleum industry in the Middle East and elsewhere. The general features of these arrangements have already been discussed in Chapter III. When the first crude oil production and sales from Libyan concessions commenced during the latter part of 1961, the Libyan government started receiving its share of revenues from the outcome of this oil according to the provisions of the concessionary scheme.

Forms of the Government's Revenues from the Oil Industry

The government's revenues under the concessionary system were derived mainly in the form of royalty payments and income tax on the profits of concession holders in the country. These two elements of payments represented the main source of the government's revenues from oil produced and sold under the

¹Petroleum Law No 25/1955, Article 1

concessionary scheme. Although the government is also entitled to receive some other forms of payments from concession holders, such as concession acquisition fees and annual rentals of concession areas, but these payments can be ignored here for two reasons; first, they are insignificant in comparison to total governmental revenues from oil operations; second, when these payments are made, a major portion of them becomes deductible from royalty and taxes payable to the state as will be noted later in this chapter.

Up to 1972, the Libyan government drew its income from the operating oil companies, mainly in the form of royalties and income taxes on companies' profits. The oil concessions were totally owned and operated by international companies who, according to the concessionary system, assumed all the responsibilities of petroleum activities from the initial exploration stage to the final marketing of produced oil. Similarly, under this system, the oil companies were bearing all the burden of financing their operations in the concessions as well as all the risks involved in them. But since the government entered, through the participation agreements, into the oil business as a partner to the international companies in 1973, it started receiving another form of income from the industry. As an owner of a part of the oil concessions, the government became entitled to a share in petroleum production and equally sharing the costs of financing the operations. The part of production which the government became entitled to accordingly, became marketable by

the government (or its national corporation) and the net profits derived from this production provided the government with a new form of income from the oil industry. However, the international companies continued to pay royalties and income taxes to the government on their share of production (their equity oil) from the partnership.

The continued application of the concessionary formula in determining the government's income from a portion of the country's oil production (the foreign partner's share of production) offers the opportunity to evaluate the two comparative systems on a somewhat factual basis. This evaluation and whether or not the participation formula has been more rewarding to the Libyan government in terms of net revenues will be taken up in Chapter VI. The discussion in this chapter is concerned with main variables determining government's income from oil operations and the related accounting principles.

General Basis of Determining Government Revenues under the Concessionary Formula

As previously pointed out, government revenues from producing oil companies under the concessionary system were drawn mainly in the form of royalty payments on production and income taxes on the profits of oil companies. In Libya, the general principles of determining these payments were provided for in the Petroleum Law according to which petroleum concessions were granted to the international oil companies operating in the country. Such

principles were also incorporated in the concessionary agreements themselves. According to the Libyan Petroleum Law, concessionary contracts were granted on a uniform basis to all companies wishing to operate in Libya. A standard concessionary agreement was annexed to the Petroleum Law.²

Furthermore, the Law authorized the oil minister to issue any administrative, financial or other regulations necessary for the implementation of the Law.³ A number of such regulations were issued by the oil minister in this capacity. The most important of which in relation to determining the government's revenues were Regulation No 6⁴ and Regulation No 9⁵. Reference to such regulations will be made in this study as appropriate.

According to the provisions of the Petroleum Law and the concessionary agreements as well as the ministerial regulations, determination of the government's receipts of royalties and income tax from the oil companies were made dependent on a number of variables as follows:

²Appendix 2 of the Petroleum Law No 25/1955.

³Petroleum Law No 25/1955, Article 14.

⁴Petroleum Regulation No 6 was issued in 1961 and published in the Official Gazette No 18, (December 1961).

⁵Petroleum Regulation No 9 was issued in 1973 to substitute for Regulation No 6.

1. volume of petroleum production and exports (or sales)
2. posted prices
3. royalty structure
4. income tax structure
5. costs of production and operations.

A brief description is to be given below of each of these variables.

The volume of petroleum production

The volume of crude petroleum production is largely dependent on the bounty of nature and the richness of the discovered fields underground. Having completed a technically efficient development of a particular field in terms of wells and production facilities, its periodical production will be dependent on its technical capacity qualified by the producer's policies of adjusting this production to other external (non-technical) factors such as economic considerations as well as governmental regulations. Production policies in Libya were for some time determined solely by the operating companies. This prerogative was guaranteed to the companies by the old concessionary agreements in Libya and elsewhere. Although OPEC, after its formation, attempted to regulate production among member countries in order to stabilize the price of crude oil at desirable levels, the organization's attempts failed. Disagreement among member countries about how a production program should be designed and implemented was the main reason of this failure. The idea of production programming

by host countries was met with strong opposition from the international oil companies who saw it as a violation of the terms of the concession agreements which gave the companies full managerial freedom in deciding volumes of production and exports.⁶

Libya, whose first commercial production of crude oil had only started in late 1961 - after the first discovery in the country was made by one of the operating companies (Esso Libya) - saw a rapid expansion in the volume of production during the following years. This was due to additional discoveries made by various operators in the country who were encouraged by the attractive conditions of their Libyan concessionary agreements and by the quality and geographical advantages of the Libyan crude. The operating companies intensified their exploration and development activities and production of Libyan crude increased with great rapidity unprecedented in the older producing areas of the Middle East. This was the norm of petroleum production until 1970 which resulted in the enormous growth in the volume of production shown in Table IV-1. This trend seemed to have been favoured by the Libyan monarchical government ruling the country at that time. But when, in 1971, the production policies were reversed by the new revolutionary government's enforcement of some conservation measures, the trend

⁶Zuhayr Mikdashi, The Community of Oil Exporting Countries, (London : George Allen & Unwin Ltd, 1972), pp 111-136.

Table IV-1

Libyan Oil Production (1961-1979)

Year	Total Annual Production Millions bbl	Average Daily 000's bbl	Annual % Change
1961*	6.641 886	54.4	
1962	67.132 887	183.9	+238.1
1963	169.235 357	46.6	+125.0
1964	315.621 938	864.7	+ 86.6
1965	445.373 963	1,220.2	+ 41.1
1966	550.156 081	1,507.3	+ 23.5
1967	636.503 907	1,743.9	+ 15.6
1968	952.356 914	2,609.1	+ 49.6
1969	1,134.838 571	3,109.1	+ 19.1
1970	1,211.072 875	3,318	+ 6.7
1971	1,007.686 906	2,760.8	-(16.8)
1972	819.619 322	2,239.4	-(18.89)
1973	794.094 417	2,174.9	- (2.88)
1974	555.291 024	1,521.3	-(30.05)
1975	540.129 277	1,479.8	- (2.7)
1976	707.335 161	1,932.6	+ 30.9
1977	753.129 597	2,063.4	+ 6.7
1978	723.638 046	1,982.5	- (3.9)
1979	763.556 694	2,091.9	+ 5.5

* September-December 1961

Sources

Figures for 1961-1971, Ministry of Petroleum, Libyan Oil 1954-1971, (Tripoli : The Republic's Printing Press, 1972), p 73.

Figures for 1972-1979, Ministry of Petroleum, Oil and Gas Statistics, published annually, various issues.

of production was curbed. Production volume was cut from 3.3 million barrels per day in 1970 to 2.7 million in 1971. These cuts were ordered by the government who started the gradual implementation of a new regulation aimed at preventing oil fields from rapid exhaustion.⁷ The enforcement of these conservation measures began at the time when the government was attempting to negotiate with the operating companies an increase in the posted price and improvements in the financial arrangements of the concessionary agreements. The production cuts were partially used by the government to pressure the oil companies to accept its demands for a higher income from oil.⁸

The conservation measures taken by the Libyan government were based on technical factors related to each oil field and were aimed at limiting the daily production to what is known in the oil industry as "the maximum efficient rate of production". This rate is usually calculated by engineers utilizing the technical features of each field in order to assure the maximum possible recovery throughout the life of the field. Engineers of the Ministry of Petroleum made a study of the various Libyan fields and recommended the maximum production rate that should be observed for each field. These rates were far below what the

⁷ Petroleum Regulation No 8 for the Conservation of Petroleum Resources.

⁸ S Ghanem, The Pricing of Libyan Crude Oil, (Malta : Adams Publishing House, 1975), p 151.

companies were producing up to 1970.⁹ As these production rates were fully enforced by the government, the volume of production declined further in 1972 (by about 19 per cent from the 1971 level). The general trend of declining production continued in 1973 and 1974 due to the oil embargo and production cuts enforced by Libya and the other oil producing countries after the Arab Israeli War of October 1973. Although the embargo was lifted by the end of the first quarter of 1974, the slow-down in market demand for oil, which began in the second half of 1974 and persisted through a good part of 1975, resulted in a continued decline in Libya's volume of production to reach its lowest level in 1975. Total production from the Libyan fields was in 1975 about 540 million barrels, less than half of the 1970 level. However, production of crude oil started to take an upward trend after 1975 but remained below the peak of 1970 (see Table IV-1).

The importance of the volume of crude production in calculating the government's take from oil companies is that it is the basis of determining the royalty payment. Royalty payable by each company to the Libyan government is computed as a percentage of the company's crude production each period regardless of

⁹Abdulhai Ben Omran, "Technical and economic factors and their role in determining petroleum production volumes", a lecture delivered in The Oil Industry Seminar held at The University of Libya, Benghazi, (November 25-28, 1972).

whether the crude was sold or not. The government is entitled to receive the due royalty either in kind or in cash - valued at the applicable posted price. Crude production volume is measured for this purpose as the recovered crude goes to the field storage facilities after being treated for the separation of associated gas, water and foreign substances. The only quantities of production exempted from the royalty levies are those which are used by the company in the course of its operations in the field.¹⁰

The volume of petroleum exports

Table IV-2 shows the annual crude oil exports from Libya during the period 1962-1979 and the respective shares of foreign companies and government corporations in these exports. The volume of annual exports has generally followed the pattern of production since most of the Libyan production is exported in the form of crude oil (see Figure IV-A). The figures in Table IV-2 represent actual shipments from Libyan terminals each year. In calculating the income tax payable to the government by an oil company under the concessionary formula, quantities of oil exported by the company are considered sales subject to such tax whether they were destined to customers or to the producing company's affiliates. However, quantities of crude oil included in computing taxable income were defined in the Libyan legislation in a rather wider concept. They include the following:

¹⁰ Petroleum Law No 25/1955. Article 13, paragraph 1.C; and Concessionary Agreement, Clause 7, paragraph 1.

Table IV-2

Libyan Oil Exports (1961-1979)

Year	Annual Exports			% Change of Total Volume
	Foreign Companies	Government Companies	Total	
	mill bbl	mill bbl	mill bbl	
1961*	5.2	-	5.2	
1962	65.4	-	65.4	+ 1,157
1963	167.7	-	167.7	+ 156
1964	313.8	-	313.8	+ 87
1965	442.6	-	442.6	+ 41
1966	547.3	-	547.3	+ 23
1967	627.1	-	627.1	+ 14.5
1968	945.1	-	945.1	+ 31.8
1969	1,120.4	-	1,120.4	+ 18.5
1970	1,208.9	-	1,208.9	+ 7.8
1971	1,002.7	-	1,002.7	- 17
1972	785.5	24.8	810.3	- 19.1
1973	603.1	189.9	793.0	- 2.1
1974	245.3	298.6	543.9	- 31.4
1975	191.5	330.8	522.3	- 3.9
1976	238.2	434.6	675.8	+ 29.3
1977	236.2	473.0	709.2	+ 4.9
1978	240.4	436.6	676.9	- 4.5
1979	238.8	478.8	717.6	+ 6.0

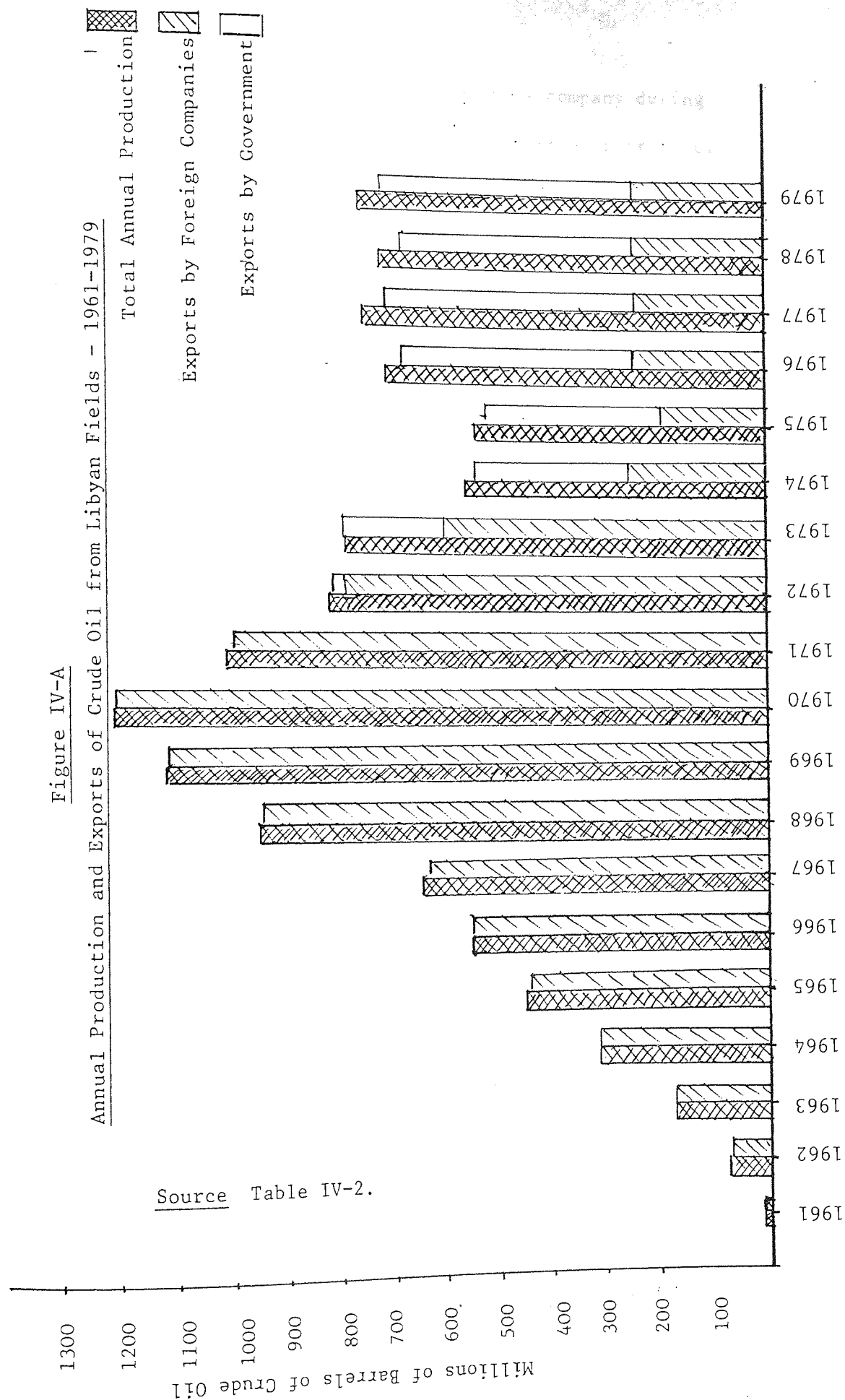
* September-December 1961

Sources

Figures for 1961-1971, Ministry of Petroleum, Libyan Oil 1954-1971, op. cit.

Shares of foreign companies and government companies in total exports for 1972-1973 obtained from the Auditor General's Office Report 1976.

Other figures for 1972-1979 from Ministry of Petroleum, Annual Oil and Gas Statistics, various issues.



- a. All crude oil exports shipped by a company during the year whether the shipment occurred prior to or after the sale.¹¹
- b. Any crude oil delivered to the government in settlement of royalty in whole or in part "if such crude oil is delivered to the Libyan government ... for export."¹²
- c. Thirty per cent of the crude oil delivered to the government for the purpose of refining for local consumption.¹³
- d. Any crude oil sold or lent to another company in Libya and any borrowing returned to a lender during the year in which the sale, the lending or the returning took place.¹⁴

¹¹Petroleum Law No 55 of 1955, Article 14, paragraph 1.D.

¹²Ibid.

¹³Crude Oil Purchase Agreement between the Libyan government and the producing companies of May 1971. The agreement provided that, the government can buy from the oil companies quantities needed for local consumption according to the proportionate share of each company in total production. Special pricing arrangements were agreed to apply to such oil. 30% of the quantity bought by the government is priced at the applicable posted price. The remaining 70% is priced on the basis of average cost plus an agreed fee of about 5 US cents per barrel.

¹⁴Petroleum Regulation No 9, Articles 24, 25.

The posted price

Valuation of petroleum production and exports for the purposes of determining royalty and income tax payments due to the government under the concessionary formula is based on the applicable posted price. The posted price in Libya and elsewhere is usually quoted in US dollars per barrel of crude oil. The Libyan posted price is fixed for the base crude of 40° API gravity,¹⁵ and the applicable prices for crudes of different grades are adjusted by adding or deducting certain US cents per barrel for each degree above or below 40° API.

As posted prices are subject to changes from time to time, the law provides that it is the posted price prevailing at the time of completing each shipment of crude oil which should be used in valuing the shipment for the purpose of arriving at the taxable income.¹⁶

¹⁵ API gravity stands for gravity according to the scale used by the American Petroleum Institute. This is a measure of the quality of oil which is based on the "specific" gravity (or density) of the particular crude; the lower the specific gravity, the higher is the API grade and the better is the quality of crude and vice versa. The API gravity is related to the specific gravity by the following equation:

$$\text{API Gravity} = \frac{141.5}{\text{Specific Gravity (at } 60^{\circ} \text{ F)}} - 131.5$$

See: The British Petroleum Company Ltd, Our Industry Petroleum, (London : BP Co Ltd, 1970), p 160.

¹⁶ Petroleum Regulation No 9, Article 19, paragraph 1.

The subject of posted prices, as previously pointed out was the main area of disputes and controversies between the government and the oil companies. This was true not only in Libya but in all the oil producing countries who have similar concessionary agreements with foreign oil companies. When oil production from Libyan concessions started during the early part of the 1960's, posted prices were fixed by the oil companies who were in control of the international oil market. The oil companies had already effected the famous reductions of Middle East oil prices of 1959 and 1960 (discussed in Chapter III) and managed to retain a freeze in the reduced posted prices throughout the decade despite attempts from the host countries to revise them. The first Libyan posted price was established in 1961 at \$2.23 per barrel for the Libyan base crude of 40⁰ API. This price was fixed by the first company to start production from Libya (Esso Libya) and was based on the prevailing posted prices of other Middle Eastern crudes with some allowances for the quality and geographical premium of the Libyan oil. The same price was adopted by the other Libyan producers who followed Esso. No changes occurred in this basic price which remained applicable in determining governmental income from the companies until the end of 1970.

By 1971 negotiations between the government and the oil companies began to put the posted price on the upward trend. Several increases in the posted price were reached by negotiations which gradually raised the Libyan posting from

\$2.23 per barrel in 1970 to \$4.582 by the middle of 1973 (Table IV-3). Later on, when the balance of power in the international oil industry moved away from the oil companies and the producing countries became in control of oil policies, the bilateral fixation of posted prices was replaced by unilateral action. Following the escalation in market prices after the Middle East War (of October 1973), posted prices were raised a number of times to bring the Libyan posting by January 1, 1974 to the unprecedented high level of \$15.768 per barrel (Table IV-3). Ever since, and except for a slight decline in 1975 and in 1978, the posted price has been rising in current dollars as shown in Table IV-3. These posted prices have since late 1973 been fixed by the government in accordance with OPEC's decisions. The structure of such prices and their impact on the government's revenue from the oil industry will be discussed in more detail in the next chapter.

Royalty

Conceptually, the royalty is distinct from taxation and is regarded as the share of the landowner in the oil produced, whether the landowner is a private citizen, as in the US, or the state, as in most of the oil producing countries. This royalty is economically justified as "compensation paid to the owner of an exhaustible asset for its capital value which reduces by exploitation."¹⁷

¹⁷ L C Gray, "Rent under the assumption of exhaustibility", Quarterly Journal of Economics, (May 1914), p 466.

Table IV-3

Posted Prices of Libyan Crude Oil

40° API Gravity

Period	\$ per barrel
1961 -	2.230
1/9/70 -	2.530
1/1/71 -	2.550
21/3/71 -	3.447
1/7/71 -	3.423
1/10/71 -	3.399
1/1/72 -	3.386
20/1/72 -	3.673
1/4/72 -	3.642
1/7/72 -	3.620
1/1/73 -	3.783
1/4/73 -	4.043
1/6/73 -	4.252
1/7/73 -	4.416
1/8/73 -	4.582
1/10/73 -	4.604
19/10/73 -	8.925
1/11/73 -	9.061
1/1/74 -	15.768
1/4/75 -	15.000
1/6/75 -	14.600
1/10/75 -	16.060
1/7/76 -	16.350
1/1/77 -	18.250
1/7/77 -	18.780
1/1/78 -	18.340
1/4/78 -	18.710
1/1/79 -	19.250
21/2/79 -	20.210
3/3/79 -	21.200
1/4/79 -	24.280
16/5/79 -	25.280
27/5/79 -	28.530
1/7/79 -	31.620
15/10/79 -	35.530
13/12/79 -	40.800

Source

Ministry of Petroleum, Tripoli.

In Libya, as in most other countries, by law, all the subsoil wealth, insofar as it is a natural resource, is considered the property of the state regardless of who owns the surface land. Accordingly, the government is the only beneficiary from the royalty. Following the modern and fairly generalized practice, instead of being stated in terms of a definite sum per unit of production, the oil royalty was stated in the form of a percentage of petroleum production. The Petroleum Law in its original form as well as the original concessionary agreements stipulated that the concession holders should pay a royalty of 12.5 per cent of the value of all the petroleum recovered from a concession area; this rate is equivalent to one-eighth, traditionally paid to the private landowner in the US.¹⁸ The law gave the government the option to receive the royalty either in kind or in cash, based on the posted price.¹⁸ But the government, considering that the posted price was generally higher than the realized market price, has generally been cautious of using its prerogative of receiving the royalty in kind.

Although the government was continuously pressing the oil companies to raise their payments to it from petroleum produced in the Libyan concessions, the rate of royalty remained

¹⁸C A Smith and H R Brock, Accounting for Oil and Gas Producers, (Englewood Cliffs, NJ : Prentice-Hall Inc, 1959), pp 121, 407.

¹⁹Petroleum Law, Article 13.

unchanged from the beginning of production until 1974. In July 1974 the first increase in the rate of royalty was introduced in the Libyan concessions, raising this rate to 14.5 per cent. This increase was based on a decision of OPEC to adopt a higher rate of royalty in member countries²⁰ which the Libyan government introduced from July 1, 1974. The second increase in the royalty rate came three months later when the new rate of 16.67 per cent was adopted, effective October 1, 1974²¹ and has remained the applicable rate until the present.

Income tax

In addition to royalty payments, the concessionary formula provides for the payment of an income tax on companies' profits. The original concessions granted in Libya were based on the 50-50 profit sharing principle which was the pattern of payment to the host countries in the Middle East. Although the concessionary agreements specified the government's right to receive 50 per cent of the producing companies' net profits from crude oil sold from Libyan concessions in the form of tax levies, they made royalties and other dues paid to the government a credit against the 50 per cent tax. Thus, tax payments were added to royalties and other payments to bring the total entitlement of the government

²⁰OPEC Resolution No XL-171 of June 15, 1974.

²¹Law No 76 of 1974 amending certain provisions of the Petroleum Law No 25 of 1955, issued October 21, 1974.

to a maximum of 50 per cent of the concessionaires' net profits from Libyan operations. This was the procedure despite the fact that income tax, being based on the element of national sovereignty, is quite different from royalty, exaction of which is based on the direct state ownership of oil resources.

However, this situation was changed in 1965 when the OPEC formula of expensing royalties was adopted in Libya. The Libyan Petroleum Legislation as well as the concessionary agreements with the operating companies were amended to accommodate this formula. According to the adopted formula, the 12.5 per cent royalty was no longer accounted as a tax credit, but rather a cost deductible from taxable income. Consequently the government became entitled to receive 50 per cent of the companies' net profits in addition to the royalty resulting, thus, in an additional income to the government.

The introduction of OPEC's formula of expensing royalties was accompanied as indicated earlier with certain adjustments in the posted price used for calculating taxable income. These adjustments were meant to moderate the effects of the new procedures on the oil companies and to make the expensing of royalties rather gradual. Therefore, the oil companies were allowed to make certain agreed discounts from the posted price. These allowances as applied in the Libyan concessions as well as the resultant increase in government revenues affected by the expensing of royalty procedure will be discussed in more detail in the following chapter.

However, the basic tax structure of 50 per cent on the companies' net profits remained applicable in Libya until 1971 when the government concluded a new agreement with the operating companies providing, among other things, for a rise in the tax rate to 55 per cent of profits.²² This rate which became the standard rate in all the oil exporting countries was again raised to 60 per cent in October 1974. But the latter increase was different from the former in that it was decided by the unilateral action of the government following the shift of power in the international oil industry. This shift of power brought petroleum policies under the control of the host countries. Policies concerning tax and royalty rates as well as oil prices and other related matters became determinable by governments of the host countries through OPEC. By January 1, 1975 the organization recommended a further increase in the tax rate in member countries. The new rate became 65 per cent from January 1, 1975 and remained applicable in calculating the government's take from foreign oil companies until the present.

Costs

The net income of a concessionaire oil company on which the above described taxes are calculated is determined on the basis of petroleum exports valued at the applicable posted price and after deducting costs of production and operations allowed for

²² Tripoli Agreement of March 20, 1971.

tax purposes. As the search for underground oil resources, their development and the production of oil from them involves numerous activities and consequently calls for a variety of expenditures to be made in the different stages of operations, problems arise as to how to allocate such expenditures in the determination of a company's periodical net income. These problems are complicated by the fact that the amounts of expenditures involved in the oil industry are relatively huge, there is often a long delay between the time an expenditure is incurred and the ascertaining of whether any benefit will result from it, the costs incurred in a particular period therefore may bear little or no relationship to the revenues of that period but may be related to results of subsequent periods.²³

In order to understand what expenditures incurred by an oil company are allowed for tax purposes, it will be helpful to first have a brief description of the nature of activities in which the various expenditures are committed. Then, some of the major accounting controversies over the allocation of these expenditures in the oil industry in general are discussed, before reviewing how such expenditures are dealt with for tax purposes in Libya.

²³Robert E Field, Financial Reporting in the Extractive Industries - Accounting Research Study No 11, (New York : The American Institute of CPA's, 1969), p 6.

Nature of Activities Involved in the Oil Industry

As previously pointed out, numerous activities take place in the oil industry prior to the time that its product reaches the market. The nature and extent of these activities are varied, complex, and extremely interesting.²⁴ The following is a summary of the general categories of oil activities:

1. Preliminary exploration (or prospecting)
2. Lease (or concession) acquisition
3. Detailed exploration and drilling
4. Development of discovered reserves
5. Production of hydrocarbons
6. Transportation
7. Refining
8. Marketing.

An individual company may specialize in one or more of these activities. However, this brief discussion is concerned mainly with those activities involved in the finding, developing and producing phases of operations. A company engaged in finding, developing and producing oil must determine first the geographical area within which exploration activities will be carried out. Specific geographical areas are sometimes termed

²⁴For an enlightening discussion of these activities see: Max W Ball, This Fascinating Oil Business, (New York : The Bobbs Merrill Company, 1940); and British Petroleum Company, Our Industry Petroleum, (London : BP Co Ltd, 1970), Chapters 2-4.

"areas of interest". The search for suitable "areas of interest" is usually known in the oil industry as "prospecting". It begins with preliminary geological surveys of a broad area and gradually narrows down to a smaller area (or areas of interest), which on the basis of surface and subsurface studies appear to contain geological formations indicative of a probability of the existence of oil pools underground.

Preliminary exploration activities include surface geological surveys and subsurface mapping, geophysical surveys based on such techniques as gravimetry and seismography, and the analysis and interpretations of the results of these surveys. Such geological and geophysical activities may precede or follow the acquisition of a lease (or concession). In the former case, they are usually carried out under a preliminary exploration (or prospecting) permit secured from the landowner or the state with or without an option to lease. These permits are generally known in the oil industry as "shooting rights", or "reconnaissance permits". In Libya they are granted by the Ministry of Petroleum to interested companies on payment of a specific fee, giving the company the right to carry out surface surveys in a designated area for the duration of one year.²⁵

²⁵Libyan Petroleum Law, Article No 6.

The elements of costs involved in the prospecting stage include costs of obtaining rights of access to land for geological and geophysical surveys, labour costs of crews and scouts, costs of equipment and supplies used, transportation costs of materials and personnel and the costs of laboratory and other analyses of data. They also include payments to outside contractors if any geological or geophysical work is done by them.²⁶

Once the area of interest is determined, the company will obtain a lease (or concession) within the area. This is in the case if it does not already hold one in such area. An oil lease (or concession) permits the company to conduct exploration and drilling activities in search for hydrocarbon reserves and gives it the right to develop them and extract oil and gas from them. Typically an oil lease or concession runs for a specific number of years during each of which the company is required to carry out a minimum amount of exploratory work. A bonus or fee is usually paid upon the signing of the lease and annual rentals are made over the holding period. Additional "delay charges" are also required if the minimum exploration work is not done.

In addition to these payments, lease (or concession) acquisition and retention costs include legal costs involved in obtaining the lease or extending it when the term expires.²⁷

²⁶Robert E Field, Financial Reporting in the Extractive Industries, op. cit., p 14.

²⁷Ibid, pp 42-43.

Also, payments to landowners may be required as compensation for access to areas covered by the lease.²⁸

The mere acquisition of an oil lease (or concession) in an "area of interest" does not assure the presence of oil, or even that the company will drill a well. Before a transaction of such magnitude is undertaken, additional geological and geophysical work may be necessary. The geological and geophysical techniques used in this stage of operations though more extensive, do not differ much from those in the prospecting stage. Exploration for petroleum resources is, in fact, a continuous and inter-related process whereat the distinction between the various stages of operations cannot always be easily made. The only distinction between prospecting and detailed exploration is perhaps by objectives of the exploration efforts, where exploration efforts at the prospecting stage seek geological information about "areas of possible mineralization" in which the search may be intensified, detailed exploration activities are aimed at "probing an area of possible mineralization for specific deposits."²⁹

On the basis of all geological and geophysical information accumulated throughout the preliminary as well as the detailed exploration stages of searching for oil, it may be decided that a particular location provides sufficient indications of possible

²⁸Petroleum Law No 25/1955, Article 9/11.

²⁹R Laurence and S Henderson, Financial Reporting in the Extractive Industries - An Australian Survey, (Sydney, Australia : The Australian Society of Accountants, 1970), p 15.

underground petroleum accumulation to warrant drilling a test well. Drilling is the only assured way of determining whether or not hydrocarbons exist in a particular location. Such drilling in this stage of operations is usually termed "exploratory drilling" and distinguished from "development drilling" according to the purpose of the drilling operation. As the two names suggest, an "exploratory well" is drilled to discover a new oil or gas field, while a "development well" is drilled to obtain additional production from or information about a field which has already been discovered. Aside from these considerations, exploratory drilling operations do not differ from development drilling.

Once the drilling site is determined, the necessary equipment and materials are moved to the location and actual drilling activities are begun. This may be preceded by construction of the necessary roads, bridges, canals and so on, required to transport men, equipment and supplies to the site. A substantial amount of work is also necessary to clear and prepare the location for the large amount of equipment required in drilling a well. This preparatory work seems incidental and trivial, but actually entails large costs which are just as important as the costs of drilling itself.

After drilling operations are begun, they will usually continue around the clock until the well is completed as a "producer" or is abandoned as a "dry hole". The procedures of drilling are very complex and involve numerous subordinate operations to cope with various technical problems occurring

during the drilling. They also involve continual evaluation and testing to determine the possibility of a formation holding oil or gas reserves and whether or not to continue drilling the well. If the well is found productive, "completion procedures" are carried out. "Well completion" involves such operations as "casing" and "cementing" the well, installing subsurface well pipes and valves, "perforating" and "fracturing" the well, and fitting well-head equipment to prepare it for production. Dry wells, also, must be plugged and safety-checked before abandonment.

The company moves into the development and production phases of operations once a productive well is discovered. Development activities include the drilling of additional wells in the field and the construction of all access and handling facilities to lift, treat, store, and prepare crude oil and gas for shipment. At the development stage, much remains in terms of geological and other efforts to delineate the boundaries of the hydrocarbon reserve. Ultimate boundaries of oil fields are often established through the drilling of several productive and non-productive wells, "appraisal wells". Development, however, continues until such time as sufficient wells and facilities exist to extract the natural resource efficiently and effectively and this may take a number of years.

Production activities begin as soon as the lifting and handling facilities are installed to allow the flow of hydrocarbons in the form of crude oil, gas and gas liquids. Because hydrocarbons usually exist at thousands of feet below the ground

under a great amount of pressure, it is largely the energy of this pressure which drives oil from the reservoir into the well and through the production pipes up to the surface. This is what is termed in the oil industry as "natural flow". If the reservoir pressure is not sufficient then "artificial lifting" methods such as the use of pumping equipment must be employed. In some cases reservoir pressure is maintained by injecting water, gas, or air into the reservoir through injection wells in order to help oil flow to the surface. This method is known as "secondary recovery" technique. The activities involved in the production stage include all operations related to lifting, treating, storing oil and gas and the maintenance of the oil wells and field equipment and facilities.

The produced hydrocarbons are either shipped to the company's own refineries or sold to other parties. Transportation of crude oil and gas to sought destinations involves activities related to operating pipe line facilities, shipping terminals, storage of crude oil at terminals and the loading of petroleum into tankers.

Cost Allocation Problems in the Oil Industry in General

As could be comprehended from the above discussion of the nature of operations involved in the oil industry, numerous activities are called for in the various stages of the industry. Subsequently, many items of expenditure have to be made in each stage of the operation. The amounts of expenditure involved are

often large, and the time lag between their commitment and the realization of their outcome, in terms of production or sales of oil, is usually long. In many instances such expenditure will not result in any oil being discovered and produced because of the speculative nature of the search for oil. Such characteristics of the oil industry pose certain problems when attempting to measure the periodical income of an oil company whether for income tax purposes or for financial accounting purposes. Problems of periodical income determination in the oil industry arise mainly from the difficulty of allocating pre-production expenditures which in themselves represent a relatively large component of the industry's total costs.

The problem of allocation of costs and revenues in general is in the core of the theory of accounting measurement. It arises from the need for having some sort of quantitative comparison of efforts and accomplishments to evaluate the performance of business entities. Providing such procedure in business is the function of accounting whose basic tool in this respect is the process of "matching costs with revenues". "Costs are considered as measuring effort, revenues as measuring accomplishment."³⁰ The basic idea in the matching process is that cause-and-effect-relationships between costs and revenues

³⁰W A Paton and A C Littleton, An Introduction to Corporate Accounting Standards, American Accounting Association, Monograph No 3, (Ann Arbor, Michigan : AAA, 1940), p 15.

must be recognized³¹ in order to produce a meaningful comparison of efforts and results in particular accounting periods. The revenues of the period should be charged with the costs which are associated with the producing of such revenues in order to determine the period's income adequately.

It is a well recognized fact that the amount of income or loss resulting from a particular business venture can only be accurately determined upon the eventual culmination of that venture. Many of the allocation problems would disappear if there was no necessity for an intermediate determination of such income or loss. However, the present day needs for accounting information are such that regular determinations should be made and some fixed periods of time established for these determinations. Income tax laws as well as the needs of present economic systems require these determinations to be made at least annually. In view of these needs and since the operations of business concerns in general are regarded as a continuous process,³² the periodical determination of income becomes a problem of dividing and assigning the streams of costs incurred and revenues realized between present and future periods.³³ A satisfactory measurement of income in a particular

³¹Eldon E Hendrikson, Accounting Theory, (Homewood, Illinois : Richard D Irwin, Inc, 1970), pp 183-184.

³²Paul Grady, Inventory of Generally Accepted Accounting Principles for Business Enterprises, (New York : American Institute of CPA's, 1965), p 27.

³³Paton and Littleton, op. cit., p 67.

period depends on the proper matching of revenues and costs assigned to that period. This matching of costs and revenues is perhaps "the greatest single problem that occurs in accounting" regardless of the type of business that is under consideration.³⁴ It is in this area where opinions differ as to what revenues and what costs should be attributed to a particular period's income, consequently, allowing for a variety of actual practices to exist and with differing results. An abundance of standards, principles and concepts have been advanced by accounting authoritative bodies as well as academicians to provide the theoretical framework for an adequate matching. But a great deal remains to be done in the way of perfecting the measurement process.

The problem of matching costs with revenues and of differing practices and underlying theories and opinions is even more acute in accounting for the oil industry. A wide variety of accounting methods are known to have been in use by oil companies, particularly in the allocation of their pre-production exploration and drilling costs. The allocation of these costs in the oil industry involves two interrelated and inseparable issues: the first is to identify the unit of account (choice of the cost centre); the second is to assign costs to this unit.³⁵

³⁴Rufus Wixon, ed, Accountants Handbook, Fourth Ed, (New York : The Ronald Press Company, 1960), p 17.

³⁵Alan F Smith, "Oil production and accounting in the extractive industry", Abacus, (December 1972), p 101.

Choice of the cost centre

Oil reserves may be discovered only in a small portion of one or more widely dispersed geographical areas covered by the exploration activities of an oil company. Thus the accounting unit (or units) to which costs are to be allocated is not readily available when the matching of costs and revenues is made. In practice various units are adopted by oil companies. Among them are the following:³⁶

- (a) the international company as a whole
- (b) the company's total concessions (or leases)
in a single country
- (c) the single concession (or lease)
- (d) the oil field
- (e) the oil well.

Different accounting units eventually lead to different costs matched with the revenue, for the accounting unit problem is directly associated with the allocation of costs.

The allocation of pre-production costs

As previously pointed out, there is no clear-cut relationship between costs incurred in looking for oil and the success achieved since the oil business is highly speculative and a large portion of the exploration effort and

³⁶ Robert E Field, Financial Reporting in the Extractive Industries, op. cit., p 58.

cost will not directly result in discovery. Furthermore, the time lapse between the incurrence of costs and the discovery of oil, if any, is relatively great. Such conditions make it difficult to decide what costs are assigned to revenues of a particular period. Different philosophies and procedures exist to deal with this problem. At one extreme, lies the so-called "full-cost" (or "total cost") procedure which capitalizes all exploration expenditures incurred anywhere by the company regardless of their result, and amortizes them against revenues from successful strikes whenever they occur. At the other extreme, there is the "successful efforts" method which capitalizes only those expenditures which are directly related to a particular discovery and subsequently amortizes them against its revenues. All other expenditures that do not directly result in the finding of an oil reserve are charged to operations when they are incurred. The philosophy underlying the "full costing" approach justifies the capitalization of unsuccessful exploration expenditures on the basis that they are inevitable costs of finding oil. A company engaged in the search for oil underground cannot make successful strikes and discover new reserves in a particular location without some unsuccessful attempts in unrelated areas. Therefore, the costs of unsuccessful attempts are indirect costs of any new discoveries resulting from the overall exploration program of the company.³⁷ The "successful

³⁷C A Smith and H R Brock, Accounting for Oil and Gas Producers, op. cit., pp 173-194.

efforts" approach, on the other hand, is based on the view that exploration costs which do not result in the discovery of an oil reserve have no future benefit in terms of future revenues. Therefore, they should not be carried in the books as assets but rather considered as losses chargeable to current income.³⁸

General Controversies about varying Accounting Practices in the Oil Industry

Between the two above mentioned methods of accounting, a variety of procedures exist to deal with the various segments of costs involved in the search for oil. All these methods and procedures have been equally acceptable in accounting for oil companies.* However, in recent years much criticism has been raised about the diversity of accounting practices among oil companies - questioning the reliability of the companies' accounting statements being based on varying procedures. The subject has come under extensive discussions in the accounting

³⁸Brock and Smith, pp 172-137.

*In an attempt to examine the extent of this variation in accounting practices among oil companies, the researcher, at one stage, had surveyed the financial reports of a sample of American petroleum companies in order to see how different they are in allocating petroleum finding and development costs. Results of the survey, which show a wide diversity of accounting practices among the sample companies, are reported in Appendix A of this thesis.

and financial literature, particularly in the United States since the early 1970's. This concern with accounting practices of the oil industry was inspired, perhaps, by the oil crisis and the public's demand for more information about the activities of companies engaged in this vital industry. Professional as well as legislative and other authoritative bodies in the United States have stepped in, presumably in an attempt to narrow the range of alternative accounting practices within the industry and improve the adequacy of oil companies accounting statements for external users.

Position of professional accounting bodies - The American Institute of CPA's

On the professional side, the American Institute of Certified Public Accountants (AICPA's) became concerned with petroleum accounting practices as a distinctive segment of the accounting profession in the late 1960's when it commissioned a comprehensive study of the subject (Accounting Research Study No 11). The study was intended, at the time, to lay the groundwork for a pronouncement on the subject by the Accounting Principles Board (APB - then the standards setting body of the AICPA's). A report of the results of this study was published in 1969³⁹ containing a thorough evaluation of current accounting practices of oil as well as other extractive industry companies and providing a

³⁹Robert E Field, Financial Reporting in the Extractive Industries - An Accounting Research Study, No 11, (New York: AICPA's, 1969).

number of recommendations for the improvement of these practices. The recommendations called for the oil field "or the individual mineral deposit" to be used as the accounting unit (or "the cost center") to which exploration and development costs should be related.⁴⁰ In allocating these costs among time periods, the ACIPA's report discarded the use of "full costing" practice on the grounds that it does not reflect the required cause-effect-relationship between costs and revenues.⁴¹ Instead, it recommended procedures closely in line with the "successful efforts" method, capitalizing only those costs which are "properly associated with minerals in-place". The important recommendations in this connection are reproduced below:

"Recommendation 3. Expenditure for prospecting costs indirect acquisition costs, and most carrying costs should be charged to expense when incurred as a part of the current cost of exploration.

Recommendation 4. Direct acquisition costs of unproved properties should be capitalized and the estimated loss portion should be amortized to expense on a systematic and rational basis as a part of the current cost of exploration.

Recommendation 5. Unsuccessful exploration and development expenditures should be charged to operations even though incurred on property units where commercially recoverable reserves exist.

.....

Recommendation 9. Capitalized costs associated with minerals in-place should be amortized rateably as the related minerals are extracted but may be amortized on the basis of time when time is the controlling factor in consumption of economic usefulness."⁴²

⁴⁰Ibid, p 58.

⁴¹Ibid, pp 60-65.

⁴²Ibid, pp 150-151.

Following the conclusion of Accounting Research Study No 11, the subject of petroleum accounting practices was taken up by the APB Committee on Extractive Industries which was established to determine appropriate practices and to narrow the accounting differences in the industry. A public hearing was held by the Committee in 1971 to allow all interested parties (from the oil companies, the accounting and investment professions, and the academic world) to present their views on the subject.⁴³ An exposure draft was issued by the Committee on Extractive Industries on October 22, 1971 outlining the tentative position of the APB on petroleum accounting practices which favoured the elimination of the "full costing method" and recommended accounting procedures in line with those previously included in the Accounting Research Study No 11.⁴⁴ But the Exposure Draft was not adopted at the time as the pronounced official opinion of the APB because of the negative reaction to it from major factions supporting the full costing method and members of the investment community who feared that the change to the "successful efforts" procedures by companies previously reporting on bases of the "full costing method" would affect

⁴³For a full account of the position, papers and discussions presented in these hearings, see: APB Public Hearings on Accounting and Reporting Practices in the Petroleum Industry, Cases in Public Accounting Practice, Vol 10, (Chicago : Arthur Anderson and Company, 1972).

⁴⁴Daniel W Collins, Warren T Dent and Melvin C O'Conner, "Market effects of the elimination of full cost accounting in the oil and gas industry", Financial Analysts Journal, (November-December 1978), p 50.

their reported income and equity and might hinder their access to the capital markets and ultimately have an adverse effect on exploration and competition in the oil industry.⁴⁵

When, in 1973, the structure of AICPA's standard setting body was changed and the APB was replaced by the newly formed Financial Accounting Standards Board (FASB), responsibility for the development of definitive rules concerning petroleum accounting practices was transferred to the new body. Following a further deliberation on the subject the FASB finally issued its official decision in December 1977 (Statement of Financial Accounting Standards No 19). It affirmed to the previous stand of the APB Exposure Draft and the Accounting Research Study No 11 calling for a uniform petroleum accounting practice based on the "successful efforts" method.⁴⁶ But the FASB statement was again met with vehement resistance from the "full costing" companies and other proponents of the method. Appeals were raised by them, before several US administrative and legislative bodies including the Securities and Exchange Commission (SEC) and the US Department of Energy (DOE) for a continuation of alternative accounting practices in oil companies.

⁴⁵ Ibid, pp 48-49.

⁴⁶ "Statement of Financial Accounting Standards No 19 - Financial Accounting and Reporting by Oil and Gas Producing Companies", The Journal of Accountancy, (February 1978), pp 94-103.

Position of the American SEC

Concern of the SEC with petroleum accounting practices originates from the Commission's responsibility of securing for the public adequate financial and other information about companies whose stocks are listed for trading on US stock exchanges. "Under the several acts administered by the SEC, the Commission has broad powers to prescribe accounting procedures and the form of accounting statements filed with it"⁴⁷ by listed companies and subsequently made available to the public. But since its establishment in 1933, the SEC has generally permitted the accounting profession to lead the way in the setting of accounting standards and relied on practices generally accepted in the accounting profession.⁴⁸ This was not without the Commission's indirect influence on the development of these practices through, for example, pressure on the AICPA to reduce the areas of differences in accounting methods, and through the occasional direct stand on certain issues or the requirement of accounting reports to follow a specified procedure.

When the controversy over petroleum accounting practices grew, the Securities and Exchange Commission was prompted by a Congressional mandate (Energy Policy and Conservation Act of

⁴⁷Hendrikson, op. cit., p 77.

⁴⁸Ibid, p 78.

1975) to establish uniform accounting practices in the petroleum industry. As the issue was under consideration by the FASB, the SEC awaited the profession's decision. After the FASB deliberations finally culminated in the issuance of the Statement of Financial Accounting Standards No 19 in December 1977, the SEC held public hearings to allow different views on the FASB statement to be presented before deciding whether or not the statement would be adopted. Subsequent to these hearings, which took place during 1978, the Commission decided to postpone its ruling on the subject until such time when adequate research and analyses had been done to develop proper practices and all the economic implications of these practices had been evaluated. The SEC also suggested that the proper practice should be based on the recognition of the value of the discovered reserves and allowed an interim period of at least three years before proper practices could be developed and adopted.⁴⁹

Cost Allocations for Income Tax Purposes

In computing income taxes payable to the state on the activities of commercial ventures in general, legislations in every country, usually, prescribe the procedure to be followed in determining what revenues are recognized and what costs are

⁴⁹Edward B Deakin III, "An analysis of differences between non-major oil firms using successful efforts and full cost methods", The Accounting Review, Vol LIV, No 4, (October 1979), p 723.

deductable from such revenues. Such procedures may coincide, in some cases, with financial accounting procedures, and in others, the two procedures may be quite different. The oil industry is an area where accounting for income tax purposes varies in many respects from financial accounting practices. This is true particularly in relation to the allocation of pre-production costs.

The Libyan petroleum legislation requires each oil company operating in the country to report its annual "financial declaration" of taxable income and start paying taxes once commercial production and regular export or sale of petroleum has commenced from any concession held by the company in Libya. The items of revenues and costs used in deriving taxable income should be computed on a company-wide basis covering the company's operations in all concessions whether productive or non-productive.⁵⁰ Thus, the "accounting unit" is considered the company as a whole.

"The effective date", or, as defined by law, "the date on which the concession holder commences regular exports ... or sales in commercial quantities of petroleum derived from any of his concessions in Libya",⁵¹ serves as a critical point in the treatment of pre-production expenditures. All expenditure

⁵⁰Petroleum Law, Article 14.

⁵¹Petroleum Law, Article 14, paragraph 2.

incurred by a company prior to this date are to be capitalized, according to the Libyan Petroleum Law, and subsequently amortized after the commencement of regular exports or sales of petroleum by the company. A distinction is made here between those expenditures which are related to the acquisition and installation of physical equipment (fixed assets) and those related to other activities of the company. Although both types of expenditures are capitalized at this stage, their depreciation is calculated differently. "Physical assets" are depreciable at an annual rate of 10 per cent starting from the time an asset became operative, while other capitalized expenditures are to be amortized at the rate of 5 per cent per annum and their amortization begins after the effective date. Depreciation charges of fixed assets prior to the effective date are added to the capitalized expenditures.

The treatment of expenditures incurred after the effective date of an oil company will depend on the nature of the expenditure, the result of the activity, and the accounting practice chosen by the company where the law allows for such a choice. In this respect expenditures may fall into one of the following categories:

1. pre-drilling exploration costs
2. intangible drilling costs
3. costs of developing and equipping the oil wells or fields
4. production and operating expenses.

Pre-drilling exploration costs

These include expenditures on all the geological and geophysical work whether in the prospecting stage or the extensive exploration stage, other than what is considered as directly related to the drilling process of a particular well. In accordance with the Libyan legislation, the option is given to the company to capitalize such expenditures or charge them to operations as they are incurred. The election applies to all concessions held by the company in the country and must be followed on a consistent basis from year to year.⁵² If the company chooses the practice of capitalizing these costs, the capitalized amount becomes subject to amortization at the rate of 5 per cent per annum. However, because of the advantage to the oil companies of the immediate expensing of these costs, they generally choose this arrangement.

Intangible drilling costs

They include all expenditures made on labour, fuel, repair, maintenance, transportation, supplies, etc, necessary for the drilling of wells and which have no salvage value in themselves. In regard to these expenditures a distinction is made between (1) intangible drilling costs of exploratory wells and of wells not productive of petroleum in commercial quantities (dry holes),

⁵²Petroleum Law, Article 14(3); Concession Agreement, Clause 8, paragraph 3; and Petroleum Regulation No 6, Article 12.

and (2) costs of development wells and wells drilled for the purpose of water or gas injection. In the former case, the company has the option whether to capitalize the intangible drilling costs or to charge them to operations as they occur.⁵³ Costs related to the latter type of wells should be capitalized in accordance with the Libyan law and subsequently depreciated as fixed assets⁵⁴ (at the rate of 10 per cent per annum). Costs of drilling exploratory wells and costs of dry holes, if capitalized they become subject to amortization charges at the rate of 5 per cent per annum. But the oil companies generally choose the option of expensing these costs as incurred because of the advantage of such practice in reducing current taxes payable to the government.

Costs of developing and equipping oil wells and fields

According to the petroleum legislations all costs "incidental to the procurement and installation of physical assets" must be capitalized and consequently depreciated (at the rate of 10 per cent annually) after their installation has been completed and put into use.⁵⁵ Physical assets include the following:

⁵³Petroleum Law, Article 14(3); Concession Agreement, Clause 8, paragraph 3; and Petroleum Regulation No 6, Article 12; Petroleum Regulation No 9, Article 18.

⁵⁴Petroleum Law, Article 14(3); and Petroleum Regulation No 9, Article 18, paragraph 5.

⁵⁵Petroleum Law, Article 14(3); Petroleum Regulation No 9, Article 13, paragraph 1.

- (1) The total costs of drilling and equipping productive wells as well as other service wells (such as injection wells and other auxiliary wells). Such costs are capitalized whether they were tangible or intangible. The capitalized costs must also include an allocated portion of the general overheads of the company and a share of the costs of service departments.
- (2) The costs of all equipments and installations acquired by the company to serve in the operation of particular wells, fields, or concessions (such as production equipment, petroleum gathering and treating facilities, pipe lines, etc) and those serving the operations of the company as a whole (such as geological and geophysical equipments, drilling rigs, transportation means, shipping terminals, office facilities and fixtures, etc). The capitalized cost of each equipment includes the purchasing cost, the costs of transportation, and all the costs spent on the installation and the preparation of the equipment for use.

Production and operating expenses

They include all the costs needed for the flow of oil from the wells to the shipping terminals and the general operating costs and overheads of the company. To the extent that such costs "are not incidental to the procurement or installation of

physical assets", they are considered according to the Libyan legislation as current expenses chargeable to income during the period in which they are incurred.⁵⁶

Summary of costs deductible for income tax purposes

Costs allowed to be deducted from revenues in arriving at the taxable net income of an oil company operating in Libya can be summarized in the following:

1. Current production and operating costs and overheads
2. Geological and geophysical expenses
3. Intangible drilling costs of exploratory wells and costs of dry holes
4. Depreciation of all fixed assets at the rate of 10 per cent per annum
5. Amortization of capitalized expenditures at the rate of 5 per cent per annum. This rate applies to the pre-effective date capitalized expenses and to expenditures in which the company exercises the option to capitalize after the effective date.
6. Royalties paid to the government during the year at the applicable rate.

⁵⁶Petroleum Law, Article 14, paragraph 2(a).

CHAPTER V

DEVELOPMENT OF GOVERNMENT'S REVENUES

UNDER THE CONCESSIONARY FORMULA

The objective of this chapter is to review the basic changes that have been introduced into the traditional concessionary model of determining government's income from the oil industry and to analyse the effects of such changes on government's receipts from foreign oil companies. It is appropriate in this analysis to first filter out the effects of changes in the volumes of production and exports and examine developments in the contractual arrangements as they influenced the revenue per barrel. Then an attempt is made to examine the behaviour of government's receipts under the concessionary system as a function of overall revenues from foreign companies.

Changes in the Concessionary Formula and their Impact on the Per Barrel Revenue

The original oil concessions granted to foreign oil companies in Libya have been subject to a number of important alterations and amendments since the start of oil operations in the country. An attempt is made in this section to follow these changes in a chronological order and examine their impact on the government's per barrel take from the operating companies.

The original concessionary formula

When the original petroleum law was first drafted in 1955, the prime objective of the Libyan government was to encourage the international oil companies to apply for oil concessions in Libya and encourage investments in the country's oil industry. It was obviously successful in this respect since 47 concessions were granted in late 1955 and early 1956 to nine companies, and by 1960 there were 20 companies working in Libya within 95 concessions covering 65 per cent of the total land surface of the country.¹

Fiscal provisions of the original concession agreements were rather liberal. They included the payment of a nominal amount of 500 Libyan Dinars (\$1,400) as a flat fee, upon the grant of a concession, and surface rents which were relatively small and inconsequential. If oil was discovered and produced, a royalty payment was to be made to the government calculated on the basis of 12.5 per cent of the market value of the produced oil at the well-head (ie sales price minus transportation and handling charges from well-head). Income tax on the profits of oil companies were specified as 50 per cent of a company's net profits. There were no provisions for a "posted price" in the original concessions. Royalties, fees, rents and any other payments to the government were a direct offset against the 50 per cent profit

¹Ministry of Petroleum, Libyan Oil Development 1954-1967, pp 108-114.

tax payable to the government. In computing the profit tax, the company's gross income was based on the realized price or whatever the company sold or transferred its oil for. Deductions from gross income to arrive at taxable profits were:²

- a. operating expenses and losses;
- b. depreciation of capital expenditures on physical assets at any rate not exceeding 20 per cent per annum where the expenditure was incurred prior to commencement of commercial exports and 10 per cent if incurred thereafter;
- c. a "depletion" allowance equal to 25 per cent of the gross income from sales of petroleum less handling charges and transportation cost from the well to the terminal;
- d. amortization of all capital expenditures other than physical assets at the rate of 20 per cent per annum where the expenditure was incurred prior to the commencement of commercial production and 5 per cent if incurred thereafter.

Elections or choices were open to the companies to treat a number of significant items of expenditures as capital or as current

²Petroleum Law, original text (1955).

expenses with no provisions for consistency in such treatments from year to year. Furthermore, if the company's operations produced a net loss, this could be carried forward and deducted against profits of subsequent years up to a maximum of 10 years regardless of whether the loss occurred before or after the commencement of commercial production.

These provisions of the original concessionary agreements were too generous to the oil companies even in terms of Middle East standards, and many people in the international petroleum industry circles believed that the government should come under pressure to amend them. As Professor Edith T Penrose put it, "the fact that the concession terms in Libya were in many ways less favourable to the government than were those obtained by governments elsewhere in the Middle East gave rise to a great deal of local criticism."³

Consequently, the government shortly after the beginning of exploration in the country started to insist on better terms in the concessionary agreements. After it became certain that the Libyan subsoil contained large quantities of oil reserves, provisions of the original Petroleum Law were amended and the concessionary agreements were revised. The first Amendment was

³Edith T Penrose, The Large International Firm in Developing Countries, (London : George Allen and Unwin, 1968), pp 203-204.

introduced into the Petroleum Law in July 1961,⁴ even before the first shipment of crude oil was exported. . But it did not become effective in the oil concessions until July 1962 when it was finally accepted by the concession-holding companies, and the concessionary agreements were revised accordingly.

The original financial arrangements prevailing prior to this amendment were only practically applicable in determining government's revenues for a short period of time, (namely from September 1961 when the exports started until the end of June 1962). But the significance of these provisions, which perhaps is worth rementioning here, was that their attractiveness to the oil companies was among the factors that initiated the quick start of development of the oil industry in Libya.⁵

The amendment of 1961

The 1961 amendment of the petroleum legislation and of the terms of the Libyan concessionary agreements removed or reduced the benefits to the oil companies of many of the generous provisions mentioned above. One important aspect of this amendment was the introduction of the concept of "posted price" for the first time in the Libyan concessions. As adopted in the Libyan concessions, the "posted price" had two important effects.

⁴"Royal Decree Amending the Petroleum Law of 1955", published in The Official Gazette, (Tripoli, Libya : July 15, 1961).

⁵George W Stocking, Middle East Oil - A Study in Political and Economic Controversy, (Nashville, Tenn. : Vanderbilt University Press, 1970), p 374.

First, it became the value upon which royalty was to be calculated. Second, the concept of posted price was introduced into the profit tax provisions and taxable income became determinable on the basis of the posted price, of crude oil exported, "less marketing expensing". According to the amended law, the posted price was defined as follows:

"Posted price means the price FOB seaboard terminal for Libyan crude oil of the gravity and quality concerned arrived at by reference to the free market prices for individual sales of full cargoes and in accordance with the procedure to be agreed between the concession holder and the Ministry of Petroleum or if there is no free market for commercial sales of full cargoes of Libyan crude oil then posted price shall mean a fair price fixed by agreement between the concession holder and the Ministry or in default of agreement by arbitration having regard to the posted price of crude oil of similar quality and gravity in other free markets with necessary adjustments for freight and insurance."⁶

Discounts off the posted price which the amended petroleum legislation allowed the oil companies in the context of "marketing expenses" were at that time a common practice in the oil industry (as discussed in Chapter III). No limit was placed on these discounts in the petroleum law or the concession agreements. The absence of such restriction allowed the operating oil companies to take full advantage of the marketing expenses provisions and make heavy discounts off the officially declared posted price of Libyan crude and pay their income taxes on the basis of the discounted prices. Although the discounts made by the oil

⁶Petroleum Law, Article 14, paragraph 5, as amended in 1961.

companies on Libyan crudes differed from one company to another and from one crude shipment to another, the average discount as reported in the press was about 30 per cent or more off the official posted price (of \$2.23 per barrel).⁷ With the allowance of these discounts in calculating taxable income, the posted price, therefore, although it was introduced as a concept, and little or no significance in determining the value of crude oil for tax purposes. In practice this value was based on the realized prices (or the posted price minus marketing discounts).

As far as other changes in the financial provisions of Libyan concessions, the impact of the 1961 amendment occurred in the following areas:

1. The depletion allowance of 25 per cent was completely eliminated.
2. Depreciation and amortization rates were reduced from their previous levels. The rate of depreciation for all physical assets including costs of drilling and developing productive wells was fixed at 10 per cent per annum. The amortization rate of capitalized expenses was set at 5 per cent per annum. This rate applies to all expenses and losses incurred by a company prior to the commencement of

⁷"Libya rejoins the Middle East", The Economist, (October 19, 1963), p 277; and, "Libya threatens the independents", The Economist, (October 30, 1965), p 541; also, Petroleum Intelligence Weekly, (December 1, 1965).

production (or the effective date) and to other expenditures which the company chooses the option of capitalizing them after the commencement of production.

3. Operating expenses deductible for income tax purposes were limited to those of a current nature. All costs related to fixed assets and to the drilling and developing of productive wells as well as service wells should be capitalized and subsequently depreciated according to the depreciation rate described above.
4. Certain items of expenditure were specifically declared to be non-deductable, such as foreign taxes, penalties, and interest and organization expenses incurred by a concession holder in financing and establishing his operations in Libya.
5. Election to expense or capitalize certain costs, where the option exists, once made by the company would be binding for further years and for all the company's concessions in the country.
6. Losses and expenses incurred prior to the commencement of commercial production and sales of crude oil could not be carried forward and recouped through amortization at the rate of 5 per cent annually.

Impact of the 1961 changes on per barrel revenue To examine the effect of the above changes on the government's revenue per barrel, the following assumptions are made:

1. The oil produced and exported is of 40^o API grade for which the official posted price was \$2.23 per barrel.
2. The market price (or realized price) for such crude oil was \$1.56 per barrel (ie 30 per cent below the posted price).
3. Handling and transportation charges from the well to the shipping terminal were 5 US cents per barrel.
4. Production cost including all operating expenses and depreciation and amortization charges was 50 US cents per barrel, (for simplicity no effect is given to changes in the depreciation rate or to any changes in the treatment of expenditure items).
5. Effects of the loss carry-forward provision was also eliminated.

Applying these assumptions, it could be seen from the following calculations (Table V-1) that the amendment of 1961 had raised the government per barrel revenue from 37 US cents per barrel to 53 US cents (an improvement of about 43 per cent). This improvement came basically from the elimination of the depletion allowance after the amendment. Prior to the 1961

Table V-1
Impact of the 1961 Amendment
on the Government's Revenue per Barrel

	Prior to the Amendment	After the Amendment
	\$*	\$*
Posted price		2.23
Deduct: Marketing expenses (30%)		.67
Sales realization (Taxable price)	1.56	1.56
Less:		
Production cost (operating expenses, plus depreciation and amortization)	.50	.50
Depletion allowance*	.33	-
Taxable net profit	.73	1.06
Income tax (50%)	.37	.53
Less: Royalty payment (12.5%)	.19	.28
	.18	.25
Total government revenue	.37	.53
*Depletion calculation		
Sales proceeds	1.56	
Deduct: Transportation and handling costs	.05	
Royalty at 12½% of \$1.51 (realized price - 5 cents transportation costs from well-head)	.19	
	1.32	
Depletion = 25% thereof	.33	

* figures were rounded to the nearest US cent .

amendment the depletion allowance was deductible from taxable income. When this allowance was eliminated the taxable net profit rose from \$0.73 per barrel to \$1.06 per barrel. This rise was reflected in the income tax payable to the government which was levied at the rate of 50 per cent of net profits. The royalty had also increased from 19 cents per barrel to 28 cents as a result of applying the posted price (\$2.23) in its calculation after the amendment instead of computing it on the basis of the realized price minus transportation costs from the well-head (\$1.56-0.05). But this increase in the royalty payment had no practical effect on the total revenue of the government since under the 50-50 profit sharing principle royalties were considered a credit against the 50 per cent share of profits payable to the government. The only practical significance of this increase in royalty was in the timing of payments to the Libyan government. Royalties at that time were payable quarterly while income taxes were due annually.

However, this method of treating royalty as a credit against taxes payable to the government was changed in 1965 when significant improvements in the financial arrangements were introduced in the Libyan concessions.

The 1965 amendments

In 1965 significant changes occurred in the financial arrangements of the concession agreements. These were a result of introducing the OPEC formula of expensing the royalty,

previously referred to in Chapters III and IV. This formula was introduced in the Libyan concessions from the financial year of 1965. The main provisions of the new system were:

1. Royalty payments were to be treated as expenses deductible from taxable income.
2. Government revenues were to include 12.5 per cent royalty plus the income tax at 50 per cent.
3. Profits subject to tax were to be determined on the basis of the "posted price", eliminating the previously allowed "marketing expenses". Instead, allowance for marketing was limited to $\frac{1}{2}$ US cent per barrel of crude exported.
4. To moderate the effect of expensing the royalty on the oil companies, they were allowed to offset part of this effect by deducting a special allowance from the posted price. This allowance was called the "OPEC Allowance", and was to be gradually decreased each year until it was completely abolished.

The OPEC Allowance for the year of 1965 was set at 7.5 per cent of the posted price per barrel plus a gravity differential equal to 0.13235 US cents for each grade of crude above 27⁰ API. In 1966 the allowance was to be reduced to 6.5 per cent of the posted price plus a gravity differential of 0.2647 US cents for each grade above 27⁰ API. Further reductions in the OPEC allowance were intended for the following years. But the magnitude of

these reductions beyond 1966 were left open for negotiations between the countries concerned and the oil companies, depending on general conditions in the oil market (see Chapter III).

The impact of applying the OPEC formula on the Libyan government's revenue per barrel could be seen from the calculations in Table V-2 below. Government total receipts per barrel rose to \$0.91 compared with the \$0.53 per barrel which the government had been receiving since the amendments of 1961 (Table V-1). This improvement in the government's total revenue which amounted to over 70 per cent came from two factors. The first was the increase in the taxable price from \$1.56 under the previous arrangements, where realized prices were the basis of valuing taxable income, to \$2.04 after the application of the new formula; the second was the entitlement of the government under the new formula to receive the royalty payment in addition to the 50 per cent share of net profits of oil companies rather than the previous 50-50 system whereby the royalty was considered a partial payment of the government's 50 per cent share.

Developments of 1967

The OPEC formula of expensing royalties, when it was designed by OPEC and then introduced in member countries including Libya, was intended to make the process of expensing gradual until a full expensing of the royalty is reached by the early 1970's. That was the justification for granting of the "OPEC allowance". This allowance off the posted price which the oil companies were

Table V-2
Computation of the Government's Revenue
per Barrel after the introduction
of OPEC Formula in 1965

		US \$
Posted price per barrel (of 40° API)		2.23
Allowances from the posted price:		
7.5% of the posted price	\$0.1672	
gravity differential		
(0.13235 cents x 13)	0.0172	
	<hr/>	
Total OPEC allowance	0.1844	
Marketing allowance	.0050	
	<hr/>	
		.189
		<hr/>
Taxable price per barrel		2.041
Deduct: Royalty 12.5% of posting	.28	
Production cost*	.50	
	<hr/>	
Total deductions for tax purpose		.780
		<hr/>
Taxable net income		1.261
		<hr/>
Government revenue:		
Income tax at 50% of net income		.631
Royalty		.280
		<hr/>
Total government revenue per barrel		.911
		<hr/>

* assumed as in previous table

permitted in return for accepting the expensing of royalty principle was agreed upon for the years of 1964, 1965 and 1966 to be 8.5 per cent, 7.5 per cent and 6.5 per cent respectively. It was also agreed that further reductions in the allowance after 1966 would be determined through negotiations with the oil companies in the light of market conditions of different crudes.

Following the closure of the Suez Canal in 1967 as a result of the Middle East War of June 1967, market conditions for Libyan crude oil and other crudes shipped from Mediterranean terminals changed. Since these crudes did not have to pass through the Suez Canal to reach the European markets, they became more competitive than other Arabian Gulf crudes and the demand for them increased. The oil companies agreed under these circumstances to waive the OPEC allowance on all Mediterranean crudes as a compensation for the Suez Canal premium. The elimination of this allowance was temporarily for so long as the Canal remained closed.⁸ For Libyan crudes the OPEC allowance was eliminated from July 1967 and the royalty was fully expensed. The impact of this development on the government's revenue per barrel is illustrated in Table V-3 below. It resulted in increasing the total revenue per barrel to \$1.002 compared with \$0.911 in 1965.

Because the Suez Canal remained closed throughout the remainder of the 1960's, the Libyan government received its income from the oil companies on the above described basis. No

⁸Zuhayr Mikdashi, The Community of Oil Exporting Countries, op. cit., p 145.

Table V-3
Computation of the government's revenue
per barrel after the elimination
of OPEC allowances in July 1967

	US \$
Posted price (per barrel of 40 ^o API)	2.230
Deduct: Marketing allowance	.005
Taxable price	2.225
Deduct: Cost of production*	.500
Royalty (12.5% of posted price)	.280
Taxable net profit per barrel	1.445
Government's revenue:	
Income tax (50% of net profit)	.722
Royalty	.280
Total government revenue per barrel	1.002

* assumed as in previous tables

changes were made in the basic posted price or the tax and royalty rates. The basic posted price was established by the oil companies since the start of oil production from Libya in 1961 and remained frozen at the level of \$2.23 per barrel (of 40^o API) during the whole decade. The tax and royalty rates also remained at the respective levels of 50 per cent and 12.5 per cent which were inherited from the early 1950's. Aside from the change in the calculation of royalty and the adjustments in allowances from the posted price, no other important alterations in the financial arrangements of the concessionary agreements were effected until

the start of the 1970's decade.

From 1970, the relationship between the oil companies and the governments of the oil producing countries began a process of transition affecting all the previous arrangements in the oil industry of these countries. The major developments of the 1970's and their effects on the Libyan government's revenue from oil concessions will be discussed in the following section.

Major developments of the early 1970's

The first major development in the financial arrangements of oil concessions in Libya occurred when the new revolutionary government succeeded in reaching a series of agreements with individual concession-holding companies introducing certain adjustments in the posted price and the tax structure.⁹ Effective September 1970, all companies operating in Libya agreed to an increase of \$0.30 per barrel in the posted price for the base crude of 40° API, raising the Libyan posting by 13 per cent from the previous price of \$2.23 per barrel to \$2.53. This new price applied from September 1, 1970. The agreement also provided for an additional annual increase of \$0.02 per barrel to be added to the Libyan posted price on January 1 each year from 1971

⁹The first of these agreements was reached with Occidental Petroleum on September 1, 1970. It came after lengthy negotiations in the form of an offer made by the company and was accepted by the Libyan government. For details of the agreed settlement see: Middle East Economic Survey, (October 16, 1970), p 3. The settlement with Occidental was followed by similar agreements with the rest of the oil companies operating in Libya effective September 1, 1970.

through 1975 (see Table V-4). The gravity price differential adjustment system was also modified in favour of the government. This differential was fixed at an increase of \$0.02 per barrel for each full degree of gravity above 40° API, and a decrease of \$0.015 for every degree of gravity below. Prior to this, the gravity differential was 2 cents in both cases.

Table V-4

Increases in the Posted Price of Libyan (40° API)

Crude as agreed in the 1970 Settlement

Effective Date	Total Increase	New Posted Price
	\$	\$
Prior to the agreement	-	2.23
September 1, 1970	0.30	2.53
January 1, 1971	0.32	2.55
January 1, 1972	0.34	2.57
January 1, 1973	0.36	2.59
January 1, 1974	0.38	2.61
January 1, 1975	0.40	2.63

In addition to the adjustments in posted prices, the companies agreed to an additional tax in lieu of retroactive payments dating back to 1965. Such tax was called supplementary tax and was intended to compensate the government for past losses in revenues resulting from the undervalued prices of Libyan crude oil and was to be applicable until the end of each concession. The supplementary tax varied from company to company depending on their past output levels and the number of years a company had

operated in Libya, but on average, it added roughly 5 percentage points to the basic 50 per cent income tax rate.

The effect of these adjustments on the government's per barrel revenue could be seen from the following illustration (Table V-5).

Table V-5
Impact of the 1970 Agreements between
the Libyan Government and the Oil Companies
on the Government's Revenue per Barrel

	Prior to the Agreements	After the Agreements
	\$	\$
Posted price per barrel of 40 ⁰ API	2.230	2.530
Deduct: Marketing allowance	.005	.005
Taxable price	2.225	2.525
Deduct: Production cost*	.500	.500
Royalty	.279	.316
Net taxable income	1.446	1.709
Government revenue:		
Basic income tax (50%)	.723	.855
Supplementary tax 5%	-	.085
Total tax	.723	.940
Royalty	.279	.316
Total government revenue per barrel	1.002	1.256
Increase in revenue		\$0.254 (or 25%)

* assumed as in previous tables

The 1970 agreement as seen from the above analysis improved the government's revenue per barrel by about 25 per cent from what the government was receiving previously. This increase was eventually a result of both the increase in price and the tax structure introduced by the agreement. These adjustments in the posted price and the tax structure agreed upon were meant to bring the undervalued price of Libyan crude oil in line with prices of other crudes in the Middle East and to compensate the government for past losses in revenues occurring because of the undervalued price.

But the significance of this settlement was not only in the increase in government revenues, but also, as mentioned in the previous chapters, in the fact that it was the first time in the history of oil concessions that the posted price and other financial matters were fixed by negotiations between the oil companies and a host government. Previously, these matters were completely in the hands of the companies who had persistently opposed the principle of a negotiated posted price. The Libyan agreement was a precedent which opened the door for further negotiations and adjustments of the concessionary arrangements in Libya as well as in the other oil producing countries of the Middle East and elsewhere.

Tehran agreement (February 15, 1971) As soon as the Libyan agreement was concluded with the oil companies, other producing countries in the Middle East started to raise

similar demands to the oil companies for higher annual revenues through price and tax rate increases. The first result of these demands was the conclusion of the Tehran Agreement between oil producing countries from the Gulf area and the oil companies on February 15, 1971.¹⁰ According to this agreement oil prices of the Gulf crudes were increased by about 35 cents per barrel effective February 15, 1971. Further, the agreement provided for additional annual increases of 2.5 per cent of the posted price plus 5 cents per barrel starting from June 1, 1971 and on January 1 of 1973, 1974 and 1975. In addition to this, the tax rate was raised in the Gulf countries to 55 per cent from the previously applied rate of 50 per cent.

Tripoli Agreement (March 20, 1971) Following the Tehran agreement, the Libyan government soon began to seek a new negotiation with the oil companies, for the Libyan oil became, anew, underpriced in comparison with the posted prices negotiated in Tehran. By March 20, 1971 an agreement was worked out between Libya and the oil companies, which although negotiated and signed by each company separately, was in the form of a uniform proposal submitted individually by the oil companies to the Ministry of Petroleum. According to this proposal which was accepted by the government and became

¹⁰ See Chapter III for details of the Tehran Agreement.

known as the Tripoli Agreement, the following adjustments were made:¹¹

1. The posted price for Libyan crude of 40⁰ API was raised from \$2.55 (including the 2 US cents added January 1, in accordance with the previous settlement of September 1, 1970) to \$3.447 per barrel, an increase of 35 per cent. The new Libyan price was arrived at through a complicated formula and was composed of the following elements:
 - (a) a basic price component of \$3.07 arrived at by adding to the previous \$2.55 posting the 35 cents gained by the Gulf States plus 17 cents allowed for the lower sulphur content and the permanent freight advantages of the Libyan crude; (b) a fixed allowance of \$0.12 for so long as the Suez Canal remained closed; (c) a variable freight premium which was to be adjusted quarterly on the basis of the Average Freight Rate Assessment (AFRA), this adjustment premium amounted to 13 cents per barrel during the first quarter of 1971; and (3) a revised annual inflation escalation element amounting to 2.5 per cent of the basic posted price (ie the \$3.07) plus a moratorium 5 cents per barrel. The escalation element for 1972 became effective immediately, accounting for the remaining

¹¹ Tripoli Agreement of March 20, 1971 between the Libyan government and the operating oil companies. For full text of the Agreement see: Middle East Economic Survey, (April 9, 1971); also, Petroleum Intelligence Weekly - Special Supplement, (April 12, 1971).

\$0.127 of the new price, with the other inflation allowance to take effect on January 1 of 1973, 1974 and 1975. In addition to these adjustments, there was a further \$0.02 per barrel annual increase in the form of escalation provided for in the agreement for low sulphur crudes provided that the sulphur content remained below a certain level (0.5 per cent), which was the case for most of Libya's crudes, This escalation was to take effect on January 1 of 1972, 1973, 1974 and 1975.

2. The marketing discount off the applicable posted price was eliminated. Up to the date of the agreement, the companies were allowed to deduct from the posted price $\frac{1}{2}$ a cent per barrel as a "marketing expense" according to the 1965 settlement.
3. Under the March 20 agreement the basic income tax rate was raised from 50 per cent to 55 per cent of the oil companies' net profits. This was in line with the rate established for the Arabian Gulf States by the Tehran agreement. But in the case of Libya the supplementary tax of 5 per cent previously agreed upon in the 1970 settlement remained applicable to Libyan crude because this payment was in settlement of retroactive claims related to past production, prior to 1970. However, the 5 per cent supplementary payment was determinable on a different basis than that of the basic income tax.

The immediate effect of the March 20 settlement on per barrel revenue payable to the Libyan government is illustrated in Table V-6 below. This agreement resulted in a 50 per cent increase in the government's per barrel revenues raising it to \$1.901 from \$1.268 that would have been received under the previous arrangements.

Table V-6
Impact of the March 20, 1971 Settlement
on the Government's Revenue per Barrel

	Before the Settlement	After the Settlement
	US \$	US \$
Posted price per barrel (40 ⁰ API)	2.550	3.447
Deduct: Marketing expenses	.005	-
	<hr/> 2.545	<hr/> 3.447
Taxable price		
Deduct: Production cost	.500	.500
Royalty (12.5% of posted price)	.319	.431
	<hr/> 1.726	<hr/> 2.516
Taxable net profit per barrel	<hr/> <hr/>	<hr/> <hr/>
Government revenue:		
Basic income tax	.863	1.384
Supplementary payment	.086	.086
Royalty	.319	.431
	<hr/> 1.268	<hr/> 1.901
Total government revenue per barrel	<hr/> <hr/>	<hr/> <hr/>
The increase in revenue after settlement		.633 (or 49.9%)

Devaluation of the dollar and oil price settlements The agreement of March 20, 1971, when concluded between the Libyan government and the oil companies, was intended to apply to Libyan oil until the end of 1975, with the provided adjustments in the posted price to be made periodically. By the end of this period further negotiations should determine arrangements for the future. The same was the case for the Tehran agreement between the Gulf States and the oil companies. But during the latter part of 1971, a new problem arose in relation to the oil producing countries' income from oil. It was a result of the deterioration in the international monetary situation of the second half of 1971, and the consequent devaluation in the value of the US dollar on December 18, 1971, and the re-alignment of parities between the dollar and the other major currencies.¹²

The US dollar was first officially floated on August 15, 1971 and its convertibility to gold was suspended. This action followed a worsening in the United States' balance of payments and the decline in the country's gold reserves. Floating the US dollar in practice and suspending its convertibility to gold meant a de-facto devaluation. The de-facto devaluation, later, became de-juris when a Washington meeting of a group of ten industrial countries (on December 17-18, 1971) decided to increase the official price of gold from 35 to 38 dollars an ounce and

¹²The Economist, (December 25, 1971), pp 11, 67-69.

devalue the US dollar by 7.89 per cent. New re-alignment of parities between other major currencies and the dollar and gold was also established.¹³

Since crude oil prices were tied to the US dollar, the producing countries felt the adverse effects of the decline in the value of the dollar on the purchasing power of their oil revenues. The previous Tehran and Tripoli agreements had dealt with the question of international inflation and provided for a haphazard figure of 2.5 per cent annual increase, but no mention was made of the question of exchange rates or devaluation. It was natural, therefore, for the oil producing countries to ask for a further increase in the posted price to compensate for the depreciation of the US dollar value vis-a-vis other currencies. Led by OPEC, these countries began a series of negotiations with the operating oil companies in January 1972 in order to reach an agreement on such compensation. By January 20, 1972 an agreement was concluded in Geneva between oil companies and a number of producing countries of the Gulf area which provided for the following adjustments:¹⁴

¹³For more details on the 1971 dollar crisis see: The Economist, (August 7, 1971), p 63; (August 14, 1971), p 53; (August 21, 1971), pp 9 and 53-62; and (December 25, 1971), pp 67-69.

¹⁴The full text of the agreement was published in Petroleum Intelligence Weekly, (January 31, 1972), pp 5-7, also in the Middle East Economic Survey, (January 21, 1972), pp 2-8.

1. An immediate increase in the posted prices of crude oil exported from the Gulf area by 8.49 per cent.
2. The agreement included provisions for further adjustments upwards and downwards, of posted prices based on an index to measure any fluctuation which may occur "between US dollar, the currency of posting prices, and other key currencies" (of nine countries).¹⁵ The mechanism of this index was:
 - (a) To establish a "starting average" which is the arithmetic average of the exchange rate of the nine key currencies against the US dollar, "in terms of central rates as of the effective date, January 20, 1972, against April 30, 1971 IMF rates".
 - (b) The arithmetic average was to be calculated each quarter. If these calculations showed a variation of two points (or more), up or down from the starting average, the new average was to become the effective average commencing on the first day of the following calendar quarter.
 - (c) Accordingly, the 8.49 per cent increase in posted price was to be adjusted on the basis of changes in

¹⁵Key currencies chosen were the currencies of: Belgium, France, West Germany, Italy, Japan, The Netherlands, Sweden, United Kingdom and Switzerland.

—
this average from quarter to quarter, according to
an agreed upon formula.

3. The agreement was considered a supplement to the previous
Tehran agreement of February 1971, and became effective on
January 20, 1972 and was to apply until December 31, 1975.

Following the conclusion of this agreement between the oil companies
and the Gulf States, the Libyan government reached a similar
agreement with the companies operating in Libya providing for
increases in the posted price according to the same formula
applicable in the Gulf States. The Libyan agreement became
effective on January 20, 1972.¹⁶ As a result, the posted price
of Libyan crude of 40⁰ API increased from \$3.386 per barrel
(that was applicable to Libyan crude since January 1, 1972
according to the prior settlements) to \$3.673 on January 20,
1972¹⁷ reflecting the 8.49 per cent increase agreed upon. This
increase in posted price resulted in an increase of 18.4 cents
per barrel in government revenue, ie 9.9 per cent over revenues
calculated according to the posted price prevailing prior to the
January 20 agreement. The following table (Table V-7) shows
how these figures were arrived at.

¹⁶Libyan Currency Settlement of January 20, 1972, Ministry
of Petroleum, Tripoli.

¹⁷See Table IV-3.

Table V-7

Impact of the January 20, 1972

Currency Settlement on the Government's

Revenue per Barrel

	Prior to Settlement	After Settlement
	\$	\$
Posted price	3.386	3.673
Deduct: Production Cost	.500	.500
Royalty (12.5% of posted price)	.423	.459
	<hr/>	<hr/>
Taxable net profit	2.463	2.714
	<hr/>	<hr/>
Government revenue:		
Basic income tax	1.355	1.493
Supplementary payment*	.087	.097
Royalty	.423	.459
	<hr/>	<hr/>
Total government income per barrel	1.865	2.049
	<hr/>	<hr/>
Increase in per barrel revenue		\$0.184 (or 9.9%)
* Supplementary payment calculation:		
	<u>Prior to Jan 20</u>	<u>After Jan 20</u>
Posted price	\$2.570	\$2.788
Deduct: Marketing expenses	.005	.005
	<hr/>	<hr/>
Taxable price	2.565	
Deduct: Cost of production	.500	.500
Royalty	.321	.349
	<hr/>	<hr/>
Taxable net profit	1.744	1.934
Supplementary payment (5% thereof)	.087	.097

The second devaluation of the US dollar and consequent adjustments in the structure of posted prices The December 1971 devaluation in the US dollar did not end the international monetary crisis as the value of the dollar continued to weaken against principal currencies during 1972. The provisions of the Geneva and Tripoli currency settlements failed to remedy the problem of compensating oil producing countries for losing part of their oil revenue purchasing power as a result of this crisis. Fourteen months after the December 1971 devaluation, the US government found it necessary to effect a second devaluation in the value of its currency. The US dollar was devalued on February 13, 1973 by 10 per cent. This devaluation was followed by an almost universal floating of leading currencies and led to major changes in exchange rates of different currencies against the US dollar.¹⁸

Applying the periodical adjustments in posted prices provided for in the previous Geneva, Tehran and Tripoli settlements the posting of Libyan crude became \$3.783 per barrel in the first quarter of 1973. As the adjustments were made quarterly, the posted price rose to \$4.043 on April 1 1973¹⁹ (after the second dollar devaluation occurred). The

¹⁸ Ade T Ojo, "The dollar problem and disorderly floating exchange rates", OPEC Review, Vol III, No 2, (Summer 1979), p 88.

¹⁹ See Table IV-3.

rise in the Libyan posted price from \$3.783 to \$4.043 represented only an increase of 6.87 per cent which fell short of offsetting the 10 per cent decrease in value of the dollar effected by the February devaluation. Correction of the posted price adjustment formula was then called for by the Libyan government as well as other OPEC members and new negotiations with the oil companies started again in Geneva. These negotiations resulted in a supplementary agreement to the January 20, 1971 currency settlements, adopting a modified formula for calculating the adjustment in the posted price necessitated by changes in the dollar value. The new formula became effective from June 1, 1973 and was more remunerative to the oil producing countries. It expanded the currency index to include, in addition to the nine currencies previously agreed upon, the Canadian and the Australian dollars. The adjustments in prices were to be made monthly instead of quarterly and the former 2 per cent change in the exchange rate necessary to trigger a recalculation of posted prices was reduced to 1 per cent according to the new agreement.²⁰

When applied in Libya the formula of the "Supplementary Currency Agreement" resulted in increasing the posted price of Libyan crude, on June 1, 1973, to \$4.252 per barrel. This

²⁰For full text of the "supplementary currency agreement" see: Middle East Economic Survey, (June 1, 1973), pp 6-12.

increase was 12.4 per cent over the price of \$3.783 prevailing during the first quarter of the year and was 20.9 cents more than the adjustment provided for by the first currency settlement. The latter, as previously mentioned, brought the posted price up to \$4.043 per barrel on April 1, 1973 (an increase of only 6.8 per cent while the dollar devaluation was 10 per cent). The impact of these adjustments on government's revenue is illustrated in Table V-8.

Developments after the October War of 1973

The Arab Israeli War of October 1973 and its aftermath has affected the international oil industry to an unprecedented degree. Since the events of the War, the relationship between the oil producing countries and the international oil companies operating in these countries has undergone significant transition affecting all important aspects of oil production, pricing and the division of revenues from the industry.

The War began on October 6, 1973 when Egypt and Syria attacked Israel in an attempt to regain their territories which had been under Israeli occupation since the previous Middle East War of June 1967. Israel's losses early in the hostilities of October 1973 jeopardized its capacity to continue the War. Urgently needing military resupply, she appealed to the United States for help. Despite pleas from the Arab countries for the United States non-intervention,²¹ the US government rushed to aid

²¹Anthony Sampson, The Seven Sisters, op. cit., pp 243-248 and 252.

Table V-8

Impact of the Second Currency Settlement
on the Government's Revenue per Barrel

	Prior to Settlement		After Settlement June 1973
	1st quarter 1973	April/May 1973	
	\$	\$	\$
Posted price per barrel (of 40 ⁰ API)	3.783	4.043	4.252
Deduct: Cost of Production	.500	.500	.500
Royalty (12.5%)	.473	.505	.532
Taxable net profit	<u>2.810</u>	<u>3.038</u>	<u>3.220</u>
Government revenue:			
Basic income tax (55%)	1.546	1.671	1.771
Supplementary payment (5%)*	.101	.110	.117
Royalty (12%)	.473	.505	.532
Total government revenue per barrel	<u>2.120</u>	<u>2.286</u>	<u>2.420</u>
* calculation of supplementary payment			
Posted price (Table V-4)	2.590	2.590	2.590
Adjustments according to currency agreements	.300	.500	.660
Applicable posted price	<u>2.890</u>	<u>3.090</u>	<u>3.250</u>
Deduct: Marketing expenses	.005	.005	.005
Taxable price	<u>2.885</u>	<u>3.085</u>	<u>3.245</u>
Deduct: Cost	.500	.500	.500
Royalty	.361	.386	.406
Taxable net income	<u>2.024</u>	<u>2.199</u>	<u>2.339</u>
Supplementary tax (5%)	.101	.110	.117

Israel with large supplies of military materials. This action disturbed the Arab world and the leaders of Arab oil producing states decided to use their powerful oil weapon in retaliation against the United States and other countries who supported Israel. They ordered a gradual cut-back in oil production and placed an embargo on oil exports to the United States and other countries who supported Israel (namely, The Netherlands).²² Within a month from the start of the War, Arab oil production was reduced by about 30 per cent, from a normal daily volume of 20 million barrels to about 14 million barrels per day.²³ Further production cuts of 5 per cent a month were scheduled for the following periods, with the intention of pressuring the industrial countries to take a stand appreciative of the Arabs' demand for Israeli withdrawal from occupied territories and recognition of the rights of the Palestinian people²⁴ which were the main causes of the conflict. However, because of the favourable response from a number of industrial countries to the Arab cause, by December 1973, the Arab oil producing countries started to ease the embargo and the oil production cuts gradually

²²These measures were decided by the petroleum ministers of the Organization of Arab Petroleum Exporting Countries in their meetings in Kuwait (October 17, 1973 and November 4, 1973). For more details on these decisions see: George Tomeh, "The role of oil in Arab-world relations", Fundamentals of Oil and Gas Industry, (Kuwait, OAPEC, 1977), Vol III (in Arabic), pp 188-192.

²³The Economist, (November 17, 1973), p 5.

²⁴George Tomeh, op. cit., p 189.

until these restrictive measures were completely lifted by the end of the first quarter of 1974.²⁵

The Arab oil embargo and production cuts came at a time when a noticeable shift had already begun in the international oil market with increasing consumption of energy and a growing dependence on oil in meeting world energy needs. A sizeable portion of energy needs of the industrial countries was met by imports of Arab oil. The United States who was during the 1950's and early 1960's an exporter of oil became gradually an importer of foreign oil. While the US imports of oil were increasing during the 1960's by only 6 per cent a year, since 1970 they had risen by 18 per cent annually. Domestic US production in 1973 met only 65 per cent of American demand for oil.²⁶ The balance had to be imported. Nine per cent of US oil needs came from Arab producers. The other industrial countries of Western Europe and Japan²⁷ were even more dependent on Arab oil imports. For example, between January-September 1973, Western European demand for oil was met by 69 per cent Arab imports, 28 per cent non-Arab imports and 3 per cent domestic production. Japan's demand during the same period was also met by 43 per cent Arab imports and 57 per cent imports from other sources.²⁸

²⁵Ibid., pp 192-198.

²⁶Economic Report of the President, (Washington, DC : December 1974), p 44.

²⁷Ray Vicker, The Kingdom of Oil, (New York : Charles Scribner's Sons, 1974), p 9.

²⁸Ibid.

So, when the Arab oil embargo and reduction of production measures were enforced, they created havoc in the international oil market and sent the oil market prices up to unprecedented levels. For example, crude buyers were offering, around the end of October 1973, to pay about \$9 for Libyan oil.²⁹ This price is nearly double the market value of Libyan crude just before the War broke out. The latter was reported on October 1, 1973 to be \$5.50 per barrel.³⁰ The market prices continued to escalate during the latter part of 1973 and early 1974 as oil supplies remained short of meeting market demand because of the embargo and the cut-back in production. By January 1974 the market price of Libyan crude oil reached \$20 per barrel.³¹

In the light of these developments the structure of posted prices agreed upon according to the previous Tehran, Tripoli and Geneva agreements became unrealistic. The OPEC countries were already attempting to reach an agreement with the oil companies over the revision of posted prices even before the October War, on the basis of changes in market conditions and in the light of changes in realized market prices which were rising at higher levels than the agreed posted prices. Because of the failure to

²⁹Petroleum Intelligence Weekly, (October 29, 1973), p 1.

³⁰Petroleum Intelligence Weekly, (October 1, 1973), p 1.

³¹Petroleum Intelligence Weekly, (January 28, 1974), p 11.

reach a satisfactory agreement with the companies, OPEC members found the situation created by the War a suitable opportunity to begin fixing their posted prices on a unilateral basis without the consent of the oil companies. The first unilateral decision in relation to fixing posted prices was taken by the Gulf States on October 16, 1973. They decided to raise the posted price of crude oil exported from the Gulf area by 70 per cent from the price that had prevailed on October 1, 1973.³²

On October 19, 1973 the Libyan government followed suit and raised its price unilaterally to \$8.925 per barrel of 40° API.³³ This increase almost doubled the posted price which was \$4.604 on October 1, 1973. However, the new posted price was based on the Gulf posting and was arrived at in the light of the provisions of previous Tehran and Tripoli settlements.³⁴ The importance of these decisions, as was pointed out previously, was that they were taken unilaterally by the host governments replacing the bilateral norm of decisions concerning posted prices and other financial arrangements in the oil industry. This was a precedent which has changed company/country relations in the following years. The magnitude of the October 1973 increases in the posted price itself was not so great to match the continued escalations

³²Text of the Gulf States Communique issued in Kuwait, (October 16, 1973), Petroleum Intelligence Weekly, (October 22, 1973), p 9.

³³Middle East Economic Survey, (November 2, 1973), p 1, and (November 16, 1973), p 15.

³⁴S Ghanem, The Pricing of Libyan Crude Oil, (Malta : Adams Publishing House, 1975), p 223.

in market prices. For this reason, posted prices were raised again in January 1974 both in Libya and the other producing countries. The Libyan posted price was raised to \$15.768 per barrel of 40° API, effective January 1. The decision was again taken unilaterally by the government.

Impact of post-October 1973 War price increases on the government's revenue Table V-9 illustrates the comparative impact of the posted price escalation which occurred directly after the Arab-Israeli War on the Libyan government's revenue per barrel. According to the provisions of previous currency agreements and the other price agreements, the posted price of Libyan crude reached, on October 1, 1973, \$4.604 per barrel. This price includes all the provided increases for the previous dollar devaluations and the monthly adjustments necessitated by the changes in the value of the dollar vis-a-vis other major currencies. Applying this price in calculating the government's take from the oil companies resulted in a total government revenue per barrel of \$2.629 (Table V-9). This figure represented an increase of about 21 US cents per barrel over the income which the government received during June 1973 - the first month the revised currency settlement became applicable. This increase of revenue came basically from the 8.3 per cent price increase during the period affected evidently by the adjustments for currency fluctuations.

Table V-9

Impact of Changes in the Post-War Posted
Price on the Government's Revenue Per Barrel

	Prior to the War	After the War	
	October, 1-18 1973	October 19, 1973	January 1974
	\$	\$	\$
Posted price per barrel (40° API)	4.604	8.925	15.768
Deduct: Production cost	.500	.500	.500
Royalty (12.5% of posted price)	.576	1.116	1.971
Taxable net profit	3.528	7.309	13.297
Government revenue:			
Income tax (55%)	1.940	4.570	7.313
Royalty	.576	1.116	1.971
	2.516	5.686	9.284
Supplementary payment*	.113	.113	.114
Total government income per barrel	2.629	5.799	9.398

* Calculation of supplementary payment

Posted price	2.590	2.590	2.610
Adjustments for currency fluctuations	.562	.562	.566
	3.152	3.152	3.176
Marketing expenses	.005	.005	.005
	3.147	3.147	3.171
Deduct: Cost	.500	.500	.500
Royalty	.394	.394	.396
Net income	2.253	2.253	2.275
Supplementary payment (5%)	.113	.113	.114

The \$4.604 price effective October 1, 1973 was, according to the prior agreements, to be applicable until the end of the month when the price should be adjusted again on November 1, for any accountable changes in the exchange rate of the dollar vis-a-vis the agreed upon basket of currencies. But with the government's decision on October 19, 1973 to raise the posted price unilaterally to a new height of \$8.925 - following the Gulf States' similar decision - the whole structure of posted prices changed. The previous pricing agreements between the government and oil companies lost their importance in determining the posted prices. Such prices became, since this first unilateral action, determinable by host governments through meetings of the OPEC ministerial committee with many factors playing a part in their pricing decisions as will be pointed out later on in this study.

The first hike in the posted price after the War more than doubled the Libyan government's income per barrel. Such income jumped from \$2.629, during October 1-18, 1973, to \$5.799 after the October 19 new price, an increase of about 120 per cent (Table V-9). When the posted price was raised again on January 1, 1974 to the higher level of \$15.768 per barrel, the government's revenue became more than three-fold its level just prior to the October War, \$9.398 per barrel compared with \$2.629 (Table V-9).

Analysis of the Government's Annual Revenues under the Concessionary Formula

The previous discussion in this chapter has reviewed the major changes that have been introduced into the traditional concessionary model of determining government's income from oil companies since the start of oil activities in Libya. The relative impact of each incurred change in the attributes of this model on government's revenue has been shown. This was done through a per barrel analysis of government's revenue before and after each change, using the applicable posted price for the base crude of 40⁰ API, the prevailing royalty and tax rates and an assumed constant production cost per barrel.

To examine the overall impact of changes in the concessionary formula on the actual annual revenues received by the government in the light of actual trends in the cost of production and the volume of oil production and sales, the relevant data were obtained and are analysed in this chapter. The sources of these data include published materials by the Ministry of Petroleum in Libya, reports of the Central Bank of Libya, Reports of the Auditor General's Office and Annual Reports of the Libyan National Oil Corporation. Unfortunately, no sufficient financial data were available on a company by company basis, but an aggregation of such data for all the oil producing companies was obtained from the above mentioned sources for the period 1962-1979. An attempt is made below to utilize these data in analyzing the development of government's annual income from the oil industry within the

concessionary formula and the relative impact of the factors influencing such income.

As the Libyan oil industry had been from the start of oil activities in the country up to the early 1970's operating under concessions totally owned by the international oil companies, all government's income from oil were, during this period, received in the form of royalties and income taxes provided for by the concessionary formula. But since 1972, the government entered into the operations of the oil industry as an owner of a part of the oil concessions. The first entry of the government in the oil activities was with the full nationalisation in December 1971 of concessions held by BP in Libya.³⁵ This was followed in 1973 by the participation agreements with the rest of the companies operating in the country. With this entry into the oil business, a part of the government's income from the industry became receivable in the form of net profits on its share of oil production and sales. However, the foreign oil companies whose concessions in Libya were partially taken over by the government through the participation deals, have continued to pay the applicable royalty and income tax dues on their remaining share of oil production from these concessions. This

³⁵ Revolutionary Command Council's Decision of December 7, 1971, nationalising British Petroleum Exploration Company.

share of production (or the companies' equity oil) remained subject to royalty and tax payments according to the provisions of the concessionary formula. These payments, however, still represent a major portion of the Libyan government's total income from the oil industry, about one third, (see Table V-10). The rest comes from profits on government's owned oil. The latter will be analyzed in detail in Chapter VI.

In the remainder of the present chapter, the analysis will be limited to government's revenues from the foreign companies' equity oil, or those computed under the concessionary model. Table V-11 shows the general developments in such revenues in relation to the quantities of annual crude oil sales and their taxable value during the entire period 1962-1979. However, to analyze those figures, it would, perhaps, be appropriate to consider them in terms of two sub-periods; the first sub-period (1962-1970) represents the period of companies' dominance in the oil industry. Most of the important decisions affecting revenues during this period were determinable by the companies. The second sub-period is post-1970 when the balance of power had shifted from the oil companies to the government, enabling the government to introduce significant improvements in the concessionary formula.

Period 1962-1970

As shown in Table V-11, there was a steady increase in total revenues from oil activities during 1962-1970. Government's

Table V-10

Government's Annual Revenues from the Oil Industry and Crude Oil Sales

1962-1979

Year	Crude Oil Sales*			Government's Revenues			Percentage Foreign Companies to Total	
	By Foreign Companies	By Government's Corporations	Total Sales	From Foreign Companies	From Government's Corporations	Total Revenues	Crude Sales %	Government's Revenues %
1962	65.4	-	65.4	37.6	-	37.6	100	100
1963	167.7	-	167.7	106.3	-	106.3	100	100
1964	313.8	-	313.8	193.7	-	193.7	100	100
1965	442.6	-	442.6	372.1	-	372.1	100	100
1966	551.1	-	551.1	503.3	-	503.3	100	100
1967	628.6	-	628.6	610.6	-	610.6	100	100
1968	944.4	-	944.4	983.6	-	983.6	100	100
1969	1,124.4	-	1,124.4	1,146.7	-	1,146.7	100	100
1970	1,236.0	-	1,236.0	1,347.1	-	1,347.1	100	100
1971	1,013.3	-	1,013.3	1,769.1	-	1,769.1	100	100
1972	773.7	24.9	798.6	1,565.8	54.3	1,620.1	96.9	96.6
1973	584.2	190.0	774.2	1,526.5	997.1	2,523.6	75.5	60.5
1974	227.4	306.6	534.0	2,272.5	4,071.9	6,344.4	42.6	34.8
1975	203.2	338.9	542.1	2,213.9	3,503.7	5,717.6	37.5	38.7
1976	238.5	464.3	702.8	2,877.9	4,933.0	7,810.9	33.9	36.8
1977	236.2	507.0	743.2	2,975.5	6,013.2	8,988.7	33.1	32.8
1978	240.4	471.7	712.1	2,951.7	5,564.8	8,516.5	33.8	34.7
1979	238.8	514.7	753.5	4,674.6	n.a.	-	31.7	-

*Figures may not agree with those in Table V-2 because of quantities of oil exchanged locally

Sources 1962-1976, from Auditor General's Reports, Tripoli, 1976.

1977-1979, from NOC's Annual Reports and Ministry of Petroleum, Oil and Gas Statistics, various issues 1977-1979.

Table V-11

Annual Crude Sales by Foreign Companies
and Total Revenues Received by Government
under the Concessionary Formula

1962-1979

Year	Sale of Crude Oil		Government's Income			
	Quantity mill bbl	Value mill bbl	Total mill \$	Change %	per bbl \$	% Change
1962	65.4	132.0	37.6	-	0.575	-
1963	167.7	226.2	106.3	+182.7	0.634	+10.3
1964	313.8	612.6	193.7	+82.2	0.617	-2.7
1965	442.6	899.8	372.1	+92.1	0.841	+36.3
1966	551.1	1,104.5	503.3	+35.3	0.913	+8.6
1967	628.6	1,313.7	610.6	+21.3	0.971	+614
1968	944.4	2,046.6	983.6	+61.1	1.042	+7.3
1969	1,124.4	2,434.1	1,146.7	+16.6	1.020	-2.1
1970	1,236.0	2,788.6	1,347.1	+17.5	1.090	+6.9
1971	1,013.3	3,102.4	1,769.1	+31.3	1.746	+60.2
1972	773.7	2,756.5	1,565.8	-11.5	2.025	+16.0
1973	584.2	2,608.3	1,526.5	-2.5	2.613	+29
1974	227.4	3,580.6	2,272.5	+48.9	9.993	+282.3
1975	203.2	3,037.1	2,213.9	-2.6	10.895	+9
1976	238.5	3,859.6	2,877.9	+30.0	12.067	+10.8
1977	236.2	4,362.6	2,975.5	+3.4	12.598	+4.4
1978	240.4	4,367.6	2,951.7	-0.8	12.278	-1
1979	238.8	11,597.1	4,674.6	+58.3	19.575	+59.4

Sources

Figures for 1962-1976, from Auditor General's Reports, Tripoli, 1976.

Figures for 1977-1979, estimates based on quantities of exports and posted prices published by the Ministry of Petroleum.

total receipts climbed from \$37.6 millions in 1962 to \$1.347 billions by 1970, with an annual average growth of 63 per cent during the period. This vast growth was mainly attributed to the growth of production from the newly discovered oil fields in Libya. Petroleum produced from Libyan fields had been and is still being marketed almost totally in the form of crude exports to customers or affiliated refiners. Such exports rose in quantity from 65.4 million barrels in 1962 to 1.236 billion barrels in 1970, representing an annual average increase of 50 per cent which accounted for most of the above mentioned rise in total revenues received by the government.

The vast growth in total revenues generated by increased field production and exports of crude oil was also accompanied by a general increase of government's per barrel revenue during the period. Per barrel income to the government rose by an average of about 8.9 per cent annually from 1962 to 1970. The effect of this rise had almost doubled the amount of revenue per barrel received by the government which rose from 57 US cents in 1962 to \$1.09 by 1970 (Table V-11). Growth in the per barrel revenue was attributable to two principal factors; First, a decline in per barrel deductible costs; Second, improvements in the methods of calculating government's take of royalty and income taxes (ie improvements in the concessionary model).

Decline in deductible cost of production Deductible costs are the costs allowed to be charged to current income for tax

purposes. They include, as previously explained in Chapter IV, lifting and operating expenses, costs of current exploration and dry holes, and the depreciation and amortization charges on fixed assets and capitalized expenditures. Unfortunately, no cost figures were publicly available for the period prior to 1970. However, some rough estimates of the average cost per barrel were derived from available data on the value and volume of annual crude exports and the amounts of royalty and income taxes received by the government. Knowing that taxes during the period were calculable as 50 per cent of the companies' net profits after the deduction of allowed costs, such costs then may be derived by multiplying the amount of income tax by two and subtracting the resultant figure from the reported value of crude sales.

The average per barrel costs arrived at by the above described method are shown in Table V-12 for the period 1962-1970. The table shows a general decline in the per barrel cost during the period. The mean decline for the period was 10 per cent. Costs were particularly high during the first few years in the table because they included losses carried forward from the first years of production for each company. It was also natural for the costs of production to be relatively high during the first few years in the table as production from the Libyan fields had just started and the newly discovered fields had not yet been fully developed to allow production of crude in a more full capacity. When further developments of the oil fields were

Table V-12
Per Barrel Analysis of Sales Price,
Costs and Government's Revenue
1962-1970

Year	Sales Value		Deductable Cost		Government's Income	
	Per bbl \$	% Change	Per bbl \$	% Change	Per bbl \$	% Change
1962	2.018	-	0.874	-	0.575	-
1963	2.005	-0.7	0.739	-15.4	0.634	+10.3
1964	1.955	-2.6	0.719	-2.7	0.617	-2.6
1965	2.033	+4.1	0.629	-12.5	0.841	+36.2
1966	2.004	-1.4	0.448	-28.8	0.913	+8.6
1967	2.090	+4.3	0.406	-9.4	0.971	+6.4
1968	2.167	+3.7	0.354	-12.8	1.042	+7.2
1969	2.165	-0.1	0.397	+12.1	1.020	-2.1
1970	2.256	+4.2	0.353	-11.1	1.090	+6.9

Mean change during 1962-1970 -10.1% 8.9%

Sources per barrel value and income, derived from Table V-11,
costs Table B-2 Appendix B.

completed and production of crude oil increased, the economy of scale was at work, and costs declined annually reaching the level of 35.3 cents per barrel in 1970 when Libyan oil production was at its peak, compared with above 70 cents figures during the first three years in the table.

This decline in per barrel costs had naturally contributed to the reported improvements in government's per barrel revenue from the oil industry. As income taxes were levied at 50 per cent of net profits, any decrease in costs would result in increasing the government's revenue by half of the cost saving. The relative effects of the cumulative decline in cost on government's per barrel income for the period 1962-1970 are presented in Table V-13 and illustrated graphically in Figure V-A.

As shown in Table V-13 and Figure V-A, the improvement of government's per barrel receipts prior to 1975, were entirely due to a decline in the cost of production. In fact, a portion of the cost savings during this period was offset by the decline in the taxable value per barrel. However, 50 per cent of the cumulative rise in government's per barrel income by 1970 was a result of the decreases in cost of production of Libyan oil.

Improvements in the concessionary model Prior to 1965 the Libyan government was receiving its share of revenues from the producing oil companies on the basis of the old 50-50 profit sharing principle. Under this principle, as has been discussed

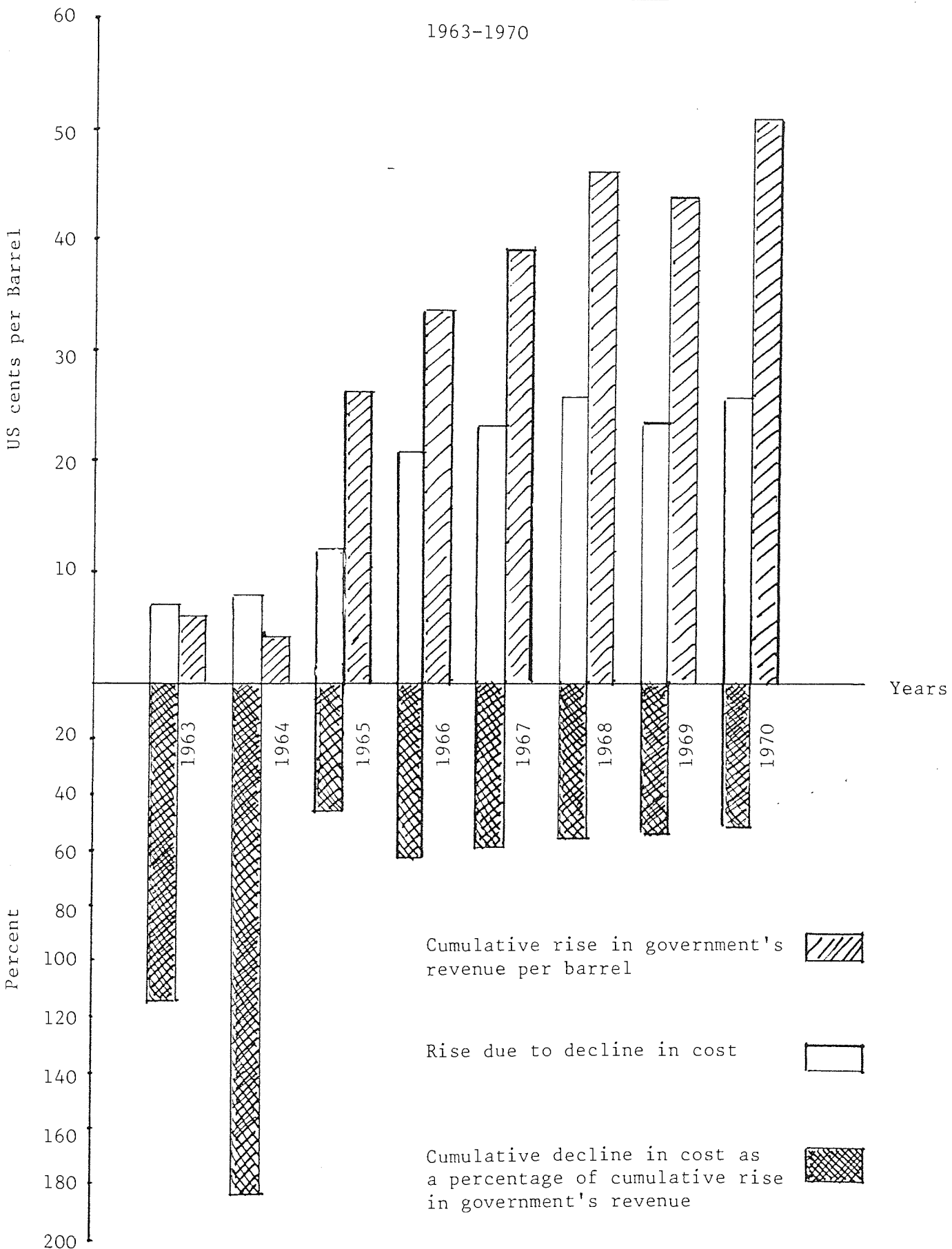
Table V-13
Relative Effect of Cost Decline
on the Government's Income Per Barrel
1962-1970

Year	Per Barrel		
	Cumulative rise in Government's Income	Rise due to Cost Decline	
		US Cents	%
1962	0	-	-
1963	5.9	6.75	114.4
1964	4.2	7.75	184.5
1965	26.6	12.25	46.1
1966	33.8	21.30	63.0
1967	39.6	23.4	59.1
1968	46.7	26.0	55.7
1969	44.5	23.85	53.6
1970	51.5	26.05	50.6

Source Table V-12.

Figure V-A

Effect of the Cumulative Decline in Cost
on Government's per Barrel Revenue



earlier, the government's total income from the outcome of produced oil was fixed at a maximum of 50 per cent of a company's net profit. The royalty payment, though, was defined as 12.5 per cent of the value of crude oil produced, it was considered a part of the total 50 per cent share of profits accruing to the government. Profits for this purpose were computed on the basis of the realized price or the posted price minus whatever discounts the operating company allowed on exported crude. During the period 1962-1964, net revenues of the government averaged about \$0.60 per barrel (Table V-12). Royalty payments accounted for over 40 per cent of this income (Table V-14).

Table V-14

Government's Revenues per Barrel

Broken down to Royalty and Income Tax

1962-1970

Year	Total Income per bbl \$	Royalty		Income Tax	
		per bbl \$	% of total	per bbl %	% change
1962	0.5744	0.2872	50	0.2872	-
1963	0.6337	0.2735	43	0.3602	+25.4
1964	0.6172	0.2686	44	0.5692	-3.2
1965	0.8408	0.2716	32	0.6434	+53.3
1966	0.9133	0.2698	30	0.7128	+13.0
1967	0.9714	0.2586	27	0.7721	+10.8
1968	1.0415	0.2694	26	0.7482	+8.3
1969	1.0199	0.2716	26	0.8131	-3.1
1970	1.0899	0.2768	25		+8.7

Source Auditor General's Report 1976, Tripoli, Libya.

When the OPEC formula of expensing royalties was introduced in Libya during 1965-1966 and the posted price became applicable in valuing Libyan crude oil sales, government's receipts per barrel increased immediately to \$0.84 in 1965 (Table V-12). This rise in the per barrel revenue represented 36 per cent over the 1964 level. It resulted entirely from the increase in the tax payment which jumped from \$0.35 per barrel in 1964 to \$0.57 per barrel in 1965 (Table V-14). This increase reflected the advantage of applying the OPEC formula coupled with a decline in the per barrel cost. The latter was 9 US cents below the per barrel cost for 1964 (Table V-12).

The adoption of the OPEC formula in calculating the Libyan government's income from the oil companies included two important elements; First, the right of the government to receive the royalty in addition to the 50 per cent income tax on the companies' net profits (with net profits being arrived at after deducting the cost of production and the due royalty from the taxable value of oil sales); Second, the application of the posted price instead of the realized price in valuing crude oil for tax and royalty purposes. Prior to 1965, though, a posted price for Libyan crude oil was established by the oil companies (\$2.23 per barrel of 40⁰ API), heavy discounts were made by the companies off this price, and the due taxes were based on the discounted prices. The only discounts off the taxable price which were allowed after the introduction of the OPEC formula were the following:

1. The gravity differential allowance which was at that time calculated as 2 US cents for each API grade of crude below 40° API.
2. A marketing allowance fixed at $\frac{1}{2}$ US cent per barrel.
3. The OPEC allowance which was granted to the oil companies make the expensing of royalty a gradual process. This allowance was to be reduced annually according to an agreed formula until it would be completely eliminated by the early 1970's. But the OPEC allowance was completely eliminated in Libya after the closure of the Suez Canal in June 1976.

When the OPEC formula was used in Libya, it resulted in an increase of about 4 per cent in the average per barrel taxable value during 1965 over the prior year, an increase of around 8 cents (Table V-12). Additional increases in this value occurred in 1967 and 1978 as the OPEC allowance was eliminated from July 1967. These increases had consequently contributed to the growth of the government's per barrel revenues which was 6 per cent in 1967 and 7 per cent during 1968 (Table V-12).

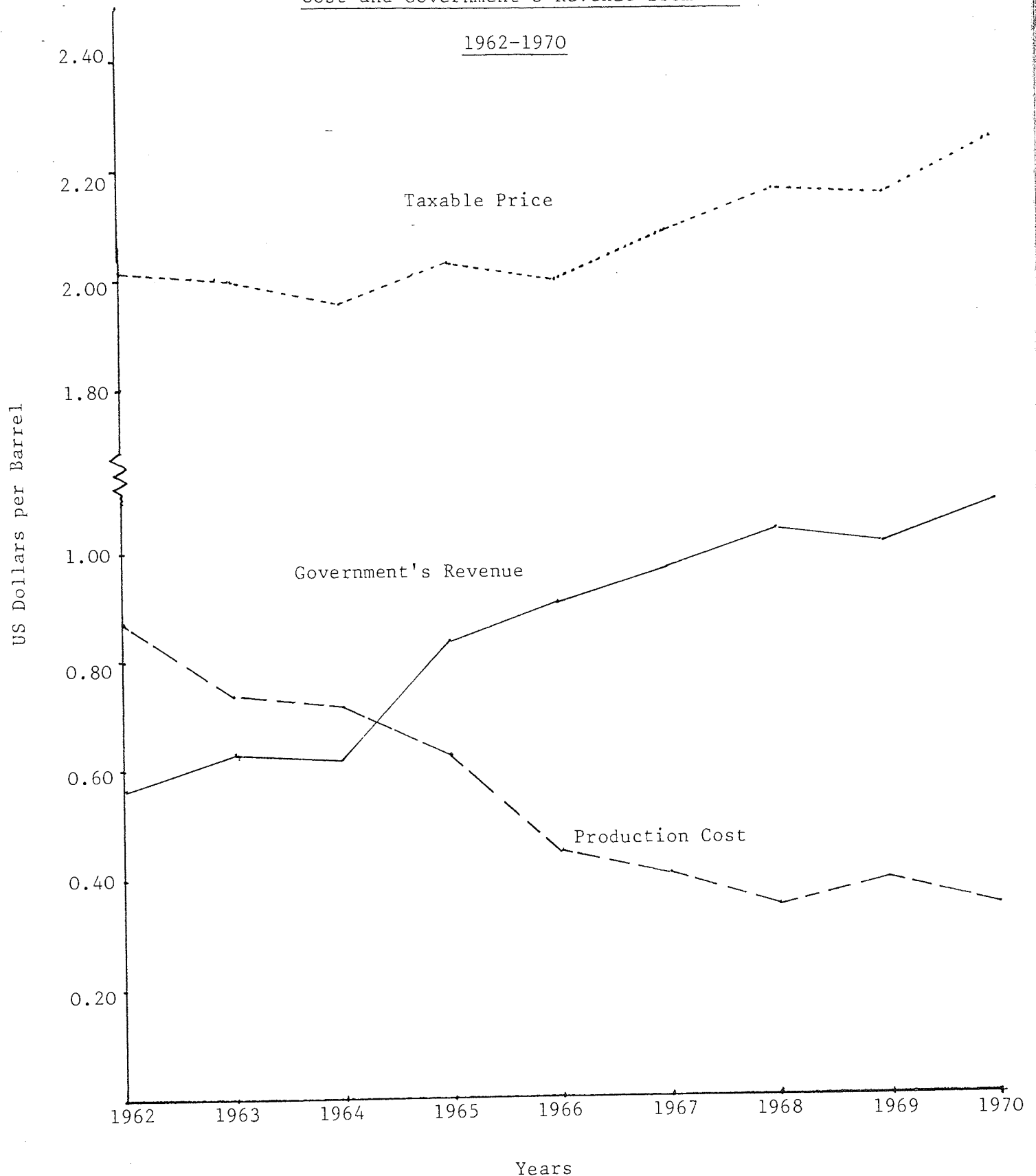
In 1969 there was a slight decline in per barrel revenues of about 2 per cent from their level of 1968. This was largely attributable to a rise in the average per barrel cost which was due to the commencement of production by a new producer* during

*Occidental Libya who is known to have invested heavily in operations in Libya during 1968-1969. See: Central Bank of Libya, Annual Report of the Board of Directors 1968/1969, pp 148-151.

Figure V-B

Development of per Barrel Price,
Cost and Government's Revenue from Oil

1962-1970



Source Table V-12.

the latter part of 1968 whose charged expenses and losses at the start of production had contributed to the 12 per cent increase in the average cost of 1969.

Period after 1970

The vast growth in the government's total annual receipts from the oil industry during the period 1962-1970 was, as indicated in the previous section, mainly attributable to increased production from the Libyan fields. During the same period there was also a general improvement in the government's revenue per barrel. A major portion of such increase in per barrel receipts resulted from the cumulative decline in the cost of production. The introduction of the OPEC formula in Libya in 1965 was an important change in the concessionary model which has boosted the level of per barrel income since 1965. The OPEC formula as previously pointed out changed the method of calculating the government's revenue from oil companies from a maximum of 50 per cent of the companies' net profits computed on the realized prices and inclusive of the royalty payments to 50 per cent of net profits computed on the basis of the posted price in addition to the royalty payment. The OPEC formula allowed for certain discounts from the posted price to make the application of the formula gradual. When these allowances were eliminated on Libyan crude during the latter part of 1967 the per barrel payment to the Libyan government improved as a result.

However, these changes in the method of calculating the government's revenue from oil did not touch the essential elements of the concessionary formula; the basic posted price and the royalty and tax rates. The basic posted price remained at the level of \$2.23 (for the base crude of 40° API) since it was first posted by the oil companies in 1961. This level itself was, as previously pointed out, objected to by the government. But despite the government's disapproval of this price, all the changes that were effected during the 1960's on prices applicable for calculating the government's income from oil were in fact dealing with the discounts allowed from the basic posted price rather than the posted price itself. The royalty and tax rates during the same period had also been kept at the old respective rates of 12.5 and 50 per cent provided for by the original concessionary agreements. The dominant position enjoyed by the concessionary companies together with the extence of over-supplies of crude oil in the international market had helped to maintain this situation and prevent any improvements in the posted price or the income and tax rates throughout the 1960's.

However, since the latter part of 1970 and early 1971, this situation began to change with the government's determined attempts to negotiate with the operating oil companies an increase in the posted price and improvement in its revenue per barrel. The Libyan government started these attempts by reversing the trend of increasing production volumes and

declaring a new oil policy directed towards a conservation of oil reserves. The operating companies were ordered to cut-back their production from the Libyan fields to certain levels decided by the Ministry of Petroleum. These cut-backs started in a number of fields during the latter part of 1970 and was gradually extended to all the Libyan fields during 1971 and 1972. As a result of these reductions, the average daily production in the country dropped from its peak of 3.3 million barrels of 1970 to 2.7 millions in 1971 and to a lower level of 2.2 million barrels in 1972. Consequently, the annual volume of exports by the oil companies went down from 1,236 million barrels in 1970 to 1,013.3 millions in 1971 and to 773.7 millions in 1972 (see Table V-10).

Further cuts in crude oil production and consequently in exports occurred during the latter part of 1973 and early 1974 when all the Arab oil producers including Libya effected the embargo measures following the Arab Israeli War of October 1973. The second half of 1973 also witnessed the emergence of the major participation agreements of the Libyan government and the operating oil companies. As the government acquired a share in the ownership of oil concessions and in the oil produceable from these concessions, the volume of crude available for export by the foreign operators decreased. The total exports of these companies dropped from 773.7 million barrels in 1972 to 584 millions as the participation arrangements applied only from August/September 1973. When the participation system was

applicable during the whole year of 1974, the foreign companies' share of oil exports dropped to 227 million barrels for the year (Table V-10). A further decline in the volume of exports by foreign companies occurred in 1975 when their annual exports reached a lower level of 203.2 million barrels. The decline in 1975 was a result of a general slow down in market demand during the year. As market conditions started to recover in 1976, the volume of exports increased to reach a total of 238.5 million barrels and it remained in the vicinity of that figure during the three following years (Table V-10).

Despite the above mentioned decreases in the volume of exports of foreign oil companies, government's total revenues from these companies have generally been on the increase since 1970. This was due to the tremendous improvements in the per barrel revenue (see Figure V-C). To analyze the behaviour of these revenues since 1970, the period 1970-1979 may be divided into two distinctive sub-periods; the first is 1970-1973, the period of negotiated settlements concerning prices and taxes and royalty structures; the second is 1974-1979, when the norm of negotiated prices and tax and royalty rates was replaced by the government's unilateral decisions usually in coordination with the rest of the oil exporting countries through OPEC.

During 1970-1973 the government's efforts to raise its per barrel revenues from the oil companies resulted in a number of agreements with the operating companies, reached either

Figure V-C

Crude Oil Exports by Foreign Companies and
Government's Income under the Concessionary Formula

1970-1979

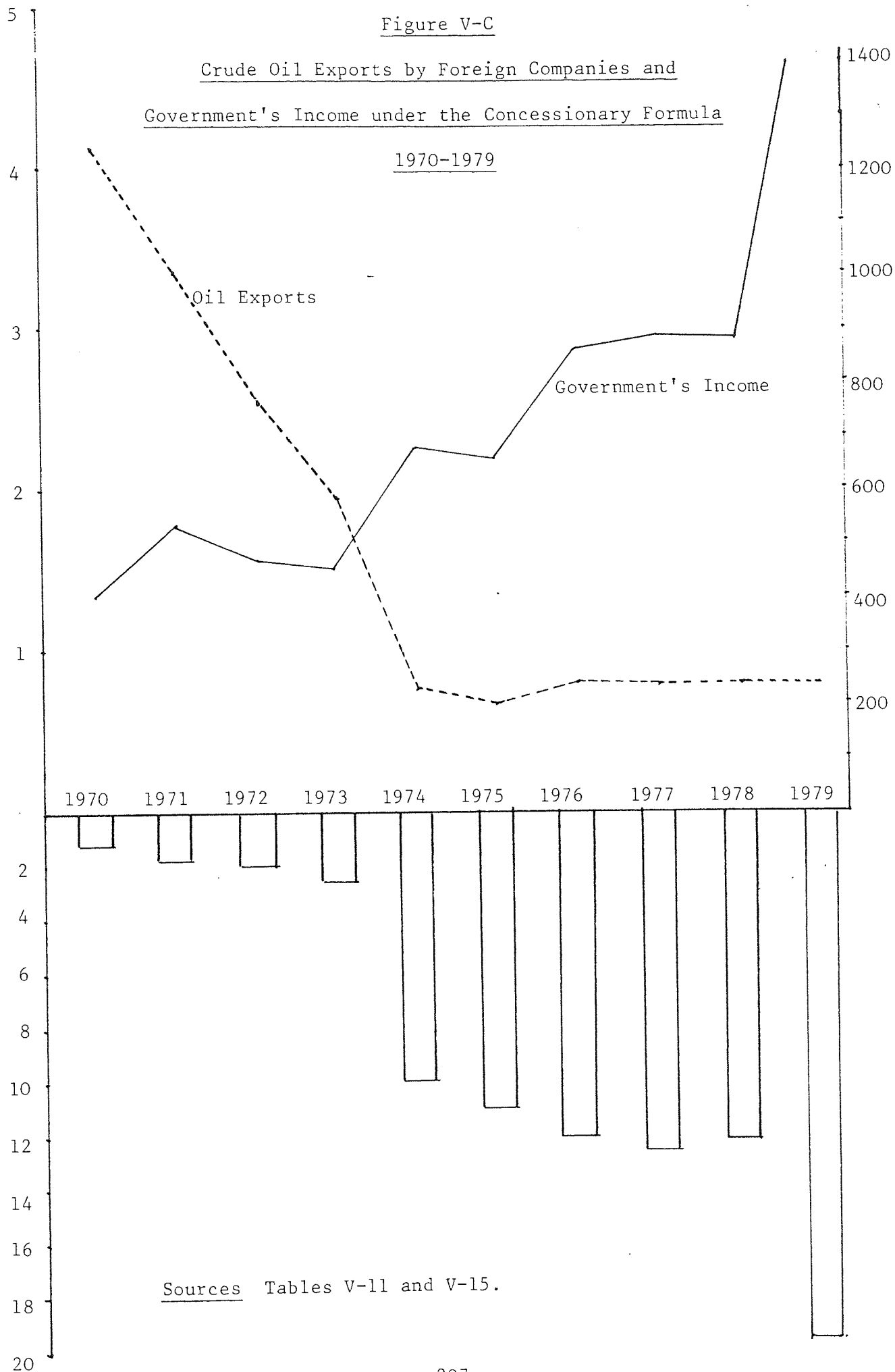
Total Income - Billions of Dollars

Oil Exports

Government's Income

Annual Oil Exports - Millions of Barrels

Per Barrel Income - US \$



Sources Tables V-11 and V-15.

individually or through OPEC over adjustments in the posted price and increase in the tax rate. These agreements were namely: the Tripoli, Tehran, and Geneva agreements which were previously discussed in detail. The adjustments in the posted price provided for by these agreements resulted in doubling the average per barrel value between 1970 and 1973. Such value rose from \$2.256 per barrel (in 1970) to \$4.465 in 1973 (Table V-15). This increase in the taxable value of crude together with the negotiated increase of the income tax rate (which became 55 per cent plus a 5 per cent supplementary tax instead of the old 50 per cent rate) were reflected clearly on the government's receipts per barrel. Such per barrel revenue rose from \$1.090 in 1970 to \$2.613 in 1973 (more than doubled). Although the per barrel cost had also increased during the period but the amount of increase was only minor in view of the jump in the taxable oil price (Table V-15).

As previously pointed out, the Middle East War of October 1973 marked the beginning of a new era in the patterns of determining oil prices and other important matters in company/country relations. The events of the War followed by the Arab oil embargo and production cut-backs created the conditions for all the governments of the oil producing countries to start fixing the crude oil prices unilaterally. Between the latter part of October 1973 and early January 1974 all posted prices were increased a number of times to unprecedented levels. By the first of January 1974 the posted price of Libyan crude

Table V-15
Per Barrel Analysis of Sales Value,
Cost and Government's Revenue
1970-1979

Year	Average Sales Value		Average Cost		Government's Revenue	
	Per bbl \$	% Change	Per bbl \$	% Change	Per bbl \$	% Change
1970	2.256	-	0.353	-	1.090	-
1971	3.062	35.7	0.327	-7.4	1.746	60.2
1972	3.563	16.4	0.370	+13.1	2.025	16
1973	4.465	25.3	0.449	+21.4	2.613	29
1974	15.646	252.7	0.602	+51.7	9.993	282.4
1975	14.946	-5.1	0.785	+30.4	10.895	9
1976	16.183	+8.3	0.825	+5.1	12.067	10.8
1977	18.420	+14.1	0.936	+13.5	12.598	4.4
1978	18.168	-1.6	1.126	+20.3	12.278	-1
1979	28.493	+56.8	1.190	+5.7	19.575	59

Source Average sales value derived from Table V-11
 Average cost: Table B-2, Appendix B
 Government revenue derived from Table V-11.

exceeded the 15 dollar level and remained at this high level throughout the year.

With this jump in the posted price, the government's income from the oil companies during 1974 reached \$9.99 per barrel compared with the average of \$2.613 for 1973 (Table V-15). This was mainly due to the said escalation in the posted price, and was in part due to the introduction of higher rates of royalty and income taxes during the latter part of 1974. The royalty rate was increased from 12.5 per cent to 14.5 per cent from July 1, and was raised again to 16.67 per cent from October 1. The income tax rate was also increased to 60 per cent from July 1, 1974.

Although the average price dropped slightly during 1975 (by 5 per cent), the per barrel revenue received by the government rose by 9 per cent to reach the level of \$10.895. This was attributable to applying the higher rates of royalty and income taxes. The latter was raised again on January 1 to 65 per cent of the companies' net profits. The decline of the average posted price of 1965 was due to a declining market price during the year which necessitated a downward adjustment by OPEC in the posted prices. But when market conditions recovered from 1966 on, OPEC members again adjusted their posted prices accordingly. As the general upward trend of prices resumed, government's revenues increased, reflecting the favourable changes in market conditions directly on receipts from foreign operators (Table V-15).

Summary

The concessionary formula, under which the oil industry in Libya as well as in the other major oil producing and exporting countries have emerged and developed, has been subject to several changes and alterations throughout the years. Although the old arrangements of this formula contained rather attractive features to the advantage of the oil companies, particularly in relation to the issues of oil revenues and pricing, this situation has gradually changed - with the ability of the host countries to secure gradual improvements in their revenues from the oil industry. Although these improvements were rather slow and limited during the early stages - because of the powerful and dominant status for long held by the oil companies, in recent years, the balance of power in the oil industry has drastically shifted away from the companies in favour of the host countries. As a result of this shift of power, the oil producing countries became able to dictate their terms in relation to the important financial provisions of their petroleum agreements with the oil companies. This was manifested in their ability to secure a higher posted price for their crude and to keep the posted price moving up in correspondence to the increasing market price, and in the higher rates of royalty and income taxes which the producers have incorporated into the concessionary model since the early 1970's.

As seen from examining the Libyan example, the application of higher rates of royalty and taxes and the government's

ability to secure favourable adjustments in posted prices have made the concessionary formula capable of maximizing the revenue benefits to the government from any upward trends in the oil market. Consequently government's revenues under the concessionary model, which has remained partially applicable in Libya, have increased both in per barrel terms and in total.

The question of how these revenues generated to the state by the improved concessionary model compare with those receivable under the participating formula will be dealt with in the following chapter.

CHAPTER VI

ANALYSIS OF GOVERNMENT REVENUES UNDER

THE PARTICIPATION FORMULA

Participation, for the purpose of this study, refers to the process of making the government of the oil producing country or its national oil company, acquire by buying or otherwise, a share of the producing foreign oil company (or companies) operating in the country concerned under a traditional concession agreement granted before the idea of state partnership in such concession was developed. It has already been discussed in Chapter III how the idea of government participation in the oil industry has developed to provide an alternative to the traditional form of concessionary arrangements where such concessions were totally owned and operated by foreign companies. There is no need at this stage of the present study to go into the details of reviewing the developments which led to the final adoption of the participation arrangements in the oil industry of the producing countries since a great deal of this has been discussed.

However, since the objective of this chapter is to evaluate the impact of the participation system on government revenues from the oil industry in Libya, one must first identify the variables on the basis of which such revenues are determined.

Therefore, reference to the provisions of the Libyan participation agreements is needed to the extent that they are related to the calculation of government revenues within the participation formula. Such revenues are then analyzed and compared with the alternative concessionary model.

The Original Participation Arrangements in Libya

The first participation deal in Libya's oil concessions came on September 3, 1972, when the government concluded a joint venture agreement with AGIP, an affiliate company of the Italian National Oil Company (ENI).¹ This agreement gave the government's National Oil Corporation (NOC) a 50 per cent share in the oil concessions held by the Italian company in Libya. In return for this share, a compensation was agreed to be paid to the company over a five year period on the basis of the net book value of its assets in the country plus a 3.5 per cent annual interest. Both parties were to share equally the expenditures (capital as well as current expenditures) needed to carry out petroleum operations in the concessions and to receive equal shares of petroleum production achieved from such concessions. The foreign company's portion of production (or equity oil) to which it was entitled under the participation agreement would be

¹Law No 131 of 1972 endorsing a participation contract between the National Oil Corporation and AGIP Inc (issued in Tripoli, September 26, 1972). Full text of the agreement was also published in: Middle East Economic Survey, Supplement, (February 23, 1973).

subject to the usual royalty and tax payments, calculated on the basis of posted prices, as provided for under the concessionary formula. As far as the government corporation's share of production was concerned, the agreement provided that it would be marketed by the foreign partner (AGIP) on the basis of a buy-back price agreed upon. This buy-back price was defined by the agreement as the "half-way price" between the tax paid cost and the posted price² minus a marketing commission to be agreed upon by the two parties. The lifting of the government's crude by the foreign partner would include all or part of the NOC's 50 per cent share at the government's option, for a period of five years (until the end of 1977, the time when the government's compensation obligations would have been fully paid). The inclusion of this provision was intended to help the unexperienced NOC in overcoming the difficulties which it might encounter in entering the oil marketing field. By the end of the given period, "the NOC was hoped to have fully acquainted itself with foreign marketing outlets to be able to market its own share of the crude directly".³

The foreign company (AGIP) was designated in the agreement as the operator of the concessions, and as such, was expressly entrusted with the exploration, production, transport and storage

²"half-way price" (X) = $\frac{1}{2}$ (tpc + posted price)
Where tpc (tax paid cost) equals royalty payment per barrel + tax payment + cost of production. Buy-back price = X - marketing commission.

³"Petroleum Minister's Memorandum", annexed to Law No 131 of 1972, paragraph 3(E).

operations pertaining to the crude oil. The operating company was made responsible to a "management committee" comprising an equal number of representatives for each party (three members for each party).

Although this agreement with AGIP was the first participation deal in the Libyan oil industry, the pattern of Libya's major participation arrangements emerged during the second half of 1973, when the government issued a number of laws providing for acquisition by the state of 51 per cent of all assets and operations of foreign oil producing companies in the country. This acquisition differed from the previous deal with AGIP in two ways. First, it came in the form of a partial nationalisation decree while the deal with AGIP came in the form of an agreement. Second, the percentage share acquired by the government was 51 per cent in the new arrangements compared with 50 per cent share provided for in the participation agreement with AGIP. However, apart from these two differences, other provisions of the participation deal were similar in all companies.

Although the government's decision of acquiring 51 per cent of the oil companies came in the form of partial nationalisation acts, perhaps for political reasons, they were previously negotiated with the main producing companies⁴ and as

⁴S M Ghanem, The Pricing of Libyan Crude Oil, (Valetta, Malta : Adams Publishing House, 1975), p 265.

soon as the decisions were declared by the government, the main companies announced their "acquiescence" to the government's decisions, and signed participation agreements with the government. The first of these "decree/agreements"⁵ emerged on August 11, 1973 when the government declared a "partial nationalisation" (51 per cent) of Occidental Petroleum Corporation's operations in Libya.⁶ This nationalised share was assigned to the government's NOC. The government's decision was immediately followed by the company's announcement of its acceptance of the decision and an agreement was signed on the next day.⁷ The participation deal provided for an immediate cash payment of \$135 millions to the company in compensation for the 51 per cent share taken over by the government. This sum was equal to 51 per cent of the net book value of Occidental's properties in Libya.⁸ The company has the right according to the participation deal to buy all the Libyan share of crude production for the duration of the original concession agreements for a buy-back price which was to be determined from time to time by agreement between the two parties. Occidental continued as the operator of the oil

⁵An expression used by the Middle East Economic Survey, (August 17, 1973), p 3.

⁶Law No 44/1973, Nationalizing 51% of Occidental Libya Inc, (issued in Tripoli, August 11, 1973). Full text of the participation agreement with Occidental was published in: Middle East Economic Survey, Supplement, (August 17, 1973).

⁷Middle East Economic Survey, (August 17, 1973), p 3.

⁸Ibid.

concessions, but a management committee was established to supervise the operations. This committee was to be composed of two representatives of the National Oil Corporation, including the Chairman, and one member representing Occidental Corporation. Although decisions in the managing committee were to be taken by majority, the agreement gave the foreign partner "the right to disassociate itself from any new exploration or development operations in the concessions if such operations were initiated by the Libyan representatives".⁹ Aside from this provision, all expenditures incurred in the concessions whether of capital or current nature were to be shared by the two parties according to their proportionate interests in the joint venture.

A few days after the agreement with Occidental had been concluded, the government reached a similar participation deal with three other companies. They were Amerada Petroleum Corporation, Continental Oil Company and Marathon Petroleum, who were partners with Shell/Royal Dutch Company in a consortium operating in Libya under the name of Oasis Oil Company. All but Shell acquiesced to the government's takeover of 51 per cent of their interests in the consortium, and signed agreements

⁹ S M Ghanem, op. cit., p 264.

to this effect with the Libyan government.¹⁰ Compensations to the three companies were also payable on the basis of the net book value of their assets, but was agreed to be paid in four instalments in the course of two years. Amerada's share of the compensation amounted to \$18.4 million, with \$42.5 million to Continental, and \$42.5 million to Marathon.¹¹ These amounts were corresponding to 51 per cent of the companies' respective interests in Oasis' assets which were 16.666. per cent, 33.333. per cent and 33.333. per cent respectively. Shell's remaining share of 16.666. per cent was subsequently fully taken over by the government after the company refused to accept the participation decision.¹² By this nationalisation, the government's participation share in Oasis increased to 59.2 per cent.

By September 1973, the Libyan government "nationalised"

¹⁰ Law No 51/1973, endorsing the participation agreement between the Libyan government and Amerada Petroleum Corporation of Libya, Continental Oil Company of Libya and Marathon Petroleum Libya Limited, (issued in Tripoli : August 18, 1973). For full text of the agreement see: Middle East Economic Survey, Supplement, (August 24, 1974).

¹¹ Central Bank of Libya, Eighteenth Annual Report of the Board of Directors, for the financial year 1973-1974, p 143.

¹² Law No 35/1974 nationalising Shell Exploration en Productie Maatschappij (Libya) NV, (issued in Tripoli : March 30, 1974).

51 per cent of the rest of the producing companies,¹³ and most of the companies concerned acquiesced to the government's decision and entered into participation agreements with the NOC. For the few companies who rejected the partial nationalisation decision, their interests in Libya were subsequently fully taken over by the government in early 1974.¹⁴ By the full nationalisation of the interests of a number of companies, the government's share in oil operations was raised to levels above the 51 per cent initial target. Table VI-1 below shows the status of ownership in the major Libyan oil producing companies before and after the participation and nationalisation procedures. This table does not include details of a number of small oil operators in the


¹³Law No 66/1973, nationalising 51% of operating oil companies, (issued in Tripoli : September 1, 1973). Full text of the law was published by Middle East Economic Survey, Supplement, (September 14, 1973), pp 2-7. Companies included in this nationalisation decree were the following:

1. Esso Standard Libya Inc, owned by Exxon
2. Esso Sirte Inc, owned jointly by Exxon (50%), Libyan American Oil Co - a subsidiary of Atlantic Richfield Co (25.5%) and Grace Petroleum Corp (24.5%)
3. Mobil Oil Libya Ltd, owned jointly by Mobil Corp (65%) and the German, Gelsenberg Co (25%)
4. American Overseas Petroleum Ltd, owned by Texaco Overseas (50%) and California Asiatic (50%)
5. Shell Exploration en Productie Maatschappij (Libya) NV, owned by Shell/Royal Dutch Group.

¹⁴Law No 10/1974 nationalising Texaco Overseas Petroleum Co and California Asiatic Oil Co, (issued in Tripoli : February 11, 1974); Law No 11/1974 nationalising Libyan American Oil Co, (issued in Tripoli : February 11, 1974); and Law No 35/1974 nationalising Shell Exploration Maatschappij (Libya) NV, (issued in Tripoli : March 30, 1974). The nationalised interests of Shell included its concessions with the Oasis group in addition to a number of concessions independently operated by Shell. But the latter were still non-productive of petroleum.

Table VI-1

The status of ownership of major Libyan oil concessions before and after participation

 <p>Aston University</p>	<p>Content has been removed for copyright reasons</p>
---	---



* on basis of 1979 production (Oil and Gas Statistics, Ministry of Petroleum, Tripoli, 1979 issue)
 ** Previously BP Exploration Company owned jointly by British Petroleum and Nelson Bunker Hunt (50% each). The company was fully nationalized by the government (prior to the emergence of participation) in 1971 for political motives.

Source: Ministry of Petroleum, Tripoli.

country whose activities continued to be carried out under the concessionary system or under different sharing arrangements with the NOC. Such companies were not affected by the participation or nationalisation decisions and their production did not represent a significant proportion of the total Libyan oil production (about 1 per cent in 1979 - Table VI-1).

Structure of the Government's Revenues under the Participation Scheme

By participation in the oil concessions, the status of the Libyan government changed from a mere collector of royalties and income taxes on petroleum produced and sold from these concessions by the international oil companies, to a partner in the ownership and operations of the oil companies. As a partner in the oil concessions, the government's National Oil Corporation became entitled to receive a proportionate share in the oil produced from the concessions. Such a share of production was to be sold by the NOC and any profits realized from it would appertain to the government, representing a form of the government's revenue not familiar under the pure concessionary formula. Although the NOC is required by law to pay royalties and income taxes on the same basis as applicable to all oil companies operating in the country, this, in reality, has no significance in terms of the ultimate revenue to the government. Since the NOC is wholly owned by the government, its net realized profits, whether delivered to the treasury in the form of royalties and taxes or retained in the corporation, represent in total the income to the country from participative oil and

will be considered as such in this discussion.

As earlier pointed out, the Libyan participation arrangements gave the NOC a percentage share in the assets and operations of the concerned oil companies and imposed upon it certain obligations. The ownership share of the NOC in the oil companies varied, after all the participation and nationalisation procedures, from 50 per cent in the first participation deal with AGIP, to 51 per cent in Occidental, Esso Standard and Mobil, to around 60 per cent in Oases and Esso Sirte, to 100 per cent (or a complete ownership) in Umm-Al-Jawabi. In terms of percentage of total country's production, the government became the owner of about 67 per cent of this production after all the participation and nationalisation steps were completed (Table VI-1). The acquisition of such ownership carried with it, in addition to the right of the NOC to receive its corresponding share of production, the obligation of sharing future expenditures and capital commitments needed for petroleum operations in the oil concessions as well as the payment of compensations for the acquired interest. Furthermore, the participation arrangements obliged both the NOC and the foreign partners for most of the NOC's share of production to be bought back by the foreign partners at buy-back price determined by mutual agreements from time to time.

As far as the foreign partners' share of production (equity oil), to which they remained entitled under the participation arrangements, was concerned, no provisions in the participation

arrangements have affected any changes in the foreign companies' rights and obligations concerning this production. Thus, crude oil receivable by the companies, in satisfaction of their proportionate share in the concessions, has continued to be subject to royalty and income tax payments to the government on the basis of posted prices and the royalty and tax structure provided for by the concessionary formula. The participation agreements themselves did not alter the structure of these payments nor did they change the accounting formula for their calculations - aside from reducing the foreign companies' volume of crude oil subject to royalty and tax payments by that portion taken over by the NOC. However, significant changes have, later on, occurred in the structure of the concessionary formula as a result of factors other than the participation agreements. These included changes in the posted price and alterations in the royalty and tax rates, which have been discussed previously in this study. The comparative effects of these changes on the government's income will be dealt with in more detail in a following section of this chapter.

Going back to the subject of what impact the introduction of the whole participation system had on the government's revenues from the oil industry, one must distinguish between the two forms of revenue which became constituent of the total government's receipts from the industry after the emergence of participation. The first is the profit derived from the National Oil Corporation's share of oil production. The second is the payments made by the

foreign partners to the government in the form of royalties and income taxes on their share of equity oil. Since the latter has already been discussed in detail in Chapter V, the emphasis here will be placed on examining attributes of the NOC's income.

Income from the NOC's share of participation oil

Income from oil allocated to the National Oil Corporation from producing concessions is determined on the basis of the realized prices which the corporation obtains from selling such oil after deducting the corporation's share of costs incurred in each respective company. The methods of determining these costs in the Libyan oil industry has not changed after the government's partial takeover of the industry. The basic provisions of the Petroleum Law No 25/1955 remained applicable in relation to computing the costs of production in various oil companies.¹⁵ These provisions have been dealt with in a previous chapter. The main changes have, however, been in the pricing structure of crude oil.

Marketing and pricing of participation oil

The Libyan participation arrangements secured to the oil companies who accepted the participation deal with the government to continue lifting the NOC's share of crude oil produced from the respective concessions at buy-back prices determined by

¹⁵ Interview with Mr M Murshid, Financial Advisor to the NOC, (Tripoli : January 22, 1980).

agreement but generally on the basis of market conditions. The buy-back arrangements came in a number of subsequent implementing agreements concluded between the NOC and individual companies. The first participation deal with Occidental which was the standard followed by the agreements with other companies gave Occidental the right to buy the 51 per cent share of crude oil allocated to the National Oil Corporation for the duration of the company's original concessions. The first price for this crude which was agreed upon when the participation deal was introduced was \$4.980 per barrel. This price which became effective from August 11, 1973 (the date of introducing the participation deal), was also agreed to be adjusted every six months on the basis of changes in market conditions.¹⁶ At the time of the agreement this agreed buy-back price was about 48 cents higher than the posted price of \$4.582 applicable during the period August-September. The buy-back price was set at a higher level than the applicable posted price mainly because posted prices were at the time lower than the market level.¹⁷ This situation was of course prior to the events of the Middle East War of October 1973. Posted prices at that time in all the oil exporting countries were arrived at by negotiation between host governments and the operating oil companies, and the \$4.582 price for Libyan crude oil was the result of the previous

¹⁶Middle East Economic Survey, (August 17, 1973), p 3.

¹⁷"Key crude oil price posting around the world", Petroleum Intelligence Weekly, (December 31, 1973), p 11.

agreements of Tehran, Tripoli and Geneva described in the previous chapter. According to these agreements the Libyan posting was to rise to \$4.604 per barrel by October 1, 1973. It must also be mentioned that the oil exporting countries including Libya were attempting through OPEC to reach an agreement with the oil companies on increasing the official posting on the basis of the rises in prices that were taking place in the oil market. A working party set up by OPEC to study oil prices, recommended in September 1973 an increase in posted prices in member countries of between 93 per cent and 106 per cent from their prevailing level at that time. This recommendation was based on the prevailing market prices of crude oil and on keeping a relationship between the posted price and the market price of 1.4 posted price to 1 realized price from the market.¹⁸ But the attempts of OPEC members to reach an agreement with the oil companies over the adjustments of prices to a level compatible with market prices were met by resistance from the oil companies.¹⁹ But soon, the whole structure of oil prices and the procedures of their determination changed after the events of the Middle East War of October 1973 as will be seen later on in this chapter.

¹⁸Petroleum Intelligence Weekly, (October 15, 1973), p 1; and (October 22, 1973), p 10.

¹⁹S M Chanem, The Pricing of Libyan Crude Oil, op. cit., pp 218-219.

Comparative Analysis of the Government's Revenue
From Participation Crude Oil under the First
Agreed Buy-Back Price

On the basis of the first agreed buy-back price of \$4.980 per barrel which was mentioned above and assuming a cost of production per barrel of \$0.449 (which was the average cost for the Libyan oil industry during 1973),²⁰ the participation deal gave the government a net income of \$4.531 on each barrel of oil received by the NOC. This income was \$1.94 (or 71 per cent) higher than income receivable from the foreign oil companies under the concessionary formula (see Table VI-2). With the posted price of \$4.582 per barrel prevailing during August/September 1975 (when the participation deals emerged) and on the basis of the applicable tax and royalty rates of 55 per cent and 12.5 per cent respectively, the government's revenue under the concessionary formula was only \$2.646 per barrel. The latter was composed of the royalty and income tax levies plus the supplementary tax payment of 5 per cent payable by the oil companies according to the previous settlements (see Chapter V).

When the posted price of Libyan crude oil rose to \$4.604 per barrel on October 1, 1973 incorporating the adjustments provided for by the previous pricing settlements, the government's

²⁰ See: Table B-2 in Appendix B of this study.

Table VI-2

Illustration of Comparative Government Revenue
Per Barrel under the First Agreed Buy-Back Price

	NOC's participation crude	Foreign company's concessionary crude	
		Aug-Sep 1973	Oct 1 1973
	\$	\$	\$
Price per barrel (of 40° API)	4.980	4.582	4.604
Deduct: Cost of Production	.449	.559	.449
Royalty (12.5%)	-	.573	.576
Net profits	<u>4.531</u>	<u>3.560</u>	<u>3.579</u>
Government's income per barrel			
Royalty	-	.573	.576
Income tax	-	1.958	1.968
Supplementary payment*	-	.115	.115
Net profits	<u>4.531</u>	<u>-</u>	<u>-</u>
Total government revenue per barrel	<u>4.531</u>	<u>2.646</u>	<u>2.659</u>

*Computation of supplementary payments

Posted price January 1, 1973	2.59	2.59
Adjustments for devaluation and currency fluctuations	.547	.562
Posted price applicable	<u>3.137</u>	<u>3.152</u>
Deduct: Marketing expenses	.005	.005
Taxable price	<u>3.132</u>	<u>3.147</u>
Deduct: Royalty (12.5%)	.392	.394
Cost	.449	.449
	<u>2.291</u>	<u>2.304</u>
Supplementary payment 5%	.115	.115

revenue from foreign oil companies (the concessionary formula) increased by 1.3 cents per barrel from \$2.646 to \$2.659 (Table VI-2). But this slight increase did not effect any significant change in the advantage of the participation model over the concessionary formula which remained at a 70 per cent level.

Changes in Oil Pricing Structure after the October War

The conditions underlying the above analysis were subject to drastic changes which began to take place shortly after the introduction of the participation arrangements. These changes were mainly a result of the dramatic changes in the international petroleum situation created by the Arab Israeli War of October 1973 and the oil embargo enforced by the Arab oil producing states on certain countries. Such events created a shortage in the world's oil supplies and pushed the market prices for crude oil to unprecedented higher levels. Uncertainties in the international oil situation resulting from these events were also accompanied by a significant shift in the balance of power in the oil industry and transformation in the company/country relationships in the major oil exporting countries of the world.

OPEC members who were already, prior to the events of the War, attempting unsuccessfully to negotiate with the oil companies some increases in posted prices to compensate for inflation and increasing oil market prices, saw the new situation in the international oil market as a suitable opportunity to begin fixing their posted prices unilaterally. As a result,

posted prices in all OPEC member countries were raised a number of times following the October War. The first of these rises was initiated by the Arabian Gulf States on October 16, 1973. They decided to increase the posted price of the Arabian light crude of 34^o API (the marker crude) by 70 per cent from its October 1 level of \$3.011 per barrel. This increase brought the marker crude up to \$5.119 and created a relationship of 1.4 to 1 with the prevailing market price which was \$3.65 per barrel for the same crude. The Gulf States intended that this relationship between the posted price and the market price should be maintained all the time with the necessary adjustments in the posted prices to be made whenever a change (of 1 per cent or more) in market prices occurs.²¹ All other crudes were to be raised in accordance to the marker crude and with the necessary adjustments for quality and geographical differentials.

The decision of the Arabian Gulf States to increase the posted price was followed by similar increases in other OPEC members using the same formula applied in the Gulf countries. According to this formula, the posted price of Libyan crude oil was raised to \$8.925 per barrel (of 40^o API), effective October 19, 1973. The new price took into account the 70 per cent increase initiated by the Gulf states plus the allowances for

²¹OPEC Gulf States Communique, (Kuwait : October 16, 1973), published in Petroleum Intelligence Weekly, (October 22, 1973), p 9.

the quality and freight advantages of the Libyan oil.²² When all these were considered, the resultant increase almost doubled the previous posting of \$4.604 per barrel prevailing since October 1, 1973.

In spite of this jump in the posted price, market prices of crude oil shot even higher in the turmoil of the oil crisis created by the War and the embargo and production cut-backs. In November and December 1973, all crudes were selling in the open market at prices way above their official postings. For example, Nigeria's crude (posted at \$9.310)²³ was auctioned in November for \$16 per barrel;²⁴ Iranian crude was selling in early December in the open market for \$17 per barrel²⁵ (compared with its official posting of around \$6 per barrel).²⁶ Algerian oil was also sold for between 14 and 16 dollars per barrel in the middle of December.²⁷

When the OPEC oil ministers met in Tehran on December 22, 1973 to reconsider the posted price structure in view of the changes that had taken place in market conditions, a new posted

²²S M Ghanem, op. cit., p 223.

²³Petroleum Intelligence Weekly, (January 7, 1974), p 9.

²⁴Loring Allen, OPEC Oil, (Cambridge, Mass. : Oelgeschlager, Gunn & Hain Publishers Inc, 1979), p 17.

²⁵Petroleum Intelligence Weekly, (December 24, 1973), p 4.

²⁶Ibid, (January 7, 1974), p 9.

²⁷Ibid, (December 17, 1973), p 3.

price was established for the marker crude (the Arabian light crude of 34⁰ API). The new price for the marker crude was fixed by the OPEC ministers at \$11.651 per barrel effective January 1, 1974, and all other crudes of member countries were to be brought in line with this posting after making the necessary adjustments in the quality and freight differentials of the individual crudes.²⁸ When implemented in Libya, these adjustments raised the Libyan 40⁰ API crude posted price to \$15.768 on January 1, 1974.²⁹ These posted price increases in Libya and the other OPEC members once again reflected the new trend in the oil producing countries/companies relations; a decision taken by the unilateral action of producing countries, and because of the international oil market situation, oil companies had to accept it.

The January increase in the posted price which brought the Libyan crude price up to \$15.768 per barrel was justified as explained earlier by the increases that had occurred in oil market prices. But although the new posting represented for the Libyan crude an escalation of 77 per cent from the price posted on October 19, 1973, it was still below the market level of Libyan crude prices. The latter was reported to have been around \$20 per barrel during January 1974.³⁰ The market prices

²⁸Text of the Tehran oil price decision was published in Petroleum Intelligence Weekly, (December 31, 1973), p 10.

²⁹S M Ghanem, op. cit., pp 224-225.

³⁰Petroleum Intelligence Weekly, (January 28, 1974), p 11.

of crudes in general were extremely high because of the uncertainties and panic in the world petroleum market - created by the oil embargo and cut-backs in production. But as soon as the embargo was lifted and the cut-backs were restored by the end of the first quarter of 1974, market prices started to decline. However, the decrease in market prices during 1974 was not as high as to necessitate a change in the posted price. For the rest of 1974 and until the end of the first quarter of 1975, posted prices were frozen by OPEC at their January level.³¹

Although there were no changes in the posted price during this period, significant adjustments were introduced by the oil producing countries in the rates of royalty and income tax levies on concessionary crude oil. At the OPEC's ministerial conference held in Quito, Ecuador on June 15-17, 1974, an increase of two percentage points in the rate of royalty was recommended.³² This increase in royalty was implemented in Libya from July 1, 1974. The royalty rate was thus raised from the traditional 12.5 per cent to 14.5 per cent.³³ Further adjustments in the royalty and income tax rates came later in the year - decided by OPEC³⁴ and

³¹OPEC's Resolutions: No XXXVII-167, (Geneva : January 7-9, 1974); No XXXVIII-168-169, (Geneva : March 16-17, 1974); and No XL-171, (Quito, Ecuador : June 15-17, 1974).

³²OPEC Resolution No XL-172, (Quito, Ecuador : June 15-17, 1974).

³³Law No 76/1974, (issued in Tripoli : October 21, 1974).

³⁴OPEC's Resolution No XLI, (Vienna : September 12, 1974).

adopted in Libya. On October 1, 1974 the royalty rate became 16.67 per cent and the income tax rate was raised from 55 per cent to 60 per cent,³⁵ with a further increase in the tax rate to 65 per cent effective January 1, 1975.³⁶ These revised rates remained applicable in determining the government's revenue from the oil companies' equity oil until the time of drafting this study.

The posted price level of 1974 continued to be applicable throughout the first quarter of 1975. But when the trend of decline in market prices for crude oil persisted during the middle of 1975 - manipulated by a continued slow down in world demand for oil, OPEC decided to decrease the posted prices accordingly. The Libyan posted price was cut by \$0.768 to become \$15.00 per barrel of 40⁰ API effective April 1, 1975. A further cut in the posted price was effected on June 1, 1975 when the Libyan posting was reduced to \$14.60 per barrel. These two cuts in the posted price reflected, as mentioned above, adjustments necessitated by the general drop during the period in market demand for oil which led to a drop in market prices. But the decline in oil prices was only a temporary phenomena lasting for a few months. When the oil market started to recover during the latter part of 1975, both posted and market prices of crude oil, in Libya as well as in other oil producing countries,

³⁵ Law No 77/1974, (issued in Tripoli : October 21, 1974).

³⁶ Law No 2/1975, (issued in Tripoli : January 1, 1975).

resumed their upward trend again. On October 1, 1975 the Libyan posted price was readjusted upwards to \$16.060 per barrel and the general trend of increasing prices continued to be the character of crude oil during the years that followed. But the magnitude of such increases have been rather moderate compared with the events of 1973 and early 1974.

Developments of buy-back prices after the War

It has been pointed out earlier in this chapter that the Libyan government was committed by the original participation agreements to sell most of its participation crude oil back to the foreign partners at buy-back prices to be agreed upon from time to time. The first participation deal with Occidental, which established the pattern for the consequent agreements with the other operating companies, fixed a buy-back price of \$4.980 per barrel. This price was originally agreed to apply for the first six months from the date of the participation agreement (August 11, 1973) and was to be adjusted every six months on the basis of changes in market conditions. However, with the dramatic changes in the oil market structure that followed the October War, this price soon became unrealistically outdated in the light of the jump in market and posted prices. For this reason, the structure of the buy-back price had to be revised only two months after its initiation. On October 19, 1973, the buy-back price was raised to \$7.60³⁷ per barrel to

³⁷ National Oil Corporation, Brega Oil Marketing Co, External Marketing Division, Official Libyan Oil Prices.

bring it in line with the escalated market prices. The new buy-back price was \$1.33 below the corresponding posted price (which was \$8.92 on October 19). When market prices continued their dramatic escalation during the latter part of 1973 and early 1974 and the posted price was raised accordingly to \$15.768 by January 1, 1974, the buy-back price was again pushed up to the high level of \$16 per barrel.³⁸ This new level was slightly higher than the posted price (1.5 per cent higher) because market prices were at that time even higher than both the posted price and the buy-back price. When quantities of Libyan government's crude were offered during January 1974 on the open market, prices offered were as high as \$20 per barrel.³⁹ But these prices were of short-term sales reflecting the desperate atmosphere created by the War and the oil embargo and cut-backs. Because governments generally prefer to deal on rather long-term basis with the operating oil companies, yet benefiting from any favourable changes in market conditions, the whole structure of the buy-back arrangements were then rearranged. The new arrangements in Libya, exemplified by the agreement between NOC and both Esso Standard and Esso Sirte (on April 16, 1974) provided for the buy-back prices to be fixed by the Libyan government at levels approximating market prices. The foreign partners were

³⁸ Ibid.

³⁹ Petroleum Intelligence Weekly, (January 28, 1974), p 11.

given "a preferential right to purchase the corporation's crude oil attributable to the corporation's undivided interests in the concessions acquired from the second parties (Esso Standard and Esso Sirte)".⁴⁰ This preferential right includes all or part of the NOC's share of production at the foreign companies' choice.

When the market demand for crude oil started to slow down after the first few months of 1974 and market prices began to decline, the government became unable to market the NOC's share of crude oil at the price of January 1974. The buy-back price had to be reduced a number of times between April 1974 and June 1975 to match the market decline. The official buy-back price of the 40⁰ API crude exported from Brega terminal (which represented the Libyan marker crude), for example, was first reduced from \$16 per barrel to \$14.80 per barrel on April 1, 1974. Further reductions were subsequently effected as the oil market continued to decline later in the year and early 1975. These reductions brought the Brega 40⁰ API crude price down to \$13.30 in the third quarter of 1974, \$12.50 during the fourth quarter of 1974, \$11.86 by January 1, 1975, \$11.56 during April-May, 1975, and by June 1, 1975 the buy-back price went as low as \$11.20, (See Table VI-3). This decline in price brought the buy-back price to a level below the \$15.768 posted price which remained unchanged during the whole of 1974 and until the

⁴⁰Participation implementation agreement between the National Oil Corporation and Esso Standard Libya Inc and Esso Sirte Inc, concluded on April 16, 1974.

Table VI-3

Comparison of posted price and buy-back price
per barrel of 40° API since the
introduction of participation until 1980

Period	Buy-back price \$ ¹	Posted price \$ ²	Difference \$ per barrel 2-1	% difference 2-1
Sep 1, 73 - Sep 30, 73	4.980	4.582		
Oct 1, 73 - Oct 18, 73	4.980	4.604		
Oct 19, 72 - Oct 31, 73	7.600	8.925		
Nov 1, 73 - Dec 31, 73	7.600	9.061		
Average for period in 73	6.694	7.287	0.593	8.9
1974:				
Jan 1 - May 31	16.000	15.768		
Apr 1 - Apr 30	14.800	15.768		
May 1 - Sep 30	13.000	15.768		
Oct 1 - Dec 31	12.500	15.768		
Average 1974	13.900	15.768	1.868	13.4
1975:				
Jan 1 - Mar 31	11.860	15.768		
Apr 1 - May 30	11.560	15.000		
Jun 1 - Sep 30	11.200	14.600		
Oct 1 - Dec 31	12.320	16.060		
Average 1975	11.705	15.324	3.619	30.9
1976:				
Jan 1 - Jun 30	12.320	16.060		
Jul 1 - Dec 31	12.620	16.350		
Average 1976	12.470	16.205	3.735	29.9
1977:				
Jan 1 - Jun 30	13.920	18.250		
Jul 1 - Dec 31	14.200	18.750		
Average 1977	14.060	18.515	4.455	31.7
1978:				
Jan 1 - Mar 31	14.000	18.340		
Apr 1 - Dec 31	13.850	18.170		
Average 1978	13.888	18.213	4.323	91.1
1979:				
Jan 1 - Feb 20	14.690	19.250		
Feb 21 - Mar 2	15.370	20.210		
Mar 3 - Mar 31	16.070	21.200		
Apr 1 - May 15	18.250	24.280		
May 16 - May 26	18.940	25.280		
May 27 - Jun 30	21.260	28.530		
Jul 1 - Oct 14	23.450	31.620		
Oct 15 - Dec 12	26.220	35.530		
Dec 13 - Dec 31	29.950	40.800		
Average 1979	21.211	28.538	7.327	34.5
1980:				
Jan 1 - Apr 30	34.670	na		
May 1 - May 31	35.440	na		
Jun 1 - Jun 30	36.670	na		
Jul 1 - Dec 31	37.000	na		
Average 1980	36.066	na		

Sources: Posted prices 1973-1979 Ministry of Petroleum, Tripoli
Buy-back prices obtained from National Oil Corporation, Brega
Oil Marketing Co, External Marketing Division, Tripoli. For
1980 the figures were obtained from World Oil, (August 15, 1980),
p 55; and Financial Times, (December 30, 1980), p 1.

end of the first quarter of 1975.

When the average annual price was calculated (Table VI-3) for each, the buy-back price and the posted price (of the Libyan crude of 40⁰ API), the gap between the two sets of prices during 1973 was 8.9 per cent,* ie, the posted price was 8.9 per cent higher than the buy-back price. With the buy-back price decline in 1974, while the posted price remained unchanged, the gap between the two average prices became 13.4 per cent. This gap became much wider (more than doubled) when the decline in market conditions continued to persist during a good part of 1975. The average buy-back price for 1975 was 30.9 per cent below the posted price.

The widened gap between the two sets of prices was an indication that the decline in market had more effect on the buy-back price than it did on the posted price. Although the two prices became officially set by the government in accordance with OPEC's pricing decisions, the buy-back price is closely linked to conditions in the oil market. The relatively lesser reaction of the posted price to these conditions shows the ability of the government to squeeze the oil companies for a maximum revenue from the companies' concessionary crude oil. For the oil companies, with the posted price of \$15.768 and the prevalent tax and royalty rates of 12.5 per cent and 55 per cent

* The average prices of 1974 was taken on the four month period following the participation deals (from September 1 to December 31), see Table VI-3.

respectively, the concessionary crude was costing them much less than what they had to pay for purchasing the government's share of participation crude. While the total tax paid cost per barrel for the companies' share of crude was on the basis of the above considerations, only \$10 in 1974, the cost of acquiring the government's crude was \$13.900. (See calculations in Table VI-4).

The existence of this wide divergence between the tax paid cost of companies' equity crude and the price of the government's crude made it difficult for government owned crude, in Libya and in other producing countries who entered into oil participation agreements, to compete with the foreign partners'. For this reason, the prices of the government's crude had to be reduced as it happened in 1974-1975. This was also the justification to the OPEC's recommendations later in 1974 of changing the structure of royalty and income tax rates which the companies have to pay on their equity crudes.⁴¹ In view of the large increases in profits which the international oil companies were

⁴¹ Suhair Nasser, "Development of crude oil prices in the Middle East", Fundamentals of Oil and Gas Industry, Vol 2, (Kuwait : OAPEC, 1977), pp 65-66.

reported to have realized after the price hikes,⁴² OPEC which was reviewing the price structure decided to narrow the gap between buy-back prices and tax paid costs on companies' equity oil by curbing the companies' profits through higher taxes and royalty levies rather than increasing posted prices. Posted prices were, as earlier pointed out, frozen at their January 1974 level.

The oil market slump which started during 1974 and persisted throughout most of 1975 was a real test for the OPEC pricing structure. World demand for OPEC oil, which had climbed steadily from 1960 to 1973, fell just over 1 per cent during 1974 and 11.4 per cent during 1975,⁴³ due to a general recession in the industrial world and to the energy conservation measures taken by most of the industrial countries in the face of the high oil prices.

Faced with these circumstances OPEC members attempted to maintain their high oil prices by voluntarily restraining their production. A production level resulted in 1975 which was 27

⁴²According to the Chase Manhattan's annual analysis of a group of petroleum companies, the combined after tax net income of the Chase group climbed \$16.4 billion in 1974, 40% from the 1973 figure of 11.7 billion. Return on companies' average invested capital rose to 19.6% in 1974 from 16.5% in 1973. Most of the increase in earnings came from operations outside the US which represented about three fifths of the group's net income in 1974. See: Chase Manhattan Bank, Financial Analysis of a Group of Petroleum Companies, (New York : The Chase Manhattan Bank, 1974), pp 14-15 and 27-28.

⁴³Petroleum Intelligence Weekly, (February 1976), p 7.

per cent below their estimated operable productive capacity.⁴⁴ Although the basic prices decided by OPEC were kept frozen, most of the producing companies reduced the premiums on higher grade oils such as the Libyan crude of 40° API.⁴⁵ This explains the slight declines in Libya's oil prices during the early and middle of 1975 (Table VI-3).

Generally speaking, OPEC oil pricing structure survived the slump market challenge and when market conditions recovered during 1976 and 1977, both buy-back prices and posted prices resumed an upward trend. However, the gap between the two sets of prices remained as high as 30 per cent or slightly more (Table VI-3 and Figure VI-A). The importance of the magnitude of such a gap lies in the fact that it determines the comparative revenue benefit to the government from government owned crude in relation to that of companies' equity oil, and it reflects directly on the costs of the two kinds of crude to the oil companies. These will be analyzed in the following section.

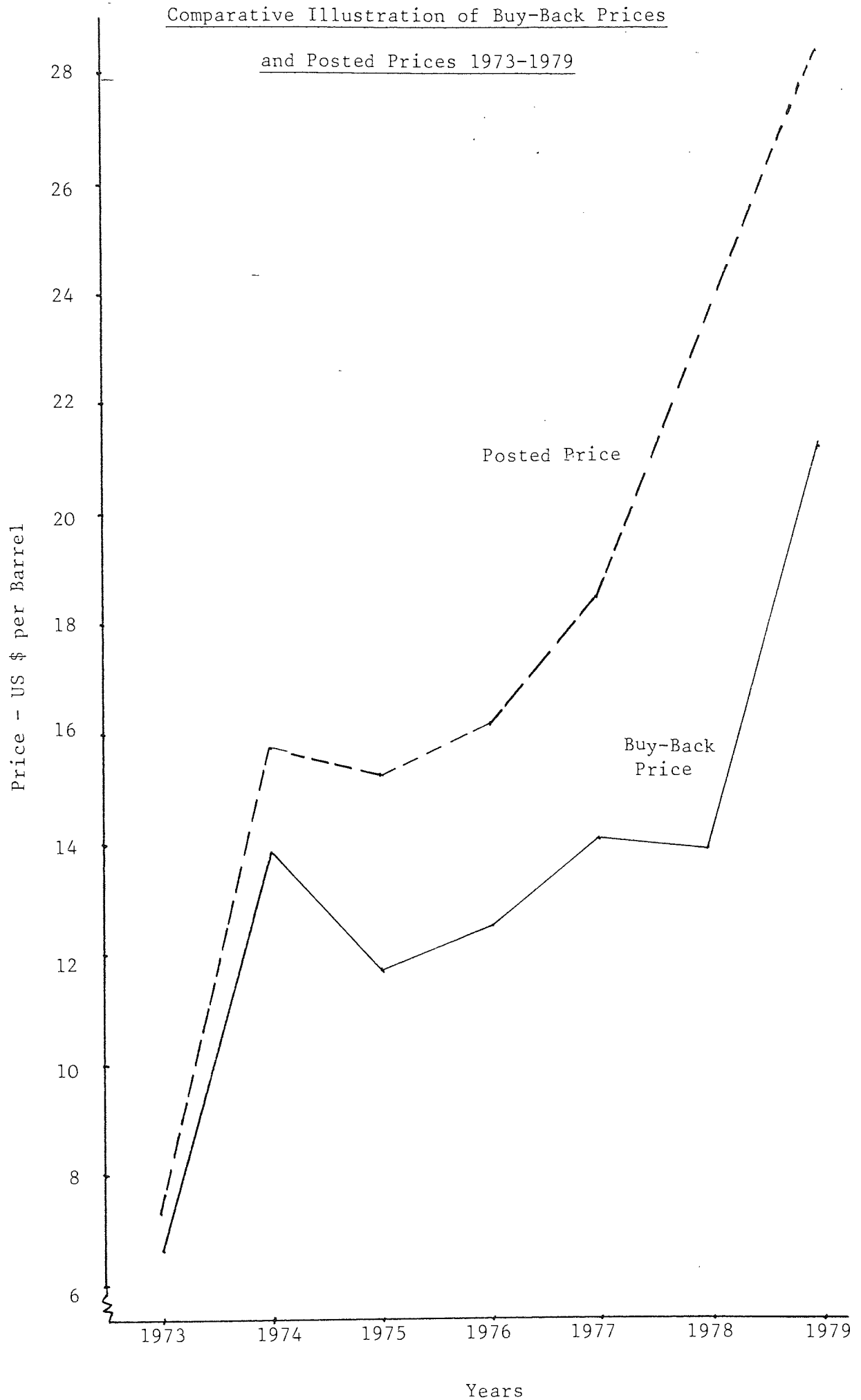
Comparative Analysis of the Government's
Per Barrel Revenue under the Participation and
the Concessionary Formulas from 1973 to 1979

Table VI-3 and Figure VI-A were presented to show the behaviour of both posted prices and buy-back prices of Libyan crude oil since the emergence of the country's major participation

⁴⁴Ibid.

⁴⁵Development of Libyan Oil Prices, unpublished report (1975).

Figure VI-A



Source: Table VI-3.

deals in 1973 and until 1980. The prices contained in the above mentioned table were related to the Libyan marker crude of 40⁰ API which is the basis of posting prices. Crudes of different qualities are priced in reference to the base crude price with certain allowances (a number of US cents) to be added or deducted for each API grade above or below 40⁰.

The annual averages of these prices as derived in Table VI-3 will be used in this section of the research to compare the government's net revenue per barrel from crude oil received and sold by the government's corporation (NOC's share of production) and revenue received from foreign companies on their equity oil. The government corporation's crude is sold presumably at the official buy-back prices which, as previously mentioned, generally approximate the market price. The net income accruing to the government from this crude is determined simply by deducting cost of production and operations which have to be borne by the NOC, from the buy-back price. The net then represents the government's receipts per barrel from its participative oil.

On the other hand, the government's receipts from the foreign companies' equity oil are determined on the basis of the concessionary formula (previously discussed in detail). Under this formula, the government is entitled to royalty and income tax at the applicable rates and on the basis of the applicable posted price for each period. In addition to the royalty and the basic income tax, the government's receipts include the supplementary tax payment agreed upon with the operating

companies since September 1970. Although the supplementary tax was in settlement of past government claims prior to 1970, it was made as an integral part of the total government's revenue under the concessionary formula for the remaining life of the original concession agreements. It must therefore be considered in this analysis.

Table VI-4 shows calculations of the average revenue per barrel accruing to the government from each accounting formula. The participation formula applies to NOC's owned crude and the concessionary formula applied to the foreign companies' equity crude. These calculations are based on the average prices for the marker crude of 40⁰ API, the average cost per barrel for the Libyan oil industry, and the applicable royalty and tax rates for each year. As the Libyan major participation arrangements were introduced during the latter part of 1973, the average price for this year, which is the first year in the table, were computed on the basis of prices prevailing from September 1, 1973 until December 31, 1973. During this period the government realized \$6.245 per barrel net revenue from its participation crude compared with only \$4.286 per barrel which was received from foreign companies' equity crude. The revenue realized from participation crude was over 45 per cent higher than the revenue from concessionary crude. The latter was in 1973 determinable on the basis of a 12.5 per cent royalty and a 55 per cent income tax rate, as these were the applicable rates during the year.

Table VI-4

Comparative analysis of the government's net revenue per barrel (of 40° API)
from concessionary crude and participation crude 1973-1979

	1973		1974		1975		1976		1977		1978		1979	
	Concess. Crude	Part. Crude	Concess. Crude	Part. Crude	Concess. Crude	Part. Crude	Concess. Crude	Part. Crude	Concess. Crude	Part. Crude	Concess. Crude	Part. Crude	Concess. Crude	Part. Crude
Sales price (a)	\$ 7.287	\$ 6.694	\$ 15.768	\$ 13.900	\$ 15.324	\$ 11.705	\$ 16.205	\$ 12.470	\$ 18.515	\$ 14.060	\$ 18.213	\$ 13.888	\$ 28.538	\$ 21.211
Deduct:														
Cost per barrel (b)	.449	.449	.602	.602	.785	.785	.825	.825	.936	.936	1.126	1.126	1.190	1.190
Royalty (c)	.911	-	2.214	-	2.555	-	2.701	-	3.086	-	3.036	-	4.757	-
Net profit	5.927	6.245	12.952	13.298	11.984	10.920	12.679	11.645	14.493	13.124	14.051	12.762	22.591	20.021
Government income from concessionary crude:	\$		\$		\$		\$		\$		\$		\$	
Royalty	.911		2.214		2.555		2.701		3.086		3.036		4.757	
Income tax (d)	3.260		7.286		7.790		8.241		9.420		9.133		14.684	
Supplementary tax (e)	.115		.114		.122		.114		.123		.141		.164	
Total revenue per barrel (concessionary crude)	4.286		9.614		10.467		11.056		12.629		12.310		19.605	
Net profit per barrel (participation crude)	6.245		13.298		10.920		11.645		13.124		12.762		20.021	
Advantage of participation \$ per barrel margin	1.959		3.684		.453		.589		.495		.452		.416	
Margin as % of concessionary crude revenue	45.7%		38.3%		4.3%		5.3%		3.9%		3.7%		2.1%	

Footnotes

- (a) Sales prices: represent the average prices for each period taken from Table VI-3.
- (b) Production costs: average costs for the Libyan oil industry including depreciation and amortization charges. See Table B-1 in Appendix B.
- (c) For 1973 the applicable rate of royalty was 12.5%. For 1974 due to changes in the royalty rate an average rate was applied which amounted to 14.04%. For 1975 on, the royalty rate was 16.67%.
- (d) Income tax for 1973 was based on the applicable rate during the year of 55%. In 1974 the tax rate was raised to 60% effective July 1, 1974. For this reason an average rate was calculated (56.25%) and applied in the table. From January 1, 1975 the tax rate was raised again to 65% and the new rate was applied for 1975 through 1979.
- (e) Estimated figures based on posted prices incorporating the adjustments for fluctuations in the value of the US dollar as reported by the Bank of Libya, Annual Report of the Board of Directors, various issues. See calculation of supplementary payments in Table B-1, Appendix B.

When the royalty and tax rates were increased during the second half of 1974, averaging for the year 14.04 per cent and 56.25 per cent respectively, although the government's revenues from both NOC's crude and foreign companies' crude more than doubled - due to the price escalation of January - the margin advantage of the participation formula declined to 38 per cent. This was due, in part, to the introduction of the higher royalty and income tax rates into the concessionary formula. But it was also partially due to the ability of the January escalated posted price to hold throughout the year while the buy-back price, after reaching \$16 per barrel during the first quarter, gradually declined to \$12.50 per barrel by the last quarter (Table VI-3). The average buy-back price for 1974 was, however, \$13.90, or 108 per cent in excess of that of 1973, compared with a 116 per cent escalation in the posted price. The rise of government revenue from participation oil brought the figure to \$13.298 in 1974, about 113 per cent of the \$6.248 revenue for 1973. The concessionary revenue was, in 1974, \$9.614 or 124 per cent in excess of that of 1973.

In 1975 a further decline in the buy-back price brought the average price for the year to \$11.705 from \$13.90 in 1974, ie 16 per cent down. This was, as previously pointed out, due to the decline in market demand for oil which had affected the buy-back price downward while the posted price was frozen. Although the latter was reduced, too, during 1975, but the reduction was only slight, less than 3 per cent from the 1974 level. As a

result of the 16 per cent decline in the average buy-back price, the government's income from participation oil dropped in 1975 to \$10.920 from \$13.298 figure realized in 1974. This drop in the participative crude revenue, on the one hand, and the improvements in the concessionary formula,⁴⁶ on the other hand, have significantly reduced the margin advantage of the participative formula over the concessionary formula. Government receipts from participative crude were, in 1975, only 45.3 US cents (or 4.3 per cent) higher than the per barrel revenue from the concessionary oil. Where, in 1974, the former gave the government \$3.684 (38 per cent) more in per barrel receipts than did the concessionary crude.

In 1976, the average buy-back price per barrel rose from \$11.705 (in 1975) to \$12.470. This rise represented a 6.5 per cent and was little higher than the increase that had occurred in the posted price for the same year. The latter rose by 5.7 percentage points from an average of \$15.324 per barrel in 1975 to \$16.205 during 1976. This slight difference in the two increases of prices resulted in improving the marginal advantage of the participation formula revenue over the concessionary formula's. The government received in 1976 from each barrel of

⁴⁶The concessionary formula was improved by increases in the royalty and tax rates which became 16.67% and 65% respectively throughout 1975 and have been at these levels ever since (see: Chapter V).

participation crude 58.9 US cents more than it did from the concessionary crude. This figure represented a marginal advantage of 5.3 per cent compared with 4.3 per cent in 1974.

However, aside from this slight increase during 1976 in the marginal advantage of the participation formula, the trend of decline in this margin persisted throughout the following years. In 1977 the margin became 49.5 US cents per barrel (or 3.9 per cent), and in 1978 and 1979 it dropped further to 45.2 cents (or 3.7 per cent) and 41.6 cents (or 2.1 per cent) respectively. This indicates the ability of the host government to fix posted prices on the basis of which its income from the oil companies' equity crude is determined at levels capable of producing the maximum revenue from such crude.

The significance of the existence of this margin can be looked at from two angles; first, the margin represents the financial reward to the government from entering into the ownership and operations of the oil industry rather than a continuation of oil concessions totally owned and operated by the international oil companies. This is on the assumption that the government should have been able, with a continued existence of the pure concessionary system, to secure the same improvements in the royalty and tax structure and maintain the same levels of posted prices as has been the case with the partial ownership under participation. The margin reward, therefore, represented the per barrel profitability of the government's total investment in the industry. As an investment proposal, the profitability of

participation must be evaluated in terms of the capital commitment which the government had to invest in the participation deals. Such evaluation will be attempted in the next section of this chapter through a discounted cash flow analysis. Second, because the same margin represents, for the oil companies, the decrement of equity oil cost (as illustrated in Table VI-5), it is the companies' financial incentive for their continued existence as participants in the ownership and operations of the host country's oil industry. This is on the assumption that other considerations as the companies' accessibility to oil are disregarded. As the margin reflects the divergence between the tax paid cost of the companies' equity crude and the cost of purchasing oil owned by the government, it is the financial return of the companies' capital commitments into the oil operations under the participation arrangements.

Discounted Cash Flow Analysis of the Participation Model

In order to conclude whether or not the Libyan participation arrangements have been creating net revenue benefits which justify the viability of the participation model, they can be subjected to certain investment criteria implied by the economic theory of choice over time. As an investment proposal, the flow of net revenues generated by the participation model should be evaluated in regard to capital commitments called for by the entrance of the government as a participant in the oil activities and in comparison with revenues which would have been derived under the alternative concessionary model. Since the comparative

Table VI-5

Comparison of the Cost to the Oil Companies of

Concessionary Oil and Participation Oil 1973 - 1979

Per Barrel of 40° API

	1973	1974	1975	1976	1977	1978	1979
	\$	\$	\$	\$	\$	\$	\$
<u>Cost of concessionary oil:</u>							
Royalty and tax levies	4.286	9.614	10.467	11.056	12.629	12.310	19.605
Production cost	.449	.602	.785	.825	.936	1.126	1.190
Tax paid cost	4.735	10.216	11.252	11.881	13.565	13.436	20.795
<u>Cost of participation oil:</u>							
(= buy-back price)	6.694	13.900	11.705	12.470	14.060	13.888	21.211
Margin left to the oil companies on concessionary crude	1.959	3.684	.453	.589	.495	.452	.416

Source

Table VI-4.

profitability of the participation model in relation to the concessionary model has been calculated in the previous section, in terms of per barrel margin of profit for the period 1973-1979, and certain assumptions could be made about its level in the intermediate future, this margin can be taken as the revenue benefit generated to the government by the entrance into participation rather than leaving the oil industry to operate under an improved concessionary system. Multiplying the per barrel profit margin by the total quantity of oil put at the disposal of the government in accordance to the participation arrangement, the total revenue benefits of the arrangements could be derived, and then compared with the total capital commitments of the government.

To make this comparison meaningful and useful, discounted cash flow tables should be constructed. The discounted cash flow analysis is an important analytical tool for evaluating any investment proposal such as the participation arrangements. It takes into consideration in general, the following important economic factors:

1. The time horizon of the investment, with a declining monetary value being assigned to the more distant costs incurred and revenues realized along this horizon.
2. The element of risk and uncertainty inherent in the investment proposal, considering that risk is measured as and represents the variance between the expected and the actual net

revenue generated by the investment.

3. The "opportunity cost" of the investment defined as the rate of return realized from the best next alternative available if funds devoted to a given investment proposal are shifted to a competing investment.

Given all these economic factors, the discounted cash flow method asserts that all revenues, expenditures, and compensations paid over the time horizon of the investment, should be discounted to their present value at a given point of time - which is usually the beginning of the time horizon. The net present value (or the total discounted net flows) of the investment proposal then could be derived to judge its viability.

The net present value is one of the most logical and generally recognized investment criteria. It is equivalent to the net income stream generated by the investment after computing the time element as measured by a certain discount factor. The following equation defines it:

$$NPV = \frac{R_n}{(1-r)^n} - \frac{C_n}{(1-r)^n}$$

where NPV = the net present value of the participation deals

R_n = the revenue generated by the participation
arrangements for each of the given years

C = the amount of capital committed into the
participation deals which includes compensations

paid to the oil companies plus capital expenditures contributed by the government.

r = the rate of discount applied to the revenue and to the cost streams of the investment.

Major assumptions of the discounted cash flow tables

1. The time horizon chosen for evaluating the Libyan participation arrangements is from 1973, when the major Libyan participation agreements became effective, until 1983. The choice to extend the analysis to 1983 was based, on the one hand, on the intention of this study to sense the implications of the emerging participation system for some years ahead. On the other hand, from the past history of the oil industry in the Middle East, it proved difficult to make any meaningful predictions of the major variables affecting the government's revenues for rather longer periods ahead. Furthermore, a period of about 10 years from the start of the participation arrangements is consistent with the time span within which the major capital expenditures are depreciated according to the accounting methods employed in the Libyan oil industry.
2. The volume of crude oil used in the cash flow tables represents the quantity of oil exported by the government's National Oil Corporation since it became a participant in the country's oil concessions in 1973. From 1973 until

1979 the figures of exports were obtained from the official statistical reports of the Ministry of Petroleum. The export figures for 1980-1983 were estimates based on officially projected volumes of production from concessions covered by the participation arrangements (see Footnotes to Table VI-6).

3. The profit margins of the participation model over the concessionary model as previously calculated in Table VI-4 were used to derive the total annual profits received by the government from applying the participation formula rather than the concessionary formula. The above mentioned margins of profit were computed on the basis of prices applicable to the marker crude of 40° API. But the actual grades of exported oil differ from field to field. The average gravity is usually between 38.2° API and 38.6° API.⁴⁷ Accordingly, both posted prices and buy-back prices applicable to such oil will differ from the marker crude prices. However, since the prices for crudes of various grades are adjusted on the basis of the marker crude prices and the same relationship is usually kept between the posted price and the buy-back price, it is assumed that the same margin of profit exists.

⁴⁷Ministry of Petroleum, Oil and Gas Statistics, published annually, various issues.

For the period 1980-1983 the margin was assumed to remain as in 1979 at the 41.6 cents per barrel level. This assumption is based on the intention of the Libyan government to keep such margin at the present level, as indicated by a number of officials in the Libyan oil industry.⁴⁸

4. The amounts of compensations and capital expenditures paid by the government under the participation arrangements were derived as follows:
 - a) Figures for compensation were obtained from NOC annual reports and the Central Bank of Libya annual reports. They represent the actual compensation payments as incurred. The NOC reports show that all compensations to foreign companies were fully paid by the end of 1978. The figures of capital expenditures for 1973-1978 were obtained from the annual reports of the NOC - representing the NOC's share of annual gross additions to fixed assets and work in progress accounts. Net of any scrapped equipment. No consideration was given in these figures for the depreciation of assets since the main concern of the analysis is with the actual amounts of capital committed by the NOC into the participation deals. For 1979, the capital expenditure figure represents the budgeted amount according to NOC reports.
 - b) Figures of capital expenditures for 1980-1983 were estimates based on present level of expenditures and

⁴⁸From interviews by the researcher with the NOC appointed Director of Oasis Oil Company, and with officials in the External Marketing Division, Brega Oil Marketing Co, Tripoli, (January 1981).

allowing for inflation. The inflation rate for 1980 and 1981 as represented by the average rise in the price of OPEC members' imports of non-food products was 13.6 per cent and 11 per cent respectively.⁴⁹ For 1982 and 1983 a lower rate of 9 per cent was applied based on official US forecasts of a declining inflation rate. The US administration projects a rate of inflation of around 11 per cent in 1981, 8 per cent in 1982 and 5.5 per cent in 1983.⁵⁰ But since these figures seem rather optimistic, the 9 per cent figure was used which is perhaps more realistic in the light of past trends.

c) The estimated capital expenditures are based on the further assumption that no major exploration and development programs will be taken in the producing oil concessions. The level of expenditures provided is only for the necessary investment in replacing aged equipment and maintaining the producing capacity of oil fields at the efficient technical levels.

5. The rate of discount used in the cash flow tables is 9 per cent for the period 1973-1980 and 12 per cent for 1981-1983. The 9 per cent rate was based on the average interest rates for the period of the Euro-dollar 12 month deposits.⁵¹

⁴⁹World Financial Markets, published monthly by Morgan Guaranty Trust Company of New York, (December 1980), p 8.

⁵⁰Chase Manhattan Bank, Chase Econometrics, (December 1980).

⁵¹World Financial Markets, op. cit., various issues.

Since interest rates have recently been at rather higher levels (for example during the 23 months from January 1979 until November 1980 the Euro-dollar rate was on average over 12 per cent with a rising trend),⁵² and assuming that this trend of higher rates will probably persist in the intermediate future, the choice of a 12 per cent for 1981-1983 seems more realistic.

The interpretation of results

Two discounted cash flow tables were computed. Table VI-6 shows the profits received by the government during the period 1973-1983 from applying the participation formula rather than the concessionary formula. The annual comparative profitability of the participation model was derived as previously pointed out by multiplying the per barrel profit margin by the total crude exports of the NOC each year. The last column of the table represents the discounted present value of these profits the total of which was \$1,857.4 millions for the entire period 1973-1983.

Table VI-7 shows the amounts of capital committed by the government each year in order to obtain the above mentioned income and computes the discounted present value of such capital. The discounted net profitability of the whole participation deal during the given period as represented by the difference between

⁵²Ibid.

Table VI-6

Discounted Cash Flow of the Participation Formula

Year	1 Volume of Crude Exported	2 Profit Margin of Participation	3 Total Profit of Participation	4 Present Value of Profits
	bbl mills	\$	\$ mills	\$ mills
1973	120.9	1.959	236.8	236.8
1974	249.4	3.684	918.8	842.9
1975	270.4	.453	122.5	103.1
1976	327.3	.589	192.8	148.9
1977	338.8	.459	167.7	118.8
1978	319.1	.452	144.3	93.8
1979	326.8	.416	135.9	81.0
1980	325.1	.416	135.2	74.0
1981	312.4	.416	130.0	63.5
1982	288.1	.416	119.8	52.2
1983	262.0	.416	109.0	42.4
			Total	1,857.4

Footnotes

1. Figures from 1973-1979 from: Oil and Gas Statistics, Ministry of Petroleum, various issues.
Figures for 1980-1983 estimates based on officially projected production levels for the period. From a 1979 Report of a Special Committee to Study the Oil Industry in Libya, appointed by the Oil Minister in 1979.
2. 1973-1979 figures from Table VI-4.
1980-1983 profits margins were assumed to be maintained at the level of 1979 (see Footnote No 48).
3. Col 1 x Col 2.
4. The discount rates were 9% for the period 1973-1980 and 12% for the period 1981-1983 (based on the average Euro-dollar interest rate for the first period and assuming the recent trend of higher rates will persist during the intermediate future period. See assumption number 5 of the discounted cash flow tables in the text.

Table VI-7
Discounted Cash Flow of Capital Commitments
under the Participation Formula
(\$ mills)

Year	1 Compensation Paid	2 Capital Expenditure Paid by the NOC	3 Total Capital Commitment of Participation	4 Present Value
1973	210.2	-	210.2	210.2
1974	141.4	81.3	222.7	204.3
1975	75.5	62.3	137.8	116.0
1976	15.0	54.2	69.2	53.4
1977	40.5	116.6	157.1	111.3
1978	109.0	164.6	273.6	177.8
1979	-	209.9	209.0	125.2
1980	-	238.4	238.4	130.4
1981	-	264.6	264.6	129.2
1982	-	288.4	288.4	125.8
1983	-	314.4	314.4	122.4
			Total	1,506.0

Footnotes

1. Obtained from NOC Annual Reports 1972-1978 and the Annual Reports of the Central Bank of Libya, various issues.
2. 1973-1979 from NOC's Annual Reports. Figures for 1980-1983 were estimates based on the 1979 level of expenditures and assuming this level will be maintained. Allowances for inflation were added (see assumption number 4 of discounted cash flow tables in the text).
3. Col 1 + Col 2.
4. The discounted rates used as in Table VI-6.

the present values of the total profits and the capital commitments was \$351.4 millions (\$1,857.4 millions - \$1,506 millions). But from Table VI-6 it appears that most of the government's \$1,857.4 millions total discounted profits from the participation model were in fact realized during the first two years of the table. The amount of discounted profits for 1973-1974 was \$1,079.7 millions (or 58 per cent of total profits for the period 1973-1983). This was a result of the low posted price for the period. This pricing structure together with the fact that the concessionary formula was still in 1973-1974 based on the old royalty and tax rates allowed the per barrel margin to be as high as \$1.959 in 1973 and \$3.684 in 1974. Such high margin was at the expense of the competitiveness of the government's crude in the market since the margin represents the decrement to the oil companies of equity oil compared with oil purchased from the government.

However, after the pricing structure was adjusted and the rates of royalty and income taxes were increased since 1975, the profitability of the participation formula in comparison with the government revenues from concessionary oil had diminished. If the subsequent period 1975-1983 could be taken as an indication of the true results of participation compared with the improved concessionary system, it would be found that the government is committing more money into the participative concessions than the comparative margin of profits obtained from them. The discounted value of capital commitments during 1975-1973 was

\$1,091.3 millions compared with discounted revenue benefits of only \$777.7 for the same period.

Furthermore, the analysis was based on capital expenditure figures, particularly during the period 1973-1979, which represented the actual levels of exploration and development activities in the concessions. Such activities during this period were perhaps kept at a minimum level due among other things to the need to get adjusted to the emerging participation system. An extended exploration and development program would have naturally increased the capital burden of the government and significantly affected the profitability of the participation system.

Conclusion

It can be said in conclusion, therefore, that on the basis of available data and the assumptions of the analysis, participation of the government into the ownership and operations of the oil industry does not seem to be a viable investment proposition. Assuming that the government would have been able, without the existence of the participation arrangements, to obtain the same levels of royalties and taxes from a total concessionary framework as it has been receiving from the companies' equity oil retained by ^{it} under the participatory partnership, such concessionary framework would have been far more remunerative in terms of net revenue to the government than participation.

CHAPTER VII

IMPACT OF PARTICIPATION ON EXPLORATION AND DEVELOPMENT ACTIVITIES

The foregoing discussion in previous chapters of this study was devoted mainly to analyzing the financial arrangements of the participation and concessionary formulas in the oil industry. The major concern of the present chapter is how the transformation of oil industry arrangements from the concessionary system to the governmental participation system has influenced the level of research and development efforts in the industry.

Importance of the Exploration and Development Effort in the Oil Industry

In the preceding two chapters, an attempt was made to evaluate the impact of the two forms of petroleum contractual arrangements (the concessionary formula and the participation formula) on net income accruing to the government from the oil industry in Libya. However, as a measurement procedure, net income in general, regardless of how it is distributed under one form of petroleum exploitation arrangements or the other, reveals only one aspect of the industry's performance. It is limited to the assessment of income or net cash flow within the period or periods of time for which "realized" revenues and related costs are calculated and "matched" according to the accounting

principle of "matching revenues with costs".¹ Revenues here are related to the current volume of oil produced and sold during the period or periods under consideration, for the "matching process" is reduced by the accounting convention of "realization"² to recognizing revenues only at the time of production or sales of goods and comparing them with costs related to the same period. When this process of periodical income measurement is viewed within the framework of the "going concern concept",³ which is also a generally recognized principle in the economics of business ventures, it falls short of providing an adequate (or at least a sufficient) measure of performance for such business; a measure that adequately accounts for the overall efforts and accomplishments. This is particularly true in the case of the oil industry whose major portion of efforts in a current period of time involves the search for and development of hydrocarbon reserves to be produced and sold in future periods.

¹For discussion of the "matching principle" and its application in the oil industry, see Chapter IV of this study.

²For more details on the "realization concept" as applied in the accounting measurement of income, see: American Accounting Association's 1964, Concepts and Standards Research Study Committee, "The realization concept", The Accounting Review, XL, (April 1965), pp 312-322.

³The "going concern concept" views the operations of a business concern as a continuing process for indefinite time, see: Paul Grady, Inventory of Generally Accepted Accounting Principles for Business Enterprises, (New York : American Institute of CPA's Inc, 1965), p 27.

As previously indicated in Chapter IV, because of the continuous and rather unique nature of the operations of the oil industry as an extractive industry, special problems arise when attempting to divide the streams of costs and revenues of the industry between present and future periods of time in order to measure the periodical income; much of the costs involved are related to the locating and developing of oil reserves underground; the time required to find and extract these reserves is long; the relationship between expenditures and results is uncertain; much of the exploration and development expenditures may be non-productive, and when successful are recoverable through sale of resources over relatively long periods of time during which many changes can occur in the factors affecting the economic recoverability of the resources. It is in general, a high risk business which requires large amounts of capital to be committed to a complex of interrelated activities, the outcome of which is not presently identifiable. All these problems contribute to the difficulties of producing an efficient measurement of periodical income in the oil industry and make the net income indicator insufficient in portraying actual performance. The assessment of the industry's performance, to be adequate, must, therefore, rely on additional indicators besides the periodical income measure.

To be justifiable as proper measurement yardsticks, these indicators must be drawn from the usual objectives of economic entities engaged in the oil industry. One of the main objectives

of companies engaged in the extractive oil business is to discover hydrocarbon reserves. To an oil company the discovery of reserves is undoubtedly the most significant event and involves the greatest expenditure of effort and money. The production of reserves, once discovered and developed, on the other hand, involves relatively little additional effort or funds. Information with respect to discovery and development of these reserves is essential to the measurement of relative success in the industry. This point was brought out by W B Coutts in arguing for some form of "value accounting" in the oil industry:

"The most important and critical phase of an oil company's operation is the search for oil and it is on this part of the operation that most of the profit is really earned since the actual production and sale of reserves, once found is relatively simple and routine. From this, it is deduced that the closest reflection of actual operations requires the recognition of the income at the time reserves are found and that, for the same reason, the most effective and useful measure of success is the excess of the value of the reserves over the cost of finding them."⁴

The use of information about reserves and costs associated with their finding and development in the assessment of an oil company's performance is a logical and well justified procedure. Its importance is well recognized by most writers in the accounting and financial literature as well as by accounting

⁴W B Coutts, Accounting Problems in the Oil and Gas Industry, a Research Study of the Canadian Institute of Chartered Accountants, (Toronto : The Canadian Institute of CA's, 1963), p 18.

authoritative bodies. Yet the incorporation of such information in current accounting systems raises many practical problems. These problems arise mainly from the uncertainties associated with the process of estimating the extent of reserve quantities, the determination of a monetary value for these reserves, and the estimation of additional future costs needed for the development and extraction of reserves.⁵ The existence of such problems has made it difficult for accountants to agree on a systematic procedure for the inclusion of reserve information in current accounting statements. Where information about reserves are disclosed in accounting reports, it is usually betrayed by the way of notes to financial statements in a rather raw form. Anyone attempting to analyze and assess the activities of companies engaged in the oil industry must rely on raw data whether obtained from accounting reports or from other available sources, and develop his own assessment technique and judgement in order to evaluate efforts and results of the companies concerned. However, as the main asset of such companies is always the hydrocarbon reserves they possess, the operational indicators that are important in the assessment of their activities are their exploration and development efforts and the success of these efforts in creating reserves.

⁵John P Klingstedt, Value Accounting in the Petroleum Industry, (Tulsa, Oklahoma : Arthur Young and Co, 1974).

Evaluation of Exploration and Development Efforts in the Libyan Oil Industry

Since this chapter is concerned, as pointed out earlier, with examining the impact of the adoption of the participation system on oil exploration and development activities, a number of indicators have to be used in this enquiry. But prior to considering what indicators are analyzed, and how the analysis will proceed, it is perhaps not inappropriate to lay down the environmental texture constituting the structure of the indicators and against the background of which the results of the analysis should be conceived.

The environmental setting

Most of the oil companies operating in Libya prior to participation and who continued to operate under the participation system had entered the country under the concessionary form of petroleum arrangements. The traditional form of concessions as described in the early chapters of this study included many attractive features which encouraged the foreign companies to initiate vigorous exploration programs and establish the existence of vast oil reserves in some of the areas explored. The earliest discoveries, made during the late 1950's, established the country's oil potential and encouraged excessive exploration and development efforts during the years that followed. Commercial production started by most of the operating companies in early 1960 and expanded rapidly until the country

became, within one decade, one of the world's largest producers. The provisions of the original concessionary agreements offered the oil companies the freedom of action in conducting their petroleum activities in the country without much interference from the government. The environmental relationship with the host government was such that, the operating companies could operate freely in response to international petroleum market conditions and according to their worldwide strategies in coping with these conditions. The result was a rapid growth in activities in Libya as reflected by the growth in the volume of production up to 1970.

Several additional factors had contributed to the quick growth of the Libyan oil industry during this period even in comparison with other oil producing countries in the area of the Middle East. First, unlike other oil producing countries in the Middle East where the bulk of the industry was developed by a single company or a consortium, Libya followed an open door policy inviting all interested companies to bid for concessions. The result of this, was a multiplicity of concessionaries including not only the majors but also a large number of independents who were very eager to discover oil and gain a foothold in the international oil market. This multiplicity of concessionaries was, as Professor M Adelman pointed out, one of the most effective factors behind the fast development of Libya's

oil industry during the first decade of its life.⁶

Second, the Libyan concessions were granted for long periods reaching 60 years, but they stipulated the gradual relinquishment of the total area of each concession. A concession holder should surrender 25 per cent of the total area within five years of the granting of the concession, and make further relinquishments thereafter. Within eight years a concession should be reduced to 50 per cent of its original size, and by ten years the concession holder is allowed to keep only 25 per cent of the original concession area.⁷ This relinquishment system benefited the country's oil industry in two ways, in the first place it exerted pressure on the concessionaries for quick exploration and development. In the second place, the areas surrendered could be offered for new bidding which in several cases resulted in sizeable discoveries by new concession holders in areas abandoned by a previous concessionary company. As the oil companies usually abandon the areas that are considered on the basis of their initial exploration attempts unfavourable, this points out the fact that additional exploration effort in such areas may prove to be successful due to the probabilistic nature of the search for oil.

⁶M A Adelman, The World Petroleum Market, (Baltimore, Maryland : The John Hopkins University Press, 1973), p 200. See also: Peter R Odell, Oil and World Power, (Harmondsworth, Middlesex, England : Penguin Books Ltd, 1974), p 91.

⁷Petroleum Law No 25/1955, Article 8, and Concession Agreement, Clause 2, annexed to the Petroleum Law of 1955.

The third factor which had contributed to the growth of the Libyan oil industry's operations during the 1960's was a combination of political and geographical factors. The existence of a conservative and rather pro-Western monarchica! regime during this period offered the foreign oil companies a sense of security and encouragement to make vast investments in the country. Oil companies who were largely dependent on oil resources from the Gulf area (East of the Suez Canal) were eager to achieve a greater security of supply through a geographical diversification of sources.⁸ For this purpose Libyan oil fields were conveniently located to supply the oil needs of the main market in Western Europe and the United States. This factor became very important in the light of the unstable political situation in the Middle East and particularly after the closure in 1967 of the Suez Canal⁹ through which most of the other Middle Eastern crude oil has to pass.

Interference from the government in the activities of the oil companies during this period of oil concessions was minimal. Aside from minor adjustments in the methods of calculating the government's tax and royalty levies, no major changes in the provisions of the concessions were effected during the first

⁸Peter Odell, op. cit., p 18.

⁹Anthony Sampson, The Seven Sisters, The Great Oil Companies and the World they Made, (London : Hodder and Stoughton, 1975), p 208.

decade of oil production in the country. However, when the monarchica regime in Libya was deposed in late 1969 and a nationalist military government came to power, it marked the beginning of a new era in the oil companies' relationship with the government. As soon as the military government established its control over the country, it started pursuing an oil policy directed towards incurring major changes in all the previous arrangements with foreign oil companies operating in the country. The first target was increasing oil posted prices and increasing the government's revenue from the oil companies. The first negotiations over prices took place during 1970 and resulted in agreements between the government and the oil companies in September 1970 effecting a negotiated increase in the posted price and some adjustments in the tax structure (details of this settlement were discussed in earlier chapters).

As the September 1970 agreement between the Libyan government and the oil companies was the first occasion in which oil posted prices were fixed by negotiations between a host government and the international companies, it was a watershed for all oil exporting countries. This opened the door for more demands for further adjustments in prices and the tax and royalty structures in Libya and the other oil exporting countries, and for the host governments' declared intentions of altering the whole structure of the oil exploitation system, towards more control by the host government. The period 1971-1973 was in fact a period of intensive negotiations surrounded by an atmosphere of uncertainty

about the future position of the international oil companies in petroleum exporting countries. The Libyan government, during this period, exerted various types of pressure on the oil companies to accept its demands, including the ordering of production cuts and the threat of total nationalisation. The results of this period's negotiations were a series of price and tax increases and the emergence of the government participation agreements with the operating oil companies.

During this period of negotiations and power struggle in the oil industry one would expect that the level of exploration and development work would naturally stagnate because of the atmosphere of uncertainty about the company's future relationship with the host government. Such an atmosphere is, of course, totally inconducive to the investment by the foreign companies in new exploration and development efforts. However, after the participation agreements were concluded, the position of the operating oil companies was placed on a rather stable basis as partners to the government in the oil operations. Emergence of the participation arrangements gave a clear clue as to the future of country/company relationships and removed a great deal of uncertainty in regard to the future position of the foreign oil companies in the country's oil industry.

The main questions arising here, are what impact has the participation system had on the level of activities of exploring for and development of new reserves in the country? Has it been able to push these activities to a level comparable with

that achieved under the alternative concessionary arrangements which participation came to replace? Certainly the answers to these questions should have some important implications for future oil exploration arrangements both in Libya and the other oil producing countries who entered into similar participation agreements with the international oil companies. Whether oil activities under the participation system have, during the last few years after the introduction of this system, been limited to pumping crude oil from the already discovered reserves, or have actually made reasonable efforts towards finding and developing new resources, is an essential point in evaluating the participation system.

As far as the prospects of any new exploration effort in Libya are concerned, it must be noted that there are fair grounds for presuming the worthwhileness of such efforts in terms of possible discoveries. Only less than one third of the area of the country had been covered by exploration activities prior to the emergence of the participation system.¹⁰ This does not include the off-shore areas which were totally unexplored. Where the exploration effort resulted in indications of oil existence, concentration of the drilling and development effort was placed only on larger fields which were commercially

¹⁰Total area covered by preliminary exploration survey up to 1971 was 328,582 square miles about 27% of the total area of the country. Ministry of Petroleum, Libyan Oil, 1954-1971, (Tripoli, Libya), pp 39, 41.

profitable under existing market conditions, of relatively low oil prices at the time. Several smaller discoveries were abandoned for the need of large capital investments in extension and development that were not economically justifiable under those conditions. With these facts in mind, together with the realities of the recent oil market trend of increased prices - that should have reflected favourably on the commerciality of smaller fields, it is safe to assume that conditions have existed to justify maximizing the exploration and development effort of the Libyan oil industry if all other factors are equal.

Empirical Analysis of Exploration and Development Activities

In an attempt to address the questions raised above and investigate the relative impact on exploration and development activities of the adoption of the system of government's participation in the oil industry in Libya, data concerning these activities were obtained from a number of sources dealing with oil industry statistics in the country. From the available data a number of indicators highlighting the oil exploration and development efforts were selected and empirically analyzed in this section of the research. The indicators chosen for the investigation, the methodology applied in their analysis, and the results of the investigation are reported below.

The indicators

The choice of indicators was largely influenced by the availability of consistent and reliable data for a reasonable length of time that could provide fair grounds for generalisations. For the fact that no adequate information was available on a company by company basis, rather aggregate figures representing the total activities of all companies engaged in the Libyan oil operations were used.

Three major indicators which were believed to be representative of the main aspects of the exploration and development effort were selected. The basic data related to these indicators are shown in Appendix C. The selected indicators and their importance in measuring the oil exploration and development activities are outlined below.

1. Percent of capital expenditures to total expenditures

This indicator represents all costs of a capital nature in proportion to total spending of the operating oil companies each year. Capitalized expenditures in the extractive oil industry usually represent most of the costs spent on exploration and development as a major portion of such expenditures. As indicated in Chapter IV of this work, the only items of costs of exploratory activities that usually are not capitalized in the Libyan petroleum industry are the geological and geophysical expenses, the costs of dry holes, and other current operating costs. All expenditures on drilling and developing productive and service

wells and on equipments and fixed assets are capitalized according to the Petroleum Legislation.

This indicator, therefore, reflects fairly well the exploration and development effort in the industry since all development costs and a major portion of the exploratory costs are included in it. Furthermore, it reflects the relative willingness of oil companies to commit new investments in anticipation of future profits as related to spending on current lifting operations. This indicator does not account for what proportion of the total capital expense is related to the replacement of depreciated items. The lack of adequate available data on depreciated charges prohibited such depreciation to be taken into consideration when using the capital expenditure indicator. Hence, capital expenditure here are inclusive of expenditures on replacing depreciated assets.

2. Seismic exploration activities - expressed in terms of total crew/months, which represent the total number of working months of parties involved in seismographic surveys during each year. Seismographic surveys are one of the most important and widely employed techniques in the exploration for oil. The technique is based on the fact that different rocks have different accoustical or sound-transmitting characteristics. By setting off a charge of explosives in a shallow hole "shot point" and registering the reflected sound waves refracted back from successive underground structural layers on special recording

instruments placed at different points on the surface, a sub-surface map could be developed on which the location of test wells can be plotted.¹¹ A seismic crew working in a single location includes a number of workers and technicians and a variety of equipment. The number of working men may be ranged up to 60-70 persons in one crew. The equipment includes transportation means and the necessary geophysical and seismic equipment and camping facilities for the crew. Seismic working effort is usually measured in terms of crew/month which takes into consideration only the actual working time of a crew eliminating the out of work periods.

3. Number of wells drilled Drilling activities represent the most important phase of oil companies' efforts in finding underground hydrocarbon resources and preparing them for the extraction of oil and gas. Three indicators of the drilling effort are generally considered in the present analysis:

- a) Total wells This includes the total number of wells drilled each year regardless of the purpose of drilling. Such indicator is therefore a representative of the total drilling effort in the industry since it includes both wells of exploratory nature and wells of development nature, the two major categories of drilling in the oil industry.

¹¹ M S Amin, "Oil exploration and drilling", Selected Studies in the Oil Industry, (Kuwait : OAPEC, 1979), pp 90-91.

- b) Exploration wells This indicator takes into consideration the total number of wells drilled for an exploratory purpose, to find new oil reserves that have not yet been actually discovered. Exploration wells include "wild cats" ie wells drilled in completely new (unproven) areas where no productive wells have been drilled previously, and wells drilled in an attempt to find new pools in some proximity with already discovered pools. Both types of wells fall under the general category of exploratory drilling and they can be either productive or dry-holes.
- c) Development wells The second major category of drilling activities taken as an indicator in the analysis is the total number of wells drilled for the purpose of development and extension of discovered oil reserves. This category covers drilling to allow production from additional wells in the discovered field, wells drilled to delineate the boundaries of such field, and wells drilled for such services in the field as the injection of water or gas to improve the recoverability of oil. Not much risk is involved in development drilling due to the nature of such an activity, but it calls for the commitment of large amounts of capital.

Although the distinction between development drilling and exploration drilling is usually made in the oil industry and it is useful in evaluating the industry's activities, such categorization is not always consistent when it comes to published

information. The purpose of drilling an individual well is usually known only to the operating company. Such purpose may also change once the drilling of a particular exploration well has reached a certain depth and the existence of an oil accumulation has been established but the company decides to extend the drilling to a deeper formation in order to acquire additional information about the field or allow production from a greater depth. For this reason, the overlap of categories in published information about drilling activities is usually noticeable.

The method of analysis

To throw some light on the assumptions concerning the impact of changes in the oil exploitation arrangements on the level of activities in Libya, the above mentioned indicators are examined in two ways - through a regression model incorporating values for these different arrangements.

First The behaviour of each indicator is analyzed through time series prior to/and after the adoption of the participation system - in an attempt to detect any shift in behaviour resulting from the emergence of the new form of arrangements of the oil industry. The indicators are considered for this purpose in terms of the total activities of all the operating companies in the country. The period prior to participation extends from 1962 to 1970 - which represents a span of time during which the industry was operating totally under the concessionary scheme. The period

representing the participation era in the analysis is from 1974 to 1978. The latter is the last year for which data were available for this research. The years 1971 through 1973 were eliminated from the analysis because, as pointed out earlier, they were a period of abnormality in the oil industry in Libya and elsewhere, due to the prevailing atmosphere of uncertainty and anticipation of changes in the structure of company/country relationships. It was the period of the intensive negotiations and power struggle in the industry over prices, revenues, ownership and control of operations. Such an atmosphere during the said period had certainly influenced the activities of operating companies, that it could not be included in this analysis as a continuation of the concessionary period. Moreover, the major participation deals in Libya were concluded and became effective during the second half of 1973, so, the first year representing the participation sub-period in the analysis is 1974 as it was the first whole year the new system was in effect.

Second As the Libyan oil industry has been since 1973/1974 operating mainly within the participation form of arrangements, but with the existence of a number of companies functioning under different arrangements, it is worthwhile to carry on the investigation also in a cross-sectional manner through 1974-1978. The operators who have been conducting their activities in Libya under systems other than the participation include two fully nationalised companies and a group of other firms operating either under the old concessionary system (those who were not included

in the 1973 participation deals), or under a more recent form of agreements with the government known as "Exploration and Production Sharing Agreements".¹² Although the latter two groups

¹²The form of arrangements, ie the Exploration and Production Sharing Agreement (EPSA), has been tried in recent years in a number of oil producing/exporting countries including Libya and is still in the experimental stage. The main features of EPSA arrangements as attempted in Libya are the following:



Aston University

Content has been removed for copyright reasons



Aston University

Content has been removed for copyright reasons

The information was obtained from the Libyan National Oil Corporation and the Oasis Oil Company, (Tripoli : January 1980).

represent only a minor proportion of the total oil business in Libya relative to the participation group, particularly in terms of oil production,¹³ their existence offers a useful opportunity for a comparative examination of activities under the participation system with other arrangements concurrently in existence. The comparative trends of the three groups' data will show the relative importance of these various systems in regard to exploration and development efforts and may give some indications as to their weight in future developments of the oil business.

The regression model

To examine the behaviour of the indicators through time series, a linear regression model was utilized and dummy (binary) variables were used in the regression analysis to distinguish observations coming from the participation dichotomy (participation period or group) from observations concerning the non-participation dichotomy (period or groups).

The linear regression model of statistical analysis, in general, is concerned with investigation of the dependence of one variable on a linear combination of independent variables. It is appropriate when the population is normally distributed or a sample is drawn from larger population which is randomly distributed. Its basic equation, which is based on the "ordinary least squares" method of estimating the line that provides the

¹³For the relative shares of different companies in the country's total production, see Table VI-1 in Chapter VI.

best fit for the data is expressed in its simple form as:¹⁴

$$Y = a + bX$$

With this equation the functional relationship of Y (the dependent variable) and X (the independent variable) can be detected and predictions can be made of a series of Y values that correspond to each of a series of values of X. The coefficients (a) and (b) have to be calculated from the data. The letter (a) signifies the intercept or the distance above the base line at which the regression line cuts the vertical (Y) axis. The letter (b) is the regression coefficient which signifies the amount by which a change in X must be multiplied to give the corresponding average change in Y. In this way it represents the degree to which the line slopes upwards or downwards.

The introduction of dummy variables in regression analysis, on the other hand, is an approach used in general, to account for the effect of various qualitative factors that cannot be measured according to a numerical scale.¹⁵ This approach is,

¹⁴John E Freund and Frank J Williams, Modern Business Statistics, Second Edition, (London : Pitman Publishers, 1970), p 287.

¹⁵For details on the dummy variable method and its application in regression analysis, see: Robert B Miller and Dean W Wichern, Intermediate Business Statistics, (New York : Holt, Rinehart and Winston, 1977), pp 277-278; K W Smillie, An Introduction to Regression and Correlation, (London : Academic Press Inc, 1966), pp 69-72; and Norman R Draper and Harry Smith, Applied Regression Analysis, (New York : John Wiley and Sons Inc, 1966), pp 134-142.

therefore, the appropriate means of introducing such non-quantifiable variables, as the non-participation/participation systems of the oil industry, under consideration in the present study, into the regression function.

Variables introduced under the dummy variable concept take only two values, 0 and 1, representing the possession or non-possession of certain attributes by an observation. With the introduction of dummy variables in the regression function, it is possible to identify shifts in quantitative relationships which constitute "additive changes" and those which constitute "slope changes". In the former case, the dummy variable approach is useful in determining whether data from different time periods (of different attributes) have different intercepts. The null hypothesis that the data were drawn from the same period, may be rejected or supported on the bases of whether Beta (the regression coefficient of the dummy variable) is significantly different from zero. In the second case, by detecting the slope changes, the dummy method is useful in determining whether data from different cross-sections of sub-groups are drawn from the same population and which of the independent variables have made the largest contribution to any difference in slope.

One noted advantage of merging data using dummy variables is found in the increase of degrees of freedom for the tests of significance. This is a result of that "the dummy technique effectively increases the number of independent variables

geometrically by the number of sub-groups". However, problems of multicollinearity may also be encountered in the application,¹⁶ a matter that necessitates caution when using the technique and interpreting results of the analysis.

The two above mentioned capacities of the dummy variable approach, testing the intercept and testing the slope changes of data, are utilized in the present analysis. Both the additive and multiplicative properties of dummies are used in the investigation. The basic concern, however, is looking at time series, assuming that the variables are independent from each other. Thus an additive dummy is incorporated in the regression equation comparing pre-participation and post-participation periods in order to test the hypotheses that some "step change" in the dependent variable (indicators of the exploration and development effort) was brought about by the introduction of participation in the oil industry. Multiplicative dummies are introduced to test the hypothesis that participation agreements significantly altered the time trend of the exploration and development effort either in attenuating or accelerating it.

The model for the pre/post-participation analysis The attempt is made, first, to investigate any changes in the intercept of data concerning exploration and development efforts in the Libyan oil industry through time prior to and following the introduction of participation and how much, if any, of this

¹⁶Herbert L Jensen and Steven D Grossman, "Accounting Applications of covariance analysis", Accounting and Business Research, No 36, (Autumn, 1979), p 300.

change can be attributed to the change in the system of oil exploitation arrangements. Exploration and development efforts are measured in terms of the indicators described above as they represent the aggregate annual figures for all the operating companies. Each of these indicators is investigated separately as a dependent variable. "Time" and "Dummy" are the independent variables. The latter take the value of 0 if an observation of the indicator comes from the non-participation (concessionary) period and the value of 1 if the observation comes from the participation period.

The regression equation used for this purpose is the following:

$$Y = a + B_1 t + B_2 D + E_i$$

from which the separate equations of the two stages of the dummy variable are obtained, and are written as:

$$E (Y/D = 0) = a + B_1 t$$

$$E (Y/D = 1) = a + B_2 + B_1 t$$

where Y is the estimation of the dependent variable, which in the case of the present analysis represents an indicator of exploration and development activities;

a and B are the constants; (a) represents the intercept and (B) represents the slope or the regression coefficient of the function;

t is the time variable;

D is the dummy variable (having a value of 0 if the

observation comes from non-participation period and a value of 1 for the participation period's observations;

E_i is the standard error (a random variable normally distributed with zero mean).

The two statistical hypotheses tested by the analysis are:

null hypothesis : H_0 = the behaviour of the dependent variable (Y) is not significantly influenced by changes in the independent variable

alternative hypothesis : H_1 = the behaviour of the dependent variable is significantly influenced by changes in the independent variable.

The model for cross-sectional analysis - post-participation

In analyzing the data for 1974-1978, in a cross-sectional manner, to determine differences in behaviour of variables for different groups of companies, as indicated above, the need arises to allow for more than two classifications by means of the dummy method as there are three groups of companies in the investigation. The three groups of companies are (1) the participation group, (2) the nationalised group, and (3) the group of other companies - designated here as "other group". Two dummy variables are used for this purpose so as to give the following combinations of values for being from one group rather than the others.

<u>Dummy (1)</u>	<u>Dummy (2)</u>	
1	0	for Participation Group (Group 1)
0	1	for Nationalised Group (Group 2)
0	0	for Other Group (Group 3).

The regression equation, with two dummies, used for this purpose, is written as:

$$Y = a_3 + a_1 D_1 + a_2 D_2 + B_3 t + B_1 t D_1 + B_2 t D_2 + E$$

In one case where data was available only for two groups of companies, one dummy variable was sufficient to estimate the variation of the dependent variable's behaviour through employment of the additive and multiplicative properties of the dummy variable according to the following equation:

$$Y = a + B_1 t + B_2 D + B_3 + D + E$$

The two statistical hypotheses to be tested by the analysis are:

null hypothesis : H_0 = the behaviour of the dependent variable (Y) is not significantly influenced by changes in the independent variable

alternative hypothesis : H_1 = the behaviour of the dependent variable is significantly influenced by changes in the independent variable.

To perform the statistical computations of the enquiry, a computer statistical package, "Interactive Data Analysis" (IDA) -

originally developed at the University of Chicago,¹⁷ was used for this purpose. Basic data was first entered and stored in computer through this program, and then manipulated by this means to produce the results reported and interpreted below. In judging the significance of these results, the null hypothesis in each case is either accepted or rejected at the 10 per cent level of significance throughout the inquiry.

Results of the Analysis and Interpretations

The results of regression analysis of the above mentioned indicators (dependent variables) on the independent variables are reported in the following section in two stages:

First, results of regressing the indicators for the overall industry through the time series prior to and following the adoption of participation.

Second, results of regressing the indicators in a cross-sectional manner for groups of companies post-participation.

Results of pre/post-participation analysis

Three indicators were considered in the analysis as dependent variables: (1) capital expenditures, (2) seismic

¹⁷Harry V Roberts, Conversational Statistics, Hewlett Packard University Business Service, (Palo Alto, California : The Scientific Press, 1974).

exploration activities, and (3) total wells drilled.

Regression of capital expenditures The results of regressing the first indicator, the percent capital expenditure to total expenditures through time series pre-participation/post-participation are presented in Table VII-1 below.

Table VII-1
Multiple Regression Analysis - Dependent Variable :
Capital Expenditures (over all companies)

Pre/Post-Participation

Parameter	Estimated coefficient	Standard error	t-statistic	Significance level
Constant term (a)	34.526	3.493	9.884	
Dummy (B_D)	-12.850	6.026	-2.132	10%
Time (B_t)	1.066	0.716	1.488	n.s.
R = 0.5517				
R ² = 0.3043				

The results in Table VII-1 display a multiple correlation coefficient (R) of 0.5517. From this value the level of explanation of variation (R²) in capital expenditure behaviour attained by the equation can be deducted, this being R² = 34.43 per cent for the model. This value signifies the extent to which the variability of the data is explained by the equation.

With this value in mind, it can also be acknowledged from the results in the table that the independent dummy variable

which represents the change from non-participation (or concessionary) system to the participation system has had a negative effect on the proportion of the industry's total expenditures that is of a capital nature. This was clear from the regression coefficient of the dummy variable $B_D = -12.85$ in the slope of data. In testing the statistical significance of this functional relationship between the dummy variable and the dependent variable (capital expenditures) it is found that the calculated t-statistic for this relationship; $t = -2.132$ is significant at the 10 per cent level. Therefore, the null hypothesis of no relationship between capital expenditures and the contractual arrangements of the oil industry $H_0 : B = 0$ versus $H_1 : B \neq 0$ can be rejected at the 10 per cent level of significance. That is, there appears to be a significant negative effect of the transformation from the concessionary form of arrangements to the participation system on capital expenditures in the industry. In other words, the introduction of the participation system has been associated with a downward shift in the oil industry's allocation to capital projects.

On the other hand, the overall time influence on the dependent variable (capital expenditure) has not been statistically significant as estimated by the regression equation. The coefficient of time was $B_t = 1.066$ per cent with a corresponding t-statistic : $t = 1.488$ that is not statistically significant at the 10 per cent level required in this inquiry. The related null hypothesis thus, can be accepted.

Regression of seismic exploration activities When examining the behaviour of seismic activities (represented by the total number of crew/months) as a function of the dummy variable (non-participation/participation) the following results in Table VII-2 were obtained from the regression analysis.

Table VII-2
Multiple Regression Analysis - Dependent Variable :
Seismic Crew/Months (over all companies)
Pre-Post Participation

Parameter	Estimated coefficient	Standard error	t-statistic	Significance level
Constant (a)	292.64	32.684	8.954	
Dummy (B_D)	-17.40	56.389	-0.309	n.s.
Time (B_t)	-16.85	6.703	-2.514	5%
$R = 0.8335$ $R^2 = 0.6968$				

The results in Table VII-2 show a slight negative relationship between the dummy variable and the dependent variable (seismic crew/months) as indicated by the value of the dummy coefficient :

$B_D = -17.40$. With a t-statistic : $t = -0.309$, this relationship is not statistically significant within the required level of significance. The null hypothesis that there is no difference between the systems of participation and concessionary agreements, $H_0 : B = 0$, can therefore be accepted. That is, the introduction of the participation system in the Libyan oil industry did not have

a significant effect on the level of geophysical exploration as represented by the total seismic crew/months of work.

Much of the change in the slope of data as computed by the equation, has been a function of time. As shown in Table VII-2, the coefficient of the time variable B_t is $B = -16.85$; with a t-statistic : $t = -2.514$ which is statistically significant at the 5 per cent level of significance. This general decline in the slope of seismic exploration efforts through time is due, perhaps, to the maturity of the Libyan oil operations in the areas held for exploration as time passes and as sufficient geological information has accumulated about the underground characteristics of these areas. However, bearing in mind that a large proportion of the country's area is still unexplored, this continuing decline over time points to the fact that no significant initiative has been taken in new areas, or perhaps no efforts in new areas at all. With the emergence of the participation system, the seismic exploration activity stagnated even further, though, not significantly according to the statistical scale of significance.

Regression of drilling activities (total wells drilled) The results of regressing total wells drilled are shown in Table VII-3 below.

Table VII-3

Multiple Regression Analysis - Dependent Variable :Total Wells Drilled (over all companies)Pre/Post-Participation

Parameter	Estimated coefficient	Standard error	t-statistic	Significance level
Constant (a)	305.55	41.651	7.336	
Dummy (B_D)	-134.4	71.860	-1.870	10%
Time (B_t)	-5.471	8.5416	-0.641	n.s.
R = 0.7972				
R ² = 0.6355				

The regression estimates in Table VII-3 display a negative impact of the dummy variable on the slope of data as indicated by the coefficient of the dummy variable : $B_D = -134.4$. With a calculated t-statistic of $t = -1.870$, the corresponding level of statistical significance to which is 10 per cent, the null hypothesis of no functional relationship ($H_0 : B_1 = 0$) between the dependent variable (total wells drilled) and the independent dummy variable (the states of participation or non-participation) can therefore be rejected in favour of accepting the alternative hypothesis ($H_1 : B_D \neq 0$) at the 10 per cent significance level. It could be concluded, then, that the change of the oil exploitation arrangements from the concessionary model of relationships to participation has significantly and negatively influenced the level of drilling activities in the country.

The time variable has also contributed to the general trend of decline in drilling activities as indicated by the slight negative 4.471 coefficient of the time Beta. However, the impact of time was not statistically significant as the t-statistic of this coefficient was -0.641 which is below the required significance level. The null hypothesis of no significant influence of the time variable on total drilling activities can therefore be accepted at the 10 per cent significance level. The extent to which these correlations in the data is explained by the regression equation was 63.55 per cent (the value for R^2).

In this analysis of drilling activities through time pre-participation/post-participation the total wells drilled were taken as the indicator (the dependent variable). No attempt is made here to investigate drilling categories of exploration wells and development wells distinctively. Since the main objective of the enquiry is investigating the independent variables' correlation with major indicators of the exploration and development effort in the oil industry, using total wells as a dependent variable, representative of the drilling phase of operations (both exploratory and development drilling) seems to be sufficient at this stage of the inquiry. However, the behaviour of the distinctive drilling efforts of exploration wells and development wells will be revealed when these are analyzed individually in the cross-sectional analysis of the participation group of companies with the other groups concurrently operating since 1974 that will be carried out in

the following section of this chapter.

Results of cross-sectional analysis - post-participation period

In an attempt to analyze the behaviour of data in a cross-sectional manner, for companies classified in groups according to the form of contractual arrangement under which the group has been operating, the variability in both slope and intercept of Y (dependent variable) relative to group difference, was computed by the regression equation. The results of the analysis are reported below for each of the dependent variables (indicators) investigated in this connection. The three groups considered in this analysis are as indicated earlier: (1) the "Participation Group", (2) the "Nationalised Group", and (3) the "Other Group".

Regression of capital expenditures Only two groups of companies are considered here; "participation companies" and "nationalised companies", because of the unavailability of capital expenditure data concerning the "other group". The regression results of these two groups are shown in Table VII-4. The regression equation used in this case employs one dummy variable with a value of 1 designated to the participation category and a value of 0 to the nationalised category. Both the additive and multiplicative properties of the dummy variable are manipulated with the following equation to detect variations in intercepts and slopes of capital expenditures (the dependent variable (Y)) between the two groups of companies.

The estimation equation is written as:

$$Y = a + B_1 t + B_2 D + B_3 tD + E_i$$

From which:

$$E(Y/D = 1) = (a + B_2) + (B_1 + B_3) t$$

$$E(Y/D = 0) = a + B_1 t$$

The following table (Table VII-4) shows the results estimated by the regression equation.

Table VII-4
Multiple Regression Analysis - Dependent Variable :
Capital Expenditures by Groups of Companies

Parameter	Estimated coefficient	Standard error	t-statistic	Significance level
Constant (a)	15.46	3.7883	4.081	
Dummy (B_D)	2.76	5.3575	0.515	n.s.
Time (B_t)	7.16	1.5466	4.630	1%
Dummy T (B_{Dt})	-6.33	2.1872	-2.894	5%
R = 0.9176				
R ² = 0.8420				

The intercept and slope of the dependent variable (Y : capital expenditure) is derived as follows for the two groups of companies:

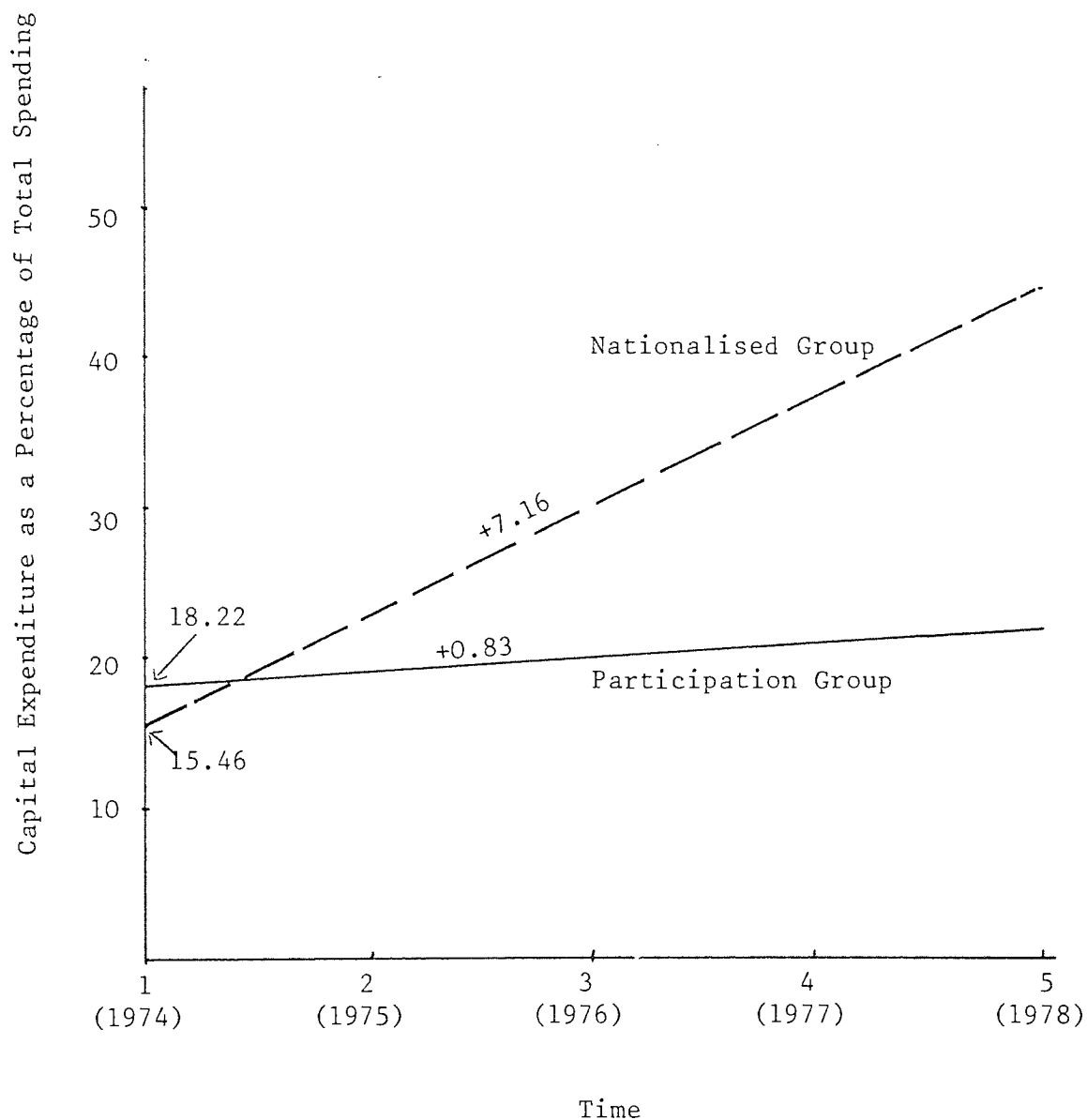
	<u>Participation Group D₁</u> (1)	<u>Participation Group D₀</u> (2)
Intercept	18.22 (a + B_D)	15.46 (a)
Slope	0.83 ($B_t + B_{Dt}$)	7.16 (B_t)

Figure VII-A shows a graphical illustration of these behaviours of the capital expenditure for the two comparative groups.

In interpreting the regression results presented in Table VII-4, it must be remembered that the capital expenditure variable here was employed in its form as a percentage of the total spending of the group. However, the results of the analysis indicate a statistically significant difference in the slope of this indicator between the participation companies and the nationalised companies since 1974. Although the latter group started at a slightly lower base than the participation group (15.46 compared with 18.22 intercepts, which were not significantly different on bases of their coefficient : $B_{D.} = 2.76$ and the corresponding t-value : $t = 0.515$) their slope climbed faster; The slope of the independent variable for the nationalised companies was 7.16 compared with 0.83 for the participation group. The difference between the two as measured by the coefficient B_{Dt} is -6.33, which has a corresponding t-value : $t = -2.894$, that is statistically significant at the level of 5 per cent. Therefore, the null hypothesis of no difference between the two groups in terms of the behaviour of their percentage allocation to capital expenditure can be rejected at the given level of significance (5 per cent). That is, the state of being from the nationalised group has significantly negatively influenced the slope of capital expenditure.

Therefore, the results of the regression analysis indicate that, while both groups started off from nearly the same base (no

Figure VII-A
Behaviour of Capital Expenditures
by Groups of Companies
1974-1978



Source Table VII-4.

significant difference in intercepts), the capital expenditure allocation of the participation group stagnated in comparison to the growth over time in the nationalised sector's capital allocation.

The time variable has also had a statistically significant impact on the dependent variable as related to the overall group. This is clearly shown by the time coefficient : $B_t = 7.16$ which has a t-statistic of 4.630. The estimated time Beta is significantly different from zero at the 1 per cent level of significance. The null hypothesis of no influence of time on the dependent variable for the overall group, then, can be rejected on the basis of these results. Alternatively, there has been a significant overall growth in capital expenditure for the two groups combined. But, as explained above, this positive change in the slope of the percentage capital expenditure of oil companies is mainly attributed to the nationalised group.

Regression of seismic exploration Seismic exploration work is considered in terms of the crew/month volume of activity as explained in a previous section of this chapter. The results of regressing the variable (Y) according to the applicable equation: $(Y = a_3 + a_1D_1 + a_2D_2 + B_3t + B_1tD_1 + B_2tD_2 + E)$, are shown in Table VII-5 below.

Table VII-5

Multiple Regression Analysis - Dependent Variable :

Seismic Crew/Months by Groups of Companies

Parameter	Estimated coefficient	Standard error	t-statistic	Significance level
Constant (a)	38.9	16.999	2.288	5%
Dummy 1 (B_{D1})	-15.26	24.039	-0.635	n.s.
Dummy 2 (B_{D2})	-37.82	24.040	-1.573	n.s.
Time (B_t)	7.94	6.9396	1.144	n.s.
D_1T (B_{D_1t})	-10.82	9.8141	-1.103	n.s.
D_2T (B_{D_2t})	17.20	9.8141	0.175	n.s.
R = 0.7592				
R^2 = 0.5763				

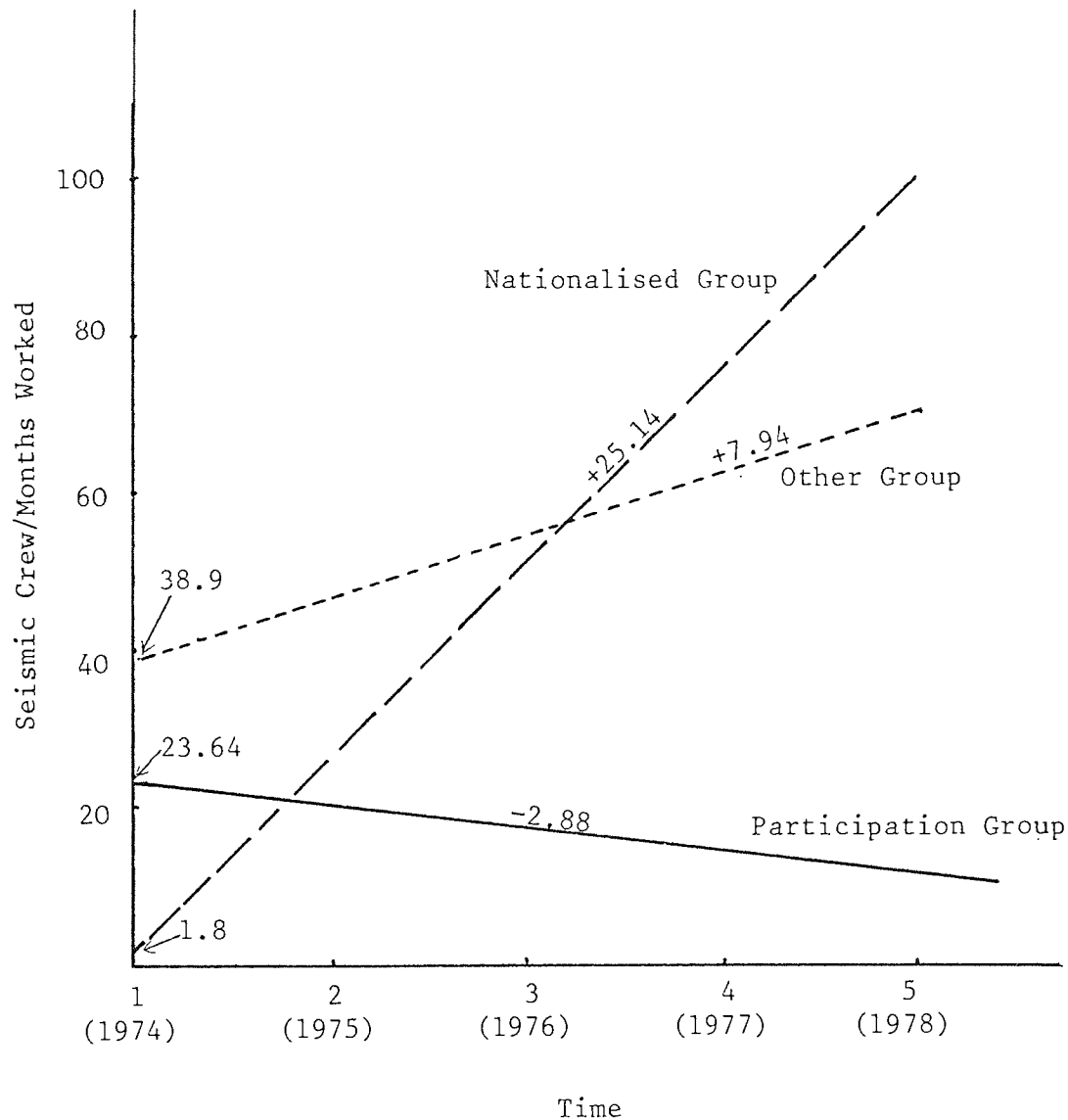
The intercepts and slopes of Y for the three groups are derived from the table as follows:

	<u>Participation Group</u> (1)	<u>Nationalised Group</u> (2)	<u>Other Group</u> (3)
Intercept	23.64 (a + D_1)	1.08 (a + D_2)	38.9 (Const: a)
Slope	-2.88 (B_t + D_1t)	25.14 (B_t + D_2t)	7.94 (B_t)

Figure VII-B illustrates these behaviours graphically for the three comparative groups of companies.

The values estimated by the regression equation show a general tendency of the dependent variable (seismic crew/month) to go up over time since 1974 for the base group of the equation,

Figure VII-B
Behaviour of Seismic Crew/Months
by Groups of Companies
1974-1978



Source Table VII-5.

the group designated as the "other group". This is indicated by the positive time coefficient $B_t = 7.94$ crew/months. But this growth is only slight, that the corresponding t-value : $t = 1.144$ is not statistically significant at the significant level required in the present inquiry (ie 10 per cent). The tendency of growth over time persists also for the nationalised group as shown by their slope of 25.14 crew/months. But for the participation group, the change in slope over time becomes negative (-2.88) crew/months.

In examining the variation between the three groups of companies, the regression results demonstrate that the estimated coefficient was significantly different from zero only when comparing group number 3 (or the one designated as "other group") versus both the participation and nationalised groups combined. Being from group number 3 rather than otherwise has a statistically significant positive association with the level of seismic exploration efforts undertaken. This is indicated by the coefficient value of the constant term produced by the regression equation. Such value was 38.9 which has a t-value : $t = 2.288$, that is statistically significant at the 5 per cent significance level. This supports the rejection of the null hypothesis of no difference between the concerned groups. Aside from this correlation, none of the other relationships shown in Table VII-5 were statistically significant from zero. The relevant null hypotheses, therefore, are accepted.

However, one important aspect of the behavioural correlations shown in this section of the analysis - that helps in throwing some light on the basic assumptions of the present research - is related to the participation group's relative contribution to the exploration effort. Starting from an already low level of activity (with consideration to both the pre-participation level of activities and the group's proportionate share in total crude production since participation), their efforts in this field have tended to, further, decline over time. This is indicative of the diminishing role of companies operating under the participation system in searching for oil in new areas in the country, while whatever growth in this effort accomplished in the country since 1974, have been in fact achieved outside the participation arrangements.

Regression of total wells drilled The results of regressing total wells drilled (Y) on the independent variables of the equation : $(Y = a_3 + a_1 D_1 + a_2 D_2 + B_3 t + B_1 t D_1 + B_2 t D_2 + E)$ are presented in Table VII-6.

Table VII-6

Multiple Regression Analysis - Dependent Variable :Total Wells Drilled by Group of Companies

Parameter	Estimated coefficient	Standard error	t-statistic	Significance level
Constant (a)	16.2	12.038	1.346	n.s.
Dummy 1 (B_{D_1})	14.4	17.025	0.846	n.s.
Dummy 2 (B_{D_2})	4.6	17.025	0.270	n.s.
Time (B_t)	7.8	4.9146	1.587	n.s.
D_1T (B_{D_1t})	0.9	6.9503	0.129	n.s.
D_2T (B_{D_2t})	5.5	6.9503	0.791	n.s.
R = 0.8041				
R^2 = 0.6466				

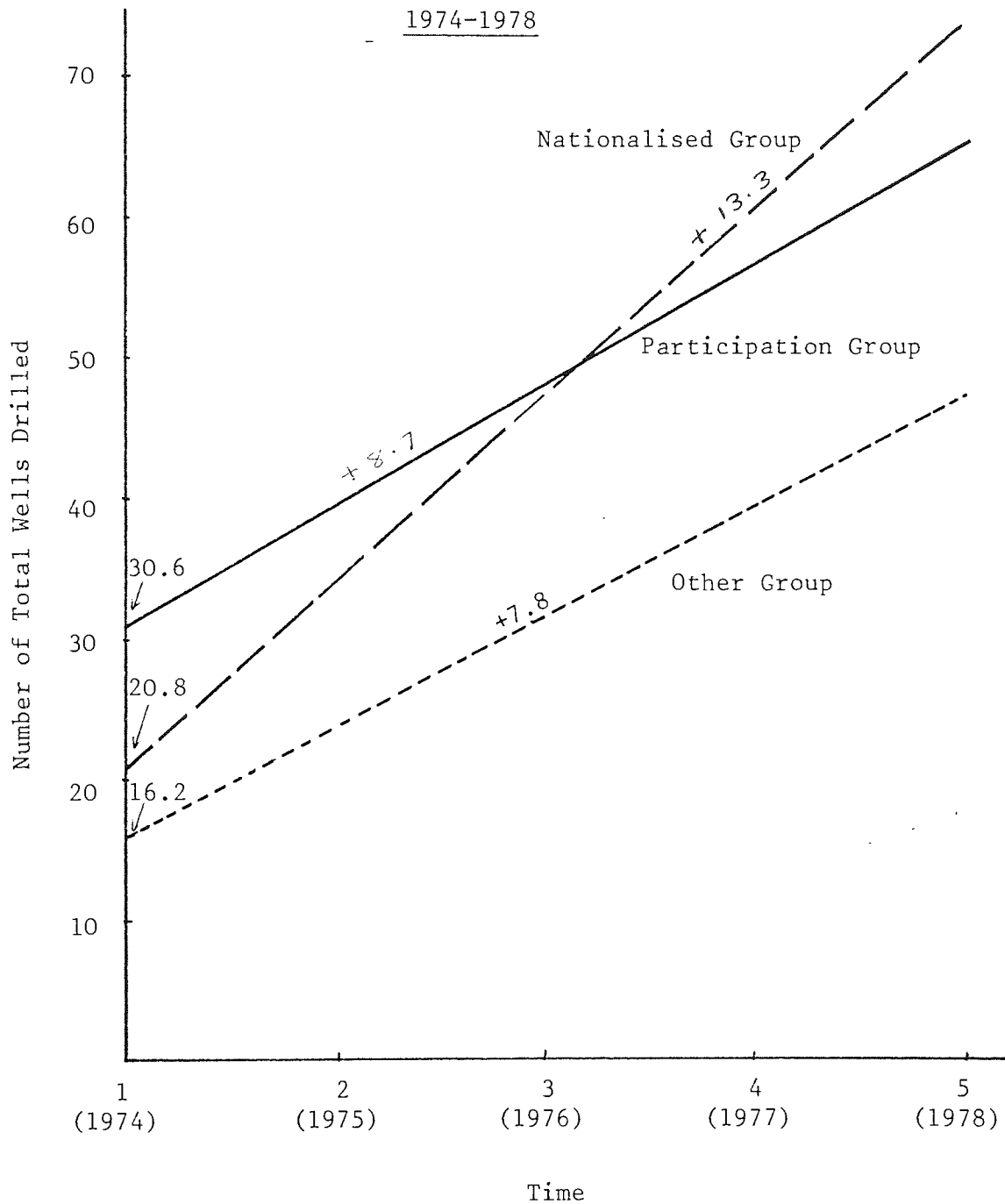
From the table, the intercept and slope of the dependent variable is derived as follows for each of the three groups:

	<u>Participation Group</u> (1)	<u>Nationalised Group</u> (2)	<u>Other Group</u> (3)
Intercept	30.6 ($D_1 + a$)	20.8 ($D_2 + a$)	16.2 (Const: a)
Slope	8.7 ($D_1t + B_t$)	13.3 ($D_2t + B_t$)	7.8 (B_t)

Figure VII-C shows a graphical illustration of the behaviour of the total wells variable in the three groups of companies.

Looking at the behaviour of the total wells slope, it could be seen that the tendency was upwards both for individual

Figure VII-C
Behaviour of Total Wells Drilled
by Groups of Companies



Source Table VII-6.

groups and for the overall drilling activity. However, the time coefficient of the data was not statistically significant in either case, neither was the coefficients of being from one group than the others. All t-statistics corresponding to these coefficients fall below the level of significance required in the present investigation. On this basis, the null hypothesis : H_0 of no significant variation between the total drilling activities of different groups can be accepted.

However, the use of total wells as an indicator of the oil industry's efforts in creating and developing new reserves have certain shortcomings. It does not take into consideration the elimination of those wells which are rather of a service nature and not of exploratory or development nature. A number of wells are usually drilled by producing companies to cope with certain operating problems and do not contribute to the objective of enlarging existing production capacities.

A better view of the companies' drilling efforts may be obtained by analyzing the behaviour of exploration drilling and developmental drilling distinctively.

Regression of exploration wells The results of regressing exploration wells drilled by the three groups of companies are presented in Table VII-7 below.

Table VII-7

Multiple Regression Analysis - Dependent Variable :

Exploration Wells by Groups of Companies

Parameter	Estimated coefficient	Standard error	t-statistic	Significance level
Constant (a)	7.6	4.5107	1.685	n.s.
Dummy 1 (B_{D_1})	15.6	6.3791	2.445	5%
Dummy 2 (B_{D_2})	5.0	6.3791	0.784	n.s.
Time (B_t)	5.6	1.8415	3.041	2%
$D_1 t$ ($B_{D_1 t}$)	-9.8	2.6043	-3.763	1%
$D_2 t$ ($B_{D_2 t}$)	-3.4	2.6043	-1.306	n.s.
R = 0.8091				
R^2 = 0.4628				

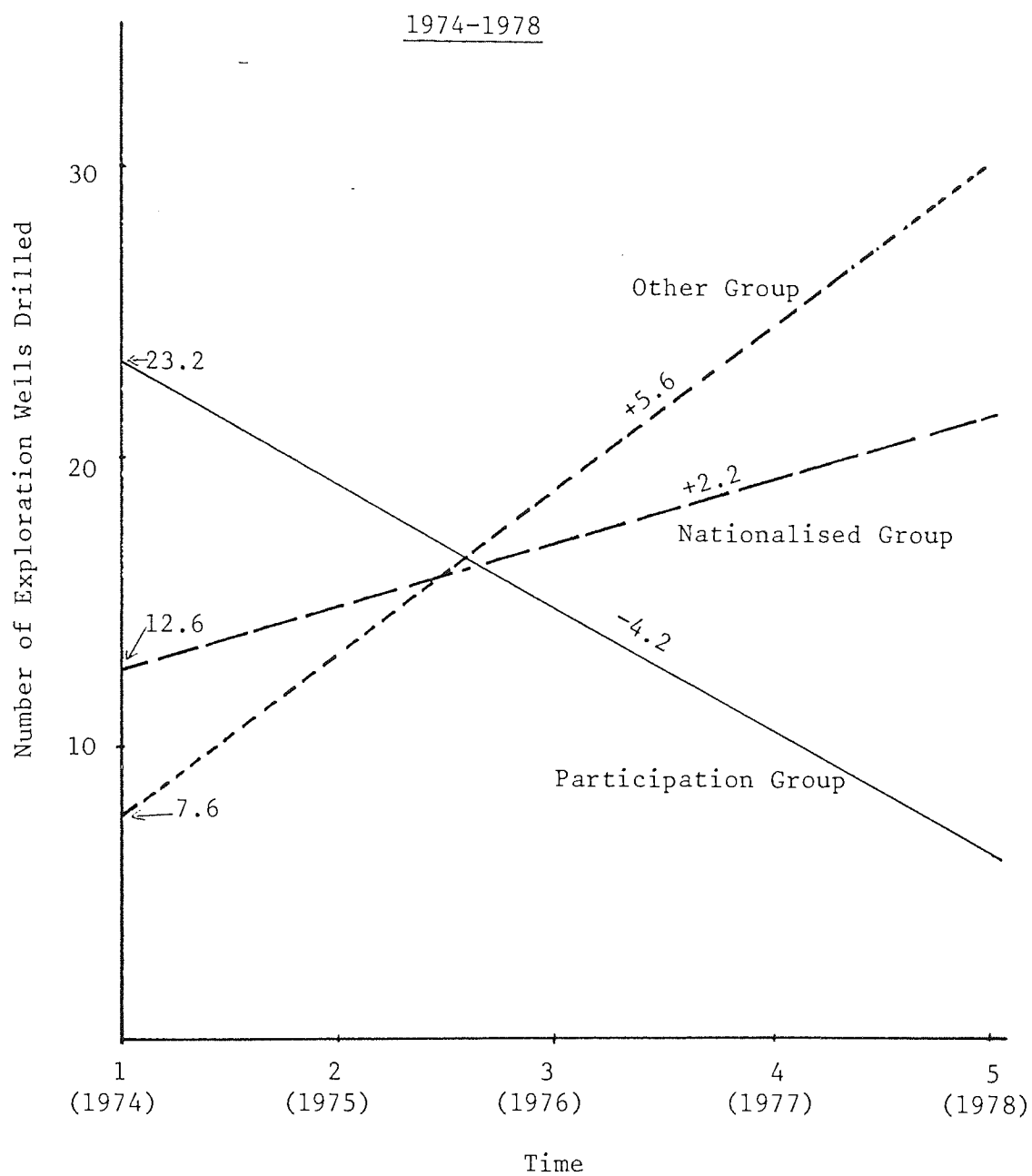
The intercept and slope of the dependent variable is derived below for each group:

	<u>Participation Group</u> (1)	<u>Nationalised Group</u> (2)	<u>Other Group</u> (3)
Intercent	23.2 ($D_1 + a$)	12.6 ($D_2 + a$)	7.6 (Const: a)
Slope	-4.2 ($D_1 t + B_t$)	2.2 ($D_2 t + B_t$)	5.6 (B_t)

These comparative behaviours of the slope and intercept of data for the three groups of companies are displayed graphically in Figure VII-D below.

The regression results in Table VII-7 for the dependent variable (Y : exploration wells) show a quite different picture

Figure VII-D
Behaviour of Exploration Wells
by Groups of Companies



Source Table VII-7.

from those of regressing total wells. There has been a statistically significant upward trend in exploration wells for the base group of the equation, ie the group designated as the "other group". As indicated by the time coefficient : $B_t = 5.6$ and the corresponding t-value : $t = 3.041$, this positive trend over time is statistically significant from zero at the 2 per cent significance level. The related null hypothesis can then be rejected in favour of the alternative hypothesis of a significant difference.

In examining the variation of exploration drilling activities between the different groups, it could be noticed that a statistically significant association exists between exploration wells (dependent variable : Y) and the independent variable (D_1). The coefficient value here is $B_1 = 15.6$, with a t-statistic of : $t = 2.445$, which is significant at the level of 5 per cent. These values indicate that the state of being from other than the participation group has had a significant positive impact on the behaviour of the dependent variable (Y). Expressed adversely, it means that the state of being from the participation dichotomy rather than otherwise has had a negative influence on the behaviour of the exploratory drilling activity. As a matter of fact the volume of exploratory wells drilled by participation companies since 1974, though started from a relatively higher basic level (intercept = 23.1 wells), has been declining over time (Figure VII-D).

The overall growth in the volume of such activity from 1974 to 1978 is attributed mainly to the nationalised companies and the "other group" of operators. The role of the participation group in creating new reserves for the oil industry has, therefore, been diminishing over time when measured by the number of exploration wells drilled.

Regression of development wells The results of regressing development wells (Y), on the independent variables are presented in Table VII-8.

Table VII-8

Multiple Regression Analysis - Dependent Variable :

Development Wells by Groups of Companies

Parameter	Estimated coefficient	Standard error	t-statistic	Significance level
Constant (a)	8.6	10.473	0.821	n.s.
Dummy 1 (B_1)	-1.2	14.812	-0.081	n.s.
Dummy 2 (B_2)	-0.4	14.812	-0.027	n.s.
Time (B_t)	2.2	4.2758	0.515	n.s.
D_1t (B_{D_1t})	10.7	6.0468	1.770	n.s.
D_2t (B_{D_2t})	8.9	6.0468	1.472	n.s.
R = 0.846				
R^2 = 0.7157				

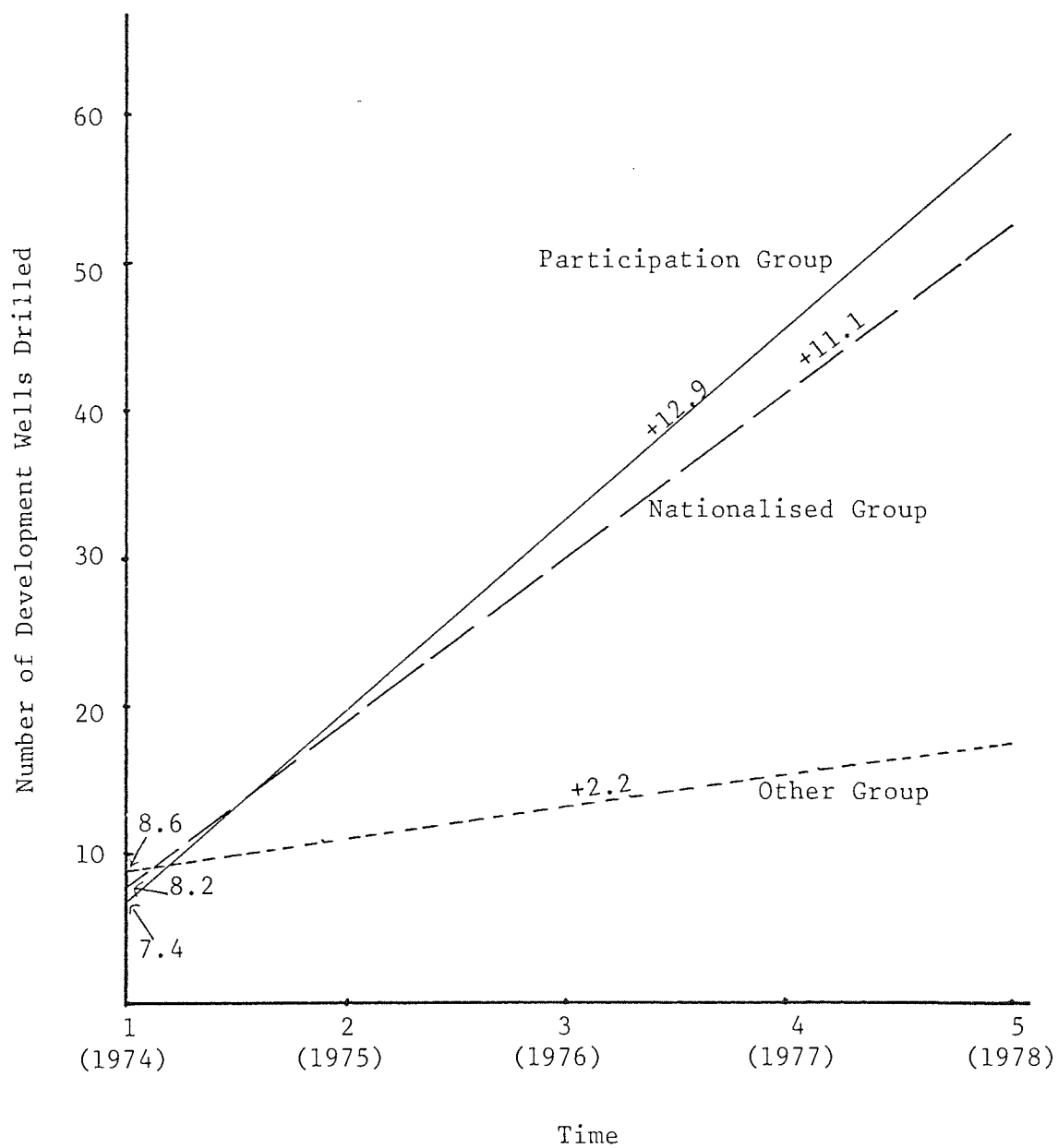
The intercept and slope of the dependent variable is derived for each group as follows:

	<u>Participation Group</u> (1)	<u>Nationalised Group</u> (2)	<u>Other Group</u> (3)
Intercept	7.4 (a + D ₁)	8.2 (a + D ₂)	8.6 (Const: a)
Slope	12.9 (B _t + D ₁ t)	11.1 (B _t + D ₂ t)	2.2 (B _t)

Figure VII-E shows a graphical illustration of the behaviour of development drilling activities for the three groups of companies. They all have increased their development drilling activities over time, with a relatively higher level of growth for the participation and the nationalised companies. The third group of companies designated as the "other group" has had a relatively lower rate of growth in the number of development wells drilled. This is explained by the fact that the latter group is still rather in the initial stage of operations where most of its activities are concentrated on exploration. However, the variation between different groups in this respect was not significant in statistical terms as indicated by the related coefficients obtained in Table VII-8. Neither was statistically significant the time coefficient for the overall groups. All Betas estimated by the regression equation have t-values that do not meet the level of significance of 10 per cent required by this study. Therefore, the relevant null hypothesis : $H_0 = 0$ can be accepted on this basis.

The conclusions to be drawn from the regression estimates, thus, is that there has not been a significant growth in the development drilling activity during the period 1974-1978 in

Figure VII-E
Behaviour of Development Wells
by Groups of Companies
1974-1978



Source Table VII-8.

terms of the overall companies, nor was significant the growth of activity for the individual groups considered. Furthermore, behaviour of the development drilling activity in various groups has not been significantly affected by the state of being from one particular group or the others.

Summary of Regression Results and Conclusions

Results of regressing the various indicators on the independent variables, both in a pre/post-participation fashion for the whole industry and in a cross-sectional manner for different groups of companies in the post-participation period, are summarized in Tables VII-9 and VII-10 respectively. To recapitulate these results, the following points can be made:

1. On the basis of the data analyzed, it becomes clear that the transformation of the Libyan oil industry from the concessionary form of exploitation arrangements to the participatory arrangements have been associated with a downward shift in the oil industry's effort of research and development as indicated by the behaviour of the main indicators of such effort.
2. Results of the regression analysis of the data display a significant negative correlation between the introduction of the participation system and the capital expense indicator for the oil industry as a whole. This indicator is representative of the percentage share of the capital investment of the oil

Table VII-9

Summary of Regression Results - Over All Companies

Pre/Post-Participation

Indicator (Dependent Variable)	Capital Expenditure (% of total spending)			Seismic Work (seismic crew/months)			Drilling Activity (total wells drilled)		
	coeff	t-stat	sig level	coeff	t-stat	sig level	coeff	t-stat	sig level
Constant a	34.526	9.884	-	292.64	8.945	-	305.55	7.336	-
Dummy B ₁	-12.850	-2.132	10%	-17.40	-0.309	n.s.	-134.4	-1.870	10%
Time B ₂	1.066	1.488	n.s.	-16.85	2.514	5%	-5.471	-0.641	n.s.
R R ²	0.5517			0.8335			0.7972		
	0.3043			0.6968			0.6355		

Table VII-10

Summary of Regression Results - Cross-Sectional Analysis

Indicator (Dependent Variable)	Post-Participation											
	Capital Expenditure* (% of total spending)			Seismic Work (seismic crew/months)			Drilling Activity (total wells)			Exploration Drilling (exploration wells)		
Independent Variable	coeff	t-stat	sig level	coeff	t-stat	sig level	coeff	t-stat	sig level	coeff	t-stat	sig level
Constant (a)	15.46	4.081	-	39.9	2.288	5%	16.2	1.346	n.s.	7.6	1.685	n.s.
Dummy 1 (B_{D_1})	2.76	0.515	n.s.	-15.26	-0.635	n.s.	14.4	0.846	n.s.	15.6	2.445	5%
Dummy 2 (B_{D_2})				-37.82	-1.573	n.s.	4.6	0.270	n.s.	5.0	0.784	n.s.
Time (B_t)	7.16	4.630	1%	7.94	1.144	n.s.	7.8	1.587	n.s.	5.6	3.041	2%
D_1T (B_{D_1t})	-6.33	2.894	5%	-10.82	-1.103	n.s.	0.9	0.129	n.s.	-9.8	-3.763	1%
D_2T (B_{D_2t})				17.20	0.173	n.s.	5.5	0.791	n.s.	-3.4	-1.306	n.s.
R		0.9176			0.7592			0.8041			0.8091	
R ²		0.8420			0.5763			0.6466			0.4628	

* Only two groups of companies are included in the model, the participation and the nationalised groups.

companies to their total annual spending in the country.

The industry's adoption of the participation formula has been associated with a statistically significant drop in this percentage. Although the capital expenditure variable has recovered over time for the overall industry since the participation system was first introduced, much of this recovery was not attributable to the group of companies operating under this system, it rather came from the efforts of the nationalised companies. While the latter companies have increased their allocation to capital projects since 1974, the participation companies' capital expenditures have relatively stagnated.

3. In terms of seismic exploration activities, the emergence of the participation system has not been shown to have significant correlation with this indicator when the activity of the industry was taken as a whole. This was perhaps due to the fact that the seismic exploration effort in Libya had declined over time before the participation system emerged. But when different groups of companies were analyzed, it became clear that this general decline in seismic work had particularly persisted for the participatory companies, while the other two groups have since 1974 made some effort to increase their activity in this field. Much of this effort has been made, however, by the number 3 group (the companies designated as the other group), ie outside the participative and the nationalised sectors of the industry.

4. Concerning the drilling activity, which is perhaps the most important indicator of the exploratory and development effort in the oil industry, the adoption of the participation formula in Libya has been associated with a downward shift in the volume of drilling activity in the country as a whole. The introduction of the new system was associated with a significant drop in the total wells drilled by oil companies. No significant variation in the behaviour of the total wells variable was shown by the analysis between different groups of companies. But when exploration wells and development wells were analyzed distinctively in a cross-section of company groups, the analysis displayed that the role of the participation companies in exploration drilling has been significantly diminishing over time since 1974 compared with other groups of operators in Libya. Exploration wells drilled by the latter have been growing after 1974, while the participative companies have shown a decline in this activity.

In relation to development drilling, on the one hand, no significant variation has existed in the behaviour of this variable for different groups of companies. The number of development wells drilled by the various groups have shown a slight increase over time since 1974 but this growth was not statistically significant.

The conclusions that can be drawn from this chapter are that the emergence of the participation system in Libya seems to have been associated with a significant decline in almost all

aspects of the exploration and development activity in the country's oil industry. The adoption of the system was associated with a sudden drop in the level of exploration and development efforts of oil companies from the relatively high levels obtained in the industry prior to participation. This drop was perhaps inevitable in view of the atmosphere of uncertainty surrounding oil operations at the time of the emergence of the participation system. But a great deal of these uncertainties have been removed by the fact that the participation agreements were reached and were put into effect - accepted by both the government and the operating companies. Moreover, the oil market situation that has existed since 1974, with high oil prices and the relative surety of such high prices to hold, should have reflected in an acceleration of exploration and development activities of the oil industry, given of course, that other factors are equal. But, this has not been the case with the participative oil companies in Libya. Their exploration and development efforts in the country have generally stagnated, and where some growth has been shown in such efforts for the country as a whole since 1974, this growth has been attributable mainly to efforts by companies other than the participative companies.

As the participation companies are the major producers of most of the country's crude oil it seems that their role in creating any new reserves in the country has been diminishing. Their activities in the country have been limited to only

extracting whatever reserves they had already discovered prior to the new agreements with the government.

However, the overall conclusions of the investigation conducted within this chapter must not be drawn without regard to the inherent limitations of the model of analysis used as well as bearing in mind many variables not accounted for here, but of potentially considerable influences on the behaviour of the tested indicators of the oil industry. As the regression model of analysis is only a means of examining the behaviour of a specific variable or variables in respect of another isolated variable or a combination of independent variables, it is only a test of association of the variables considered rather than an investigation of their direct cause and effect relationship. Nevertheless, the use of such a model of analysis permits inferences to be made from the observance of a statistically significant association between the various variables under study - as to the existence of some causal relationships of these variables.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

The various data and factors examined in connection with this study of the emerging system of host government's participation in the oil industry are summarized in this chapter. In connection with this summary, some conclusions are drawn with respect to the effects of the adoption of the participation system on certain oil industry aspects of interest to the oil producing country. These are particularly the influence of the new system on revenues from oil and its impact on the industry's efforts on research and development. Then an attempt is made to conclude the study with some inferential generalizations as to the wider implications of these conclusions on future relationships and exploitation arrangements of the international oil industry.

The study was concerned in particular with the main hypothesis that the benefits to the producing country's national economy of revenues derived from oil would have been greater under a concessionary formula than under a participating basis. A comprehensive review of the literature was carried out, to identify and examine the socio-political factors surrounding the international oil business and to see their influence on the prevailing contractual arrangements of the industry in host countries. With view of the changes induced by those environmental factors in attributes of the alternative models of determining oil revenues, a comparative discounted cash flow analysis was

then made to investigate the viability of governmental participation in the oil industry as an investment proposal. The emphasis of the investigation was placed on assembling a case study of the participation arrangements of Libya - a major producer whose oil developments and relationships with operating companies have generally assimilated the concurrent patterns of the other major oil producing and exporting countries.

As the source of revenues in the extractive oil industry is the established underground hydrocarbon deposits and these in turn are dependent on the efforts of the industry in finding and developing them, special attention was also given in the study to the impact of alternative contractual arrangements on the exploration and development activities of the industry.

The significance of such an investigation relates to the fact that oil is undoubtedly the most important internationally traded commodity in today's world economy. Its importance is not only of vitality to the oil producing/exporting countries for whom the oil industry forms the dominant element of the national economy, or to the operating companies whose corporate objectives of profitability and growth are naturally based on oil, but also to the ultimate consumers of this form of energy - countries as well as individuals. With oil being of such importance, relationships in the international oil business have always been an area of friction and conflicting interests. One major conflict of past relationships between the oil companies and the producing

countries was over the division of oil revenues (which is the main theme of this research), and consequently over oil prices and production policies.

Prior to the introduction of the participation system, relationships between the oil producing/exporting countries and the operating companies, were generally structured on the basis of concessionary agreements. By a typical oil concession of this kind the state - as owner of the country's national resources, entrusts a company (usually a foreign one) with the right to search for, develop, extract, and export hydrocarbons (crude oil and gas) from a certain area (or areas) in the country over a prescribed period of time (usually several decades), in return for certain financial payments to the state, usually in the form of taxes and royalties on productions. Operations in the oil concessions are exclusively run and financed by the concession holder who also assumes all risks associated with these operations as well as enjoying the full entitlement to any petroleum production accruing from the concessions and the freedom of disposal of such production.

Because of the long term nature of these concessionary agreements, and because of the dynamic nature of the socio-economic and political environment surrounding oil operations, a special country/company relationship was created in the international oil industry - a relationship that had naturally posed problems of negotiations and renegotiations, of contract revisions, and of modifications of the agreed arrangements. This

has been the case with oil concessions in Libya and elsewhere in the oil producing and exporting countries. Changes in the oil arrangements whenever incurred, came in a pattern identical for the various individual producers and were in response to environmental changes of the conditions surrounding the international oil operations and the bargaining positions of the parties concerned.

The early concessionary framework prior to the 1950's secured a large measure of freedom to the expatriate concessionaire companies. In return, their financial obligations to host countries were a specified royalty payment per unit of production regardless of oil prices or profits. Then, the system of payment to the host country was changed to a 50 per cent share of a company's profits. With the adoption of the principle of equal sharing of profits, special importance was given to the issue of pricing in the oil industry and to the companies' costing practices.

In determining what profits were to be shared with the government under the 50-50 profit sharing system, the concept of "posted prices" was equally introduced in the oil concessions for the valuation of oil produced. Posted prices are basically tax reference prices but they also were at the early stage representative of the prices which producers were prepared to charge to crude buyers at the tanker terminals. During the early and middle 1950's market prices approximated posted prices as

both, supply and demand in the international oil market were growing at corresponding rates. But, later in the decade, when capacity outran the growth of demand, oil was sold at discounts below the posted prices. To reduce their payments to host governments, the concessionaire oil companies reduced their official posted prices twice, in 1959 and in 1960. These reductions were decided unilaterally by the oil companies without the consent of host governments. The price reductions, which amounted to about 13 per cent, caused a strong reaction in the oil producing and exporting countries, whose revenues from oil operations suffered as a result, and were the direct cause leading to the establishment of OPEC (Organization of Petroleum Exporting Countries).

The Organization of Petroleum Exporting Countries was formed in September 1960, with the general aim of coordinating and unifying the oil policies of its member countries. One of its immediate goals upon its formation was to combat the oil companies' practices of unilaterally administering crude prices and to restore the reduced posted prices to their level prior to the reduction of 1959. Although this objective was not achieved until the early 1970's, the organization initiated a number of other improvements in the financial arrangements of oil concessions during the first decade of its life. The most important of these was the change in the treatment of royalty payments to host governments whereby the host countries became entitled to receive the amount of royalty in addition to the 50 per cent share of the companies'

profits. Previously the royalty payment was considered a partial payment of the 50 per cent profit tax payment. The other important improvement initiated by OPEC during this period was the reduction of marketing allowances which the oil companies were allowed under the original concessions to deduct from the posted price. Aside from these improvements, no other major changes were introduced on the concessionary formula. The fundamental objective of OPEC to restore the posted prices to their level prior to the reductions of 1959/1960 had resulted in no definite achievements except preventing any further deteriorations in such prices. However, the limited success of the organization during this period has demonstrated to the member countries the advantage of collective action by them against the cartel of oil companies.

With the beginning of the 1970's, this collective action of the oil producing countries, helped by some favourable changes in the structure of the oil market as well as some socio-political events in major producing countries, started to place the host governments in a powerful bargaining position. Under these conditions the oil posted prices and other variables related to the determination of the governments' income from oil became an issue for negotiation - a matter which previously had been persistently resisted by oil companies. Between 1971 and 1973 several upward adjustments in posted prices and the tax rate were achieved through the process of negotiation. In effect the posted price was doubled during the said period and 5 per cent

points were added to the old income tax rate of 50 per cent. But in view of the growing demand and increasing tightness in the oil market during this period, the agreed increases of posted prices could not keep pace with the movements of market price. However, their importance was in the fact that they marked a fundamental shift towards the producing states in the balance of economic power as they were reached through negotiation in response to OPEC's urgings.

At about the same time of these settlements the producer governments increased their efforts towards achieving control over their petroleum resources through direct participation in the ownership and operation of the oil concessions.

The principle of producing countries controlling their oil industry through a direct ownership in the oil concessions had long been a cherished goal among nationals of the oil producing countries, reflecting the many grievances in these countries against the privileged and dominant status secured to the foreign companies by the traditional concessionary agreements. The subject of participation was adopted by OPEC as a principle of collective policy for its member states first, in 1968. It was sought as a means of increasing the oil producing countries' financial and economic benefits from oil operations within their territories. But it was not actively pursued by individual producers until 1972-1973, when the major participation arrangements between the concessionaire companies and the host

governments were negotiated and concluded.

By participation in its oil industry, the status of the host country changed from a mere receiver of royalties and profit taxes from operations totally owned, financed and conducted by international oil companies to a partner in these operations. As a participant in the oil concession, the government through a state owned corporation became entitled to receive a proportionate share in crude production and equally obliged to share the financing of operations in addition to compensating the companies for the acquired share.

In disposing the government's share of participative crude oil, the participation arrangements provided for the respective foreign partners' preferential right to buy it back from the state corporation at buy-back prices fixed in approximation with market prices. Net income resulting from such crude (ie net revenue after the deduction of relevant costs) represented the income to the government from its interest in the oil participation venture. Such income therefore is a new form of revenue to the government that was not familiar under the old concessionary arrangements where the government received its revenue from oil companies only in royalty and income taxes - based on tax reference prices not directly reflecting actual market realization.

The latter form of income to the government (royalty and income taxes) remained, however, applicable to the foreign

companies' equity oil from participation. These have continued to be determined on the basis of the concessionary formula. The participation agreements themselves have not altered the structure of tax and royalty payments nor did they change the accounting formula for their calculation - aside from reducing the volume of crude oil subject to this form of payment, by that portion taken over by the government.

Upon the first emergence of the participation system, royalty and income tax payments were being determinable on the applicable rates of 12.5 and 55 per cent respectively and based on posted prices which although established by negotiation, were outrun by the rapidly advancing market prices. Under these conditions government's participative crude brought significantly better revenues to the state from those received from concessionary oil, particularly because the latter's posted prices were lagging behind the market level. But this situation was shortly reversed as a result of new realities in the international petroleum situation after the Arab Israeli War of October 1973 and its consequences; oil was used by Arab producers (who are the major suppliers of internationally traded oil) as a political weapon against countries who supported Israel; this included a general cut-back in production and an embargo on exports to certain countries. Although these measures were only temporary and were lifted early in 1974, their influences on the international oil industry were far-reaching; the oil embargo and production cut-backs came at a time when the oil market had already been

undergoing a process of transformation from a buyer's market to a seller's market. When the embargo of exports and the cut-back measures were introduced, the supplies of crude oil fell short of meeting demand in the international oil market, sending the market prices of crude oil up to unprecedented levels. The oil producing countries who were already attempting to negotiate with the oil companies an increase in their posted prices found in this situation a suitable opportunity to begin fixing their posted prices on a unilateral basis and adjust them in accordance with market prices. Oil companies who were competing against each other to secure the scarce crude found themselves in no position to challenge the producing countries. The principle of unilateral decision making by the oil producing countries was then extended to most of the essential financial matters in their relationships with oil companies, enabling the producers to extract additional benefits from the companies through further increases in royalty and tax rates.

The ability of the producing countries to adjust posted prices in accordance with market conditions and their revision of the structure of royalties and income taxes has improved their revenues under the concessionary model substantially. With these improvements, the concessionary formula - applicable to oil marketed by foreign operators - became capable of maximizing the revenue benefits to the government from any upward trends in the oil market.

When, the comparison was made in this study of the Libyan

government's revenues under this improved concessionary model with those receivable from the participation model, results of the investigation showed only a narrow margin of profits to the government from employing the participation model rather than the concessionary model. Discounted against the capital commitments which the government have to put into the oil industry in the case of participation, the viability of the participating system as an investment proposal versus a continuation of an improved concessionary arrangement cannot be justified by the economic theory of choice over time. This conclusion is, of course, on the basis of analysis of the available Libyan data (Chapter VI).

Furthermore, from the analysis of the Libyan data, it seems that the transformation of the oil industry's exploitation arrangements from the concessionary system to the participating system has been at the expense of the level of the exploration and development efforts of the industry. Empirical investigation undertaken by the present study in this connection revealed that the transformation to the participating system has been associated with a decline in the oil industry's efforts of exploration and development as indicated by the behaviour of a number of selected indicators.

One of these indicators tested in the study was the percentage spending on capital expenditures by oil companies. The adoption of the participation scheme has been, according to the analysis,

associated with a statistically significant drop in this percentage. Although, the capital expenditure variable has then started to recover slightly during the period that followed the emergence of the participation system, much of this recovery was not attributable to companies operating under the participation system. For the participation companies, capital expenditures have generally stagnated at a relatively low level.

Another indicator examined was the seismic exploration work. The empirical investigation has not shown any significant behavioural relationship of this parameter with the emergence of the participating system. This was, perhaps, due to the fact that the level of geophysical activities of the Libyan oil industry had already been declining over time even prior to the adoption of the participation arrangements. However, there has been a slight pick up in this type of activity during the period that followed the emergence of participation. But this slight improvement was in the overall industry and was totally due to the efforts of the non-participation companies. For the participation companies as an individual group a rather declining trend has persisted.

The third indicator examined by the study was the volume of drilling activity in the oil industry, which is perhaps the most important parameter of the exploration and development effort. The empirical analysis has shown a downward shift in total drilling activities for the overall industry, associated

with the emergence of the participation system. When the drilling activity was looked at in terms of the distinctive categories of exploratory drilling and developmental drilling, the analysis indicated a declining trend over time in the participation companies' exploratory drilling activity and a rather stagnant situation for the development activity. Whatever improvements incurred in these phases of oil operations since the emergence of the participation scheme have been mainly the result of efforts by companies other than the participative group.

In conclusion, therefore, it can be said that the participatory form of relationship between the host government and the international oil companies, as assimilated by the Libyan model, seems to have reduced the role of such companies to a mere extractor of whatever reserves that had already been discovered and developed prior to the adoption of this model of relationship. Bearing in mind that large areas of the country in Libya as well as in the other oil exporting countries are still unexplored and many of the explored areas are only partially searched, the recent market trend of increasing demand for oil and higher prices should have reflected favourably on the efforts of research and development in the industry - given that the contractual arrangements were suitable to all parties concerned. But this did not seem to have been the case with the participation scheme investigated in this study.

Existing oil reserves are depletable in a matter of decades, a situation which highlights the importance of intensifying the exploratory effort in order to prolong the life span of such resources by some extra years. Stimulating these efforts is not only of importance to the producing states and companies, but, it is also essential in view of the growing energy needs of the world community at large. New discoveries and development of oil deposits are needed to relieve the pressure on the demand for oil in the intermediate future until the world develops and transforms to other sources of energy.

It is a common knowledge that the exploration and development of oil reserves depends on a high level of technology. Future requirements are expected to call for more complicated material and equipment and more specialized expertise as tapping new sources moves to more difficult terrains. These characteristics make it impossible for the producing countries to undertake such an investment on their own as they lack the technology and expertise required for the job and most of them do not have enough capital or wish to invest in intensified exploration programs. Joint cooperation, therefore, is essential in future activities. Such cooperation whether it is in the form of participation between host governments and oil companies or otherwise should be based on securing a fair compensation to the producing country for depleting its scarce natural resource, and on providing an adequate return on the investment and efforts of the operating company and guaranteeing her some stability of

future relationships and position in the producing country.

Additional research is certainly needed in this area of country/company relationships of the international oil industry to throw some light on the many questions and points left unanswered by the present study. One point of interest, where further research may be beneficial, is the examination of alternative oil industry arrangements in relation to other economic aspects of the national economy of the host country. Certainly, the concern of countries of resource-based economies such as the oil producers - is not only limited to the immediate revenue benefits extractable from their exhaustable resources, but also include the even more essential aspects of integration into the national economy and the problems of enhancing social and economic development in the country. Within the limited scope of the present study, it has not been possible to deal with such issues which call for a separate and comprehensive investigation.

APPENDIX A

Report of Surveying the
Accounting Practices of
a Number of American Oil Companies

APPENDIX A

REPORT OF SURVEYING THE ACCOUNTING

PRACTICES OF A NUMBER OF AMERICAN

OIL COMPANIES

This report is concerned with the analysis of accounting methods of oil companies in allocating petroleum finding and development costs for financial reporting purposes. The analysis is based on data available in the 1974 financial reports of 27 selected American oil companies. All companies in this sample are registered on either the New York Stock Exchange or the American Stock Exchange. The 27 companies analyzed represent most of the International majors of US origin in addition to a number of the smaller companies, most of whom are also operating internationally. Thirteen of the companies in the sample were also included in the Chase Manhattan Bank's, Group of Petroleum Companies Analysis, of 1974. A list of the 27 companies surveyed is provided in Table A-1 at the end of this report.

Classification of costs

Most discussions of accounting methods in the oil industry are usually concerned with broad categories of expenditures rather than details. For this reason and because of the lack of detailed cost data in the oil companies' published statements, the broad

categories of costs are considered in this report rather than detailed classifications.

The main classifications of exploration and development expenditures generally used in the accounts of oil companies are the following:

1. Lease acquisition costs
2. Exploration costs (including geological and geophysical costs)
3. Intangible drilling and development costs.

Accounting for Lease Acquisition Costs

All companies surveyed initially capitalize lease acquisition costs when the properties (leases) are acquired. The items of costs which may be included in lease acquisition costs are not disclosed in most of the companies. The capitalized acquisition costs are usually carried in the accounting books under such titles as "undeveloped leases", or "non-producing properties".

The acquisition costs attached to each lease will remain in undeveloped status until production from the lease is obtained or until the lease is disposed of by surrender, sale, or otherwise. This will depend on the results of exploration activities carried out within each property. A great proportion of the undeveloped properties will usually prove non-productive due to the uncertain nature of the search for oil. The possibility of failure in

discovering oil or gas deposits in capitalized undeveloped leases represents a prospective loss for which accounting provisions must be made. Such practice is followed by the great majority of companies.

Amortization of undeveloped lease cost

All companies surveyed amortize the costs of undeveloped leases with the exception of one company (the Superior Oil) whose reports did not indicate such practice being used. Of the 26 companies amortizing their undeveloped lease costs, 3 companies amortize only leases in countries where production has commenced. Methods of calculating amortization differ among oil companies. The following is a description of the general amortization methods used by the 26 companies mentioned above.

Methods of Amortizing Undeveloped Lease Costs	No of Companies Using the Method
At rates based on past experience applied to total undeveloped leases	7
On a unit-of-production basis "full cost"	10
At rates based on holding period for each lease and the total lease cost	4
At rates based on holding period and estimated unproductive portion of property	3
At rates based on the future revenue method	1
By straight-line method	1

Costs of producing leases

When undeveloped properties are proven to be productive, their capitalized costs are usually transferred to "producing properties". However, practices differ among the oil companies concerning what amounts to be transferred; some companies transfer to producing properties both the original cost of the lease and the related amortization reserve. Others transfer to producing properties only the original cost of the lease and adjust the reserve through income, as necessary, to maintain the required reserve balance in relation to the remaining undeveloped property costs.

In addition to costs transferred from undeveloped properties, the capitalized costs of producing properties will include any additional capitalized expenditures related to producing leases. Such costs are generally amortized on a unit-of-production basis as hydrocarbons are produced from the properties.

Twenty five of the companies surveyed follow the unit of production method for amortizing the costs of their productive leases. The remaining two companies (Amerada Hess, Shenandoah) apply different practices; the straight-line method is being used by one while the other is applying a total revenue method.

The unit-of-production method of amortization used by the majority of companies is based on relating the costs to the total reserves estimated to be produced. The rate derived from this

procedure is multiplied by the number of units produced each accounting period to determine the amortization amount chargeable to periodic income. Many differences exist among oil companies in the application of the unit-of-production method. Such differences result from adopting different cost centers to which costs and production are related and from the different methods of estimating reserves applied by the companies.

The choice of the cost center has a direct effect on the calculation of both costs and quantities of hydrocarbons produced or estimated to be produced. Only 16 of the surveyed companies disclosed information about the cost centers being used for calculating their unit-of-production amortization and depletion. The following is a description of the various cost centers used by those companies.

The Cost Center Used	No of Companies
The individual field	3
The individual lease	2
Country or number of countries	9
Operating district	1
Company's worldwide operations	1

The estimations of reserves are usually done by engineers and geologists. However, several concepts of reserves exist in the oil industry which may affect the calculations of the unit-of-production rate. Only a few of the companies surveyed indicated

what reserve concepts were being adopted for their calculations. These concepts include: (1) proved reserves, (2) developed reserves, and (3) estimated recoverable reserves.

Proved reserves are defined in the oil industry to include total reserves estimated to be recovered after a field has been completely developed. Developed reserves are defined to include only those reserves which can be produced from existing facilities.¹ Recoverable reserves are defined as reserves which can be produced from discovered fields according to the existing technological and economic conditions.² It is evident from these definitions that reserve estimates may differ when based on one concept rather than the other.

Surrendered leases

Undeveloped leases which prove to be non-productive are usually abandoned or surrendered. The capitalized costs of these properties and the applicable accumulated amortization can be treated in many different ways in the accounting books. Seventeen of the companies surveyed disclosed their methods of treatment in accounting for surrendered leases. The following is a description of those methods:

¹Robert E Field, Financial Reporting in the Extractive Industries, (New York : The American Institute of CPA's Inc, 1969), p 83.

²P Hepple, A Glossary of Petroleum Terms, (London : The Institute of Petroleum, 1967), p 31.

Methods of Accounting for Surrendered Leases	No of Companies
Charge all capitalized costs to income	3
Charge unamortized costs to income	3
Transfer all costs to accumulated amortization reserve	5
A combination of the above methods	6

Most of the above companies are followers of the "successful efforts" method of accounting which calls for recognition of losses of unproductive properties in the accounts. The remaining 10 companies who did not disclose what accounting treatment they use for handling unproductive leases are "full costers". Under the full costing method of accounting, costs are usually accumulated on the basis of worldwide company operations and no losses on surrendered properties are recognized in the accounts. Such losses are considered part of the costs of reserves to be discovered in the productive areas held by the company.

Accounting for Geological and Geophysical

Exploration Costs

These costs are generally handled in the oil companies' accounts in three different ways. Such costs are either all expensed, all capitalized, or partially capitalized.

1. Expensing all geological and geophysical costs is a practice followed by 7 of the companies in our sample. The accounting justification of this method is that geological and geophysical costs are regularly recurring and approximately constant year-by-year especially in the larger companies where this method seems to be followed.
2. Capitalizing all geological and geophysical costs is another method of accounting applied by 7 of the companies in our survey. Six of the companies using this method are followers of the "full costing" concept which calls for capitalizing all exploration expenditures regardless of their results. The capitalized costs are then related to discoveries made anywhere within the company's properties and charged to income on a unit-of-production basis as hydrocarbons are produced.
3. Capitalizing only a part of the geological and geophysical expenditures is a practice reported to be used by 11 companies in our sample. The costs capitalized are generally the part of expenditures which is related to productive efforts, other costs are charged to income. However, companies who capitalize their exploration costs on a partial basis, reported a variety of methods in determining what costs to be capitalized. The following table describes methods of allocating geological and geophysical costs followed by the 27 companies surveyed.

Methods of Accounting for Geological and Geophysical Expenditures	No of Companies
Expensing all costs as incurred	7
Capitalizing all costs regardless of the exploration results	7
Capitalize only part of the costs on the following basis:	11
Capitalize minimum work commitment related to productive areas	1
Capitalize costs resulting in the acquisition or retention of property	4
Capitalize only costs of foreign operations	1
Capitalize only costs incurred in Alaskan lease	1
Capitalize costs of successful exploration resulting in finding oil or gas	1
Capitalize all costs except the pre-acquisition costs of foreign leases	1
Capitalize portion of geophysical costs applicable to productive US leases	1
Capitalize all costs in foreign leases and only costs related to producing US leases	1
Not disclosed	2

Accounting for Intangible Drilling and Development Costs

Drilling operations begin once the site for drilling a well has been determined. Such operations include preparation for drilling, the actual drilling activities and a host of incidental

service activities. If the outcome of drilling is successful the well is completed and equipped for production. Development activities include the drilling of additional wells in the field and the installation of all equipment necessary for the efficient and effective extraction of minerals from the field.

The costs incurred in this phase of oil operations are usually segregated into: (1) intangible drilling and development costs, and (2) tangible lease and well equipment costs. The intangible costs refer to those expenditures on items which have no salvage value in themselves. The accounting treatment of intangible costs incurred in the drilling and development of oil wells depends on the outcome of the drilling activities. A distinction is made between costs of productive wells and costs of dry wells (dry holes).

All companies surveyed, with one exception, capitalize the intangible drilling and development costs of productive wells. The one exception is the Superior Oil Company who follow the practice of expensing all intangible drilling and development costs regardless of their outcome.

Accounting treatments of dry hole costs differ among the oil companies. Sixteen of the surveyed companies expense costs of all dry wells; those companies are followers of the "successful efforts" concept of accounting. The remaining 11 companies are followers of the "full costing" concept which calls for full

capitalization of expenditures incurred in the search for oil.

Of these 11 companies, 7 companies capitalize costs of all dry holes anywhere in the world, 3 companies capitalize only the costs of dry holes in foreign countries (outside the US), and one company capitalizes only the costs of dry development wells. The following table describes methods of handling dry hole costs in the 27 companies surveyed.

Treatment of Dry Hole Costs	No of Companies
All costs of dry holes expensed	16
All costs of dry holes capitalized	7
Dry hole costs expensed in US leases and capitalized in foreign leases	3
Costs of dry exploratory wells expensed and costs of dry development wells capitalized	1

The costs of drilling and developing oil wells which have been capitalized are usually charged to periodic income through amortization or depletion. The amortization of intangible drilling and development costs is generally calculated on the basis of the unit-of-production method. Twenty two of the companies surveyed apply this method in all the leases regardless of their locations. Three of the remaining companies use the unit-of-production method for leases in the US and Canada and apply the straight-line method for leases in other areas of the world. The "future revenue" method has also been used by one company. Another method of amortization has been disclosed by one company; according to this method costs are amortized at a 50 per cent rate

in the first year and the balance is then written off over a period of 10 years.

Table A-1

Companies Surveyed

Listed According to their Total Revenues in 1974

Name of Company	1974		
	Revenues	Assets	Net Income
	Millions of Dollars		
1 Exxon Corporation	45,821	31,332	3,142
2 Texaco Inc	23,994	17,176	1,586
3 Mobil Oil Corporation	20,491	14,074	1,047
4 Standard Oil Co of California	18,775	11,640	970
5 Gulf Oil Corporation	18,216	12,503	1,065
6 Standard Oil Co of Indiana	10,156	8,915	970
7 Shell Oil Co	8,493	6,129	621
8 Atlantic Richfield Co	7,305	6,152	475
9 Occidental Petroleum	5,578	3,325	281
10 Phillips Petroleum Co	5,106	4,028	402
11 Tenneco Inc	5,064	6,402	321
12 Amerada Hess Corporation	3,783	2,255	202
13 Getty Oil Co	2,892	3,004	281
14 The Standard Oil Co (Ohio)	2,379	2,621	148
15 Kerr-McGee Corporation	1,561	1,164	116
16 American Petro Fina Inc	957	575	87
17 Reserve Oil and Gas Co	725	241	14
18 Clark Oil and Refining Corporation	593	302	(7)
19 Tesoro Petroleum Corporation	535	351	61
20 Crown Central Petroleum Corporation	413	178	10
21 The Superior Oil Co	333	822	68
22 General American Oil Co of Texas	83	285	24
23 Home Oil Co Ltd (Canadian)	80	382	14
24 Shenandoah Oil Corporation	22	74	6
25 Aztec Oil and Gas Co	17	89	7
26 Adobe Oil and Gas Corporation	15	44	5
27 Pan Ocean Oil Corporation	10	94	1

APPENDIX B

Calculation of Supplementary Tax Payments.

Average Per Barrel Cost of Libyan Crude.

The Average Rates of Exchange of the
Libyan Dinar in US Dollars.

Table B-1
Calculation of Supplementary Tax Payments

1973-1979

\$ Per Barrel (of 40^o API)

	1973	1974	1975	1976	1977	1978	1979
	\$	\$	\$	\$	\$	\$	\$
Average posted price* applicable for supplementary tax calculation	3.152	3.299	3.684	3.551	3.881	4.510	5.105
Deduct: Marketing allowance	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cost of production	0.449	0.602	0.785	0.825	0.936	1.126	1.190
Royalty (12.5%)	0.394	0.412	0.461	0.444	0.485	0.564	0.638
Net profit for supplementary tax purpose	2.304	2.280	2.434	2.277	2.455	2.815	3.272
Supplementary Tax (5%)	0.115	0.114	0.122	0.114	0.123	0.141	0.164

* Derived on the basis of prices agreed upon between the Libyan government and the operating companies according to the September 1970 Settlement (see Table V-4), plus adjustments provided for by the consequent agreements of 1971-1973.

Table B-2
Average Per Barrel Cost of Libyan Crude
1962-1979

Year	Cost Per Barrel
1962	0.8744
1963	0.7389
1964	0.7186
1965	0.6294
1966	0.4481
1967	0.4061
1968	0.3535
1969	0.3967
1970	0.3534
1971	0.327
1972	0.370
1973	0.449
1974	0.602
1975	0.785
1976	0.825
1977	0.936
1978	1.126
1979	1.190

Sources 1962-1972 figures derived from data of Exports and Government Revenues, Auditor General's Office, Report on the Oil Industry, (Tripoli, 1976).

1972-1978 figures from a 1979 Report of the Ministry of Petroleum Committee to study the oil industry in Libya.

1979 figure from NOC officials.

Table B-3
The Average Rates of Exchange
of the Libyan Dinar in US Dollars
1962-1979

Year	Average Rate US \$
1962	2.8035
1963	2.7966
1964	2.7908
1965	2.8022
1966	2.7899
1967	2.7933
1968	2.8055
1969	2.7997
1970	2.8001
1971	2.8452
1972	3.0512
1973	3.3359
1974	3.38627
1975	3.38627
1976	3.38627
1977	3.38627
1978	3.38627
1979	

Source Bank of Libya, Annual Reports of the Board of Directors,
various issues.

APPENDIX C

Data of the Main Indicators of Exploration
and Development Activities in Libya (1962-1978)

Table C-1

Annual Total and Capital Expenditures of the Oil Industry
in Libya 1962-1978

Year	Total Expenditures	Capital Expenditures	% of Capital to Total
	\$ millions	\$ millions	
1962	335.0	116.1	36.7
1963	272.9	80.6	29.5
1964	340.5	134.0	39.4
1965	367.6	141.8	38.6
1966	331.4	125.0	37.7
1967	377.4	176.8	46.8
1968	514.5	243.8	47.8
1969	692.4	278.0	40.2
1970	557.8	180.6	32.4
1971	430.8	94.5	21.9
1972	429.0	58.6	13.7
1973	353.6	40.0	11.3
1974	348.8	77.9	22.3
1975	464.2	163.9	35.3
1976	556.4	176.9	31.8
1977	662.0	268.6	40.6
1978	n.a.	n.a.	37.0

Sources 1962-1973 Bank of Libya. Annual Report of the Board of Directors. Various issues - 1962-1974.

1974-1977 Ministry of Planning - Census and Statistics Bureau, Report of the Annual Survey of Petroleum Industry, issues 1974-1977.

1978 Estimation.

Note: Figures of expenditures were reported in the above mentioned sources in Libyan Dinars and were translated for the sake of this research to US dollars at the average annual rate of exchange as reported by the Bank of Libya. The annual rates are shown in Table B-3 in Appendix B of this thesis.

Table C-2
Percentage Capital Expenditures to Total Annual
Spending by Groups of Companies
1974-1978

Year	Participation Companies	Nationalized Companies
1974	18.7%	11.8%
1975	23.3%	23.5%
1976	12.2%	35.8%
1977	21.4%	36.9%
1978	23.8%	40.9%

Sources Col 1, derived from Annual Reports of the Libyan National Oil Corporation (NOC) 1974-1978.

Col 2, derived from Annual Reports of the National Oil Corporation and Annual Reports of the Arabia Gulf Exploration Company 1974-1978.

Table C-3
Total Seismic Exploration Activities
in Libya 1962-1978

Year	Seismic crew/months	Concession area held Km ² 1,000		Crew/months per 10,000 Km ²
		End of year	Average during year	
1962	359.2	938.6		
1963	332.8	736.8	837.7	3.97
1964	246.5	727.3	732.1	3.67
1965	215.9	581.0	654.2	3.30
1966	143.6	723.0	752.0	1.91
1967	185.6	622.0	672.5	2.76
1968	149.4	628.5	625.3	2.39
1969	243.7	612.7	620.6	3.93
1970	150.5	494.2	553.5	2.72
1971	88.1	305.9	400.1	2.20
1972	48.6	303.8	305.9	1.59
1973	21.0	284.2	294.0	0.71
1974	33.9	219.5	251.9	1.35
1975	94.5	501.7	360.6	2.62
1976	120.9	724.9	613.3	1.97
1977	90.9	778.4	751.7	1.21
1978	109.3	831.8	805.1	1.36

Sources 1962-1971 figures obtained from: Ministry of Petroleum,
Libyan Oil, 1954-1971, Tripoli.

1972-1978 figures obtained from a 1979 report of
Ministry of Petroleum's special committee to study the
oil industry in Libya 1970-1978. Unpublished.

Table C-4

Seismic Exploration Activities

During 1974-1978

Annual Crew/Months by Groups of Companies

Year	Total	Participation Companies	Nationalized Companies	Other Companies
1974	33.9	24.4	3.5	6.0
1975	94.5	21.4	10.0	63.1
1976	120.9	16.0	16.7	104.0
1977	90.9	13.8	30.0	47.1
1978	109.3	13.8	41.8	53.7

Source 1979 Report of the Ministry of Petroleum's Special Committee to study the oil industry in Libya 1970-1978, op. cit.

Table C-5
Annual Drilling Activities
Number of Total Wells Drilled
1962-1978

Year	Total Wells of the overall industry	Total Wells drilled by Groups of Companies		
		Participation Companies	Nationalized Companies	Other Companies
1962	231			
1963	357			
1964	407			
1965	360			
1966	245			
1967	191			
1968	193			
1969	325			
1970	244			
1971	51			
1972	65			
1973	82			
1974	72	47	19	15
1975	84	41	28	30
1976	88	14	59	30
1977	136	54	63	30
1978	175	84	68	54

Sources Col 1. Figures for 1962-1971 obtained from: Ministry of Petroleum, Libyan Oil 1954-1971; Figures for 1972-1973 from: Ministry of Petroleum, Supplement to Libyan Oil 1954-1971; Figures for 1974-1978 from: Ministry of Petroleum, Annual Oil and Gas Statistics, issues 1974-1978.

Col 2,3 and 4. Figures from 1979, Report of Ministry of Petroleum's Committee to study the oil industry in Libya 1970-1978, op. cit.

Note: Figures in columns 1,2 and 3 may not add up to total wells in column 1 because of the varying sources of data.

Table C-6

Annual Exploration Drilling Activities

Number of Exploration Wells Drilled

1962-1978

Year	Total No of Wells	Number of Wells by Groups of Companies		
		Participation Companies	Nationalized Companies	Other Companies
1960	71			
1961	97			
1962	109			
1963	146			
1964	135			
1965	117			
1966	57			
1967	42			
1968	105			
1969	92			
1970	54			
1971	39			
1972	21			
1973	29			
1974	32	24	6	2
1975	63	22	19	22
1976	48	9	22	17
1977	56	10	22	24
1978	53	9	15	29

Sources Col 1. Figures for 1961-1971 from: Ministry of Petroleum, Libyan Oil 1954-1971, op. cit.; figures for 1972-1978 from: Report of Special Committee to study the oil industry in Libya, op. cit.

Cols 2,3 and 4. Ibid.

Table C-7
Annual Development Drilling Activities
Number of Development Wells Drilled
1962-1978

Year	No of Wells	Number of Wells by Groups of Companies		
		Participation Companies	Nationalized Companies	Other Companies
1962	122			
1963	211			
1964	272			
1965	243			
1966	188			
1967	149			
1968	105			
1969	235			
1970	198			
1971	26			
1972	55			
1973	60			
1974	49	23	13	13
1975	36	19	9	8
1976	55	5	37	13
1977	90	44	40	6
1978	153	75	53	25

Sources Col 1. Figures for 1962-1971 from: Ministry of Petroleum, Libyan Oil 1954-1971, op. cit.; figures for 1972-1978: Report of Special Committee to study the oil industry in Libya, op. cit.

Cols 2,3 and 4. Ibid.

BIBLIOGRAPHY

BIBLIOGRAPHY

- Adelman, M A. The World Petroleum Market. Baltimore, Maryland : The John Hopkins University Press, 1973.
- Allen, Loring. OPEC Oil. Cambridge, Massachusetts : Oelgeschlager, Gunn & Ham, Publishers Inc, 1979.
- Al-Jalabi, Fadel M. "Basic structural changes in the international oil industry", Selected Studies in the Oil Industry. Kuwait : OAPEC, 1979. In Arabic. pp 17-74.
- Al-Otaiba, Mana Saeed. OPEC and the Petroleum Industry. London : Croom Helm Ltd, 1975.
- American Accounting Association's 1964 Concepts and Standards Committee - The Realization Concept, "The realization concept". The Accounting Review. April, 1965. pp 312-322.
- American Institute of CPA's, Financial Accounting Standards Board (FASB). "Statement of Financial Accounting Standards No 19 - Financial Accounting and Reporting by Oil and Gas Producing Companies". The Journal of Accountancy. February, 1978. pp 94-103.
- Amin, Mahmoud Sayed. "Oil exploration and drilling", Selected Studies in the Oil Industry. Kuwait : OAPEC, 1979. pp 75-100.
- Arthur Anderson and Co. APB Public Hearings on Accounting and Reporting Practices in the Petroleum Industry, Cases in Public Accounting Practice, Vol 10. Chicago, Illinois : Arthur Anderson and Co, 1972.
- Arabian Gulf Exploration Company. Annual Reports, 1973-1976. Benghazi, Libya.
- Ball, Max W. This Fascinating Oil Business. New York : The Bobbs Merrill Company, 1940.
- Bank of Libya. Annual Reports of the Board of Directors. Tripoli, Libya. Various issues.
- Ben Omram, Abdulhai. "Technical and economic factors and their role in determining petroleum production volumes", A lecture delivered in the Oil Industry Seminar held at the University of Benghazi. Benghazi, Libya. November 25-28, 1972. Unpublished.

British Petroleum Company. Our Industry Petroleum. London :
British Petroleum Company Limited, 1970.

——— Statistical Review of the World Oil Industry. London :
British Petroleum Company Limited, 1972.

Chandler, Geoffery. "Oil in the Seventies", Middle East Economic
Survey Supplement. August 6, 1971.

Chase Manhattan Bank. Financial Analysis of a Group of
Petroleum Companies - 1974. New York : Chase Manhattan
Bank, 1974.

Collins, Daniel W; Dent, Warren T and O'Conner, Melvin C.
"Market effects of the elimination of full cost accounting
in the oil and gas industry", Financial Analysts Journal.
November-December, 1978. pp 48-57.

Coutts, W B. Accounting Problems in the Oil and Gas Industry.
A Research Study of the Canadian Institute of Chartered
Accountants. Toronto : The Canadian Institute of CA's, 1963.

Deakin III, Edward B. "An analysis of differences between non
major oil firms using successful efforts and full cost
methods", The Accounting Review. October, 1979. pp 722-734.

Draper, Norman R and Smith, Harry. Applied Regression Analysis.
New York : John Wiley and Sons Inc, 1966.

The Economist. Various issues.

Edens, David G. Oil and Development in the Middle East. New
York : Praeger Publishers, 1979.

Esso Standard Libya Inc. Libyan Oil Agreements 1970-1972.
Tripoli : Esso Standard Libya Inc, 1972.

Fanning, Leonard. Foreign Oil and the Free World. New York :
McGraw-Hill Book Co, 1954.

Field, Robert E. Financial Reporting in the Extractive
Industries, Accounting Research Study No 11. New York :
The American Institute of CPA's Inc, 1969.

The Financial Times. Various issues.

Fixler, Donald and Ferrar, Robert L. "An application of economic
theory to Middle Eastern oil pricing", Arab Oil, Impact on the
Arab Countries and Global Implications. N A Sherbiny and
M A Tessler, eds. New York : Praeger Publishers Inc, 1976.
pp 21-34.

Freund, John E and Williams, Frank J. Modern Business Statistics.
Second Edition. London : Pitman Publishers, 1970.

Ghanem, S M. The Pricing of Libyan Crude Oil. Valetta, Malta :
Adams Publishing House, 1975.

Gray, L C. "Rent under the assumption of exhaustibility",
Quarterly Journal of Economics. May, 1914. pp 466-488.

Grady, Paul. Inventory of Generally Accepted Accounting
Principles for Business Enterprises. New York : The American
Institute of CPA's Inc, 1965.

Hendrikson, Eldon E. Accounting Theory. Homewood, Illinois :
Richard D Irwin Inc, 1970.

Hepple, P. A Glossary of Petroleum Terms. London : The Institute
of Petroleum, 1967.

Hill, Peter and Vielvoye, Roger. Energy in Crisis. London :
Robert Yeatman Ltd, 1974.

Jensen, Herbert L and Grossman, Steven D. "Accounting
applications of covariance analysis", Accounting and Business
Research, No 36. Autumn, 1979. pp 300-308.

Klingstedt, John P. Value Accounting in the Petroleum Industry.
Tulsa, Oklahoma : Arthur Young and Co, 1974.

Lawrence, R and Henderson, S. Financial Reporting in the
Extractive Industries. Sydney, Australia : The Australian
Society of Accountants, 1970.

Lenczowoki, George. Oil and State in the Middle East. Itchaca,
New York : Cornell University Press, 1969.

Libyan Government. Law No 44 of 1973, Nationalizing 51% of
Occidental of Libya Inc. Issued August 11, 1973.

————— Law No 51 of 1973, Endorsing the Participation
Agreement between the Libyan Government and Amerada
Petroleum Corporation of Libya, Continental Oil Company of
Libya, and Marathon Petroleum Libya Ltd. Issued August 18,
1973.

————— Law No 66 of 1973, Nationalizing 51% of Operating Oil
Companies. Issued September 1, 1973.

————— Law No 131 of 1973, Endorsing a Participation Contract
between the National Oil Corporation and AGIP Inc. Issued
September 26, 1972.

- Law No 10 of 1974, Nationalizing Texaco Overseas Petroleum Co. Issued February 11, 1974.
- Law No 11 of 1974, Nationalizing Libyan American Oil Co. Issued February 11, 1974.
- Law No 35 of 1974, Nationalizing Shell Exploration en Productie Maatschappij (Libya) NV. Issued March 30, 1974.
- Law No 76 of 1974, Amending certain provisions of the Petroleum Law No 25 of 1955. Issued October 21, 1974.
- Law No 77 of 1974 Amending certain provisions of the Petroleum Law No 25 of 1955. Issued October 21, 1974.
- Law No 2 of 1975, Amending certain provisions of the Petroleum Law No 25 of 1955. Issued January 1, 1975.
- Law No 25 of 1955. (Petroleum Law). Issued April 21, 1955.
- Auditor General's Office. Report on the Oil Industry. Tripoli, Libya : Dewan of Audit, 1976.
- Auditor General's Office. Standard Audit Guide for the Petroleum Sector. Tripoli, Libya : Dewan of Audit, 1979.
- Ministry of Petroleum. Libyan Oil Development 1954-1967. Tripoli, 1968.
- Ministry of Petroleum. Libyan Oil : 1954-1971. Tripoli : The Republic's Printing Press, 1972.
- Ministry of Petroleum. Libyan Oil : 1972-1973. A Supplement to Libyan Oil : 1954-1971. Tripoli, 1974.
- Ministry of Petroleum. Oil and Gas Statistics. Published annually. Various issues 1974-1979.
- Ministry of Petroleum. Participation Implementation Agreement between the National Oil Corporation and Esso Standard Libya Inc and Esso Sirte Inc. Concluded April 16, 1974.
- Ministry of Petroleum. Petroleum Regulation No 6. Issued December 23, 1961.
- Ministry of Petroleum. Petroleum Regulation No 8. For the Conservation of Petroleum Resources.
- Ministry of Petroleum. Petroleum Regulation No 9, of the Financial and Accounting Provisions.

- Ministry of Petroleum. Report of Special Committee to Study Exploration, Development and Production Activities in the Libyan Oil Industry, 1970-1978. Prepared 1979. Unpublished.
- Ministry of Petroleum, Economic Department. Report on Libyan Crude Oil Prices Compared with Other Crude Prices. May 15, 1975. Unpublished.
- Petroleum Minister's Memorandum. Annexed to Law No 131 of 1972.
- Revolutionary Command Council's Decision of December 7, 1971, Nationalizing British Petroleum Exploration Company.
- Royal Decree Amending certain provisions of the Petroleum Law No 25 of 1955. Issued July 15, 1961.
- Libyan National Oil Corporation. Annual Reports, 1973-1978.
- Brega Oil Marketing Company, External Marketing Division. Official Libyan Oil Prices 1973-1980.
- Longrigg, Stephen. Oil in the Middle East. England : Oxford University Press, 1954.
- Lutfi, Ashraf A. OPEC Oil. Beirut, Lebanon : Middle East Research and Publishing Centre, 1968.
- Malti, H. "Developments in oil production and major oil reserves", Fundamentals of Oil and Gas Industry, Vol 1. Kuwait : OAPEC, 1977. pp 11-27.
- Middle East Economic Survey. Various issues.
- Mikdashy, Zuhayr. The Community of Oil Exporting Countries. London : George Allen & Unwin Ltd, 1972.
- A Financial Analysis of Middle Eastern Oil Concessions. New York : Praeger Publishers, 1966.
- Mikdashy, Zuhayr; Cleland, S and Seymour, I eds. Continuity and Change in the World Oil Industry. Beirut, Lebanon : Middle East Research and Publishing Centre, 1970.
- Miller, Robert B and Wichern, Dean W. Intermediate Business Statistics. New York : Holt Rinehart and Winston, 1977.
- Morgan Guaranty Trust Company of New York. World Financial Markets. Issued monthly. Various issues.
- Nasser, Suhair. "Development of crude oil prices in the Middle East", Fundamentals of Oil and Gas Industry, Vol II. Kuwait : OAPEC, 1977. pp 31-77.

Newsweek. Various issues.

New York Times. Various issues.

Odell, Peter R. Oil and World Power. Harmondsworth, Middlesex, England : Penguin Books Ltd, 1974.

Ojo, Adi T. "The dollar problem and disorderly floating exchange rates", OPEC Review. Summer, 1979. pp 86-112.

OPEC. Annual Statistical Bulletin. Various issues.

———— OPEC Bulletin. Semi monthly Report. Various issues.

———— Resolutions of OPEC. Vienna, Austria : OPEC. Various issues.

———— The Statute of OPEC. Vienna, Austria : OPEC, 1968.

Paton, W A and Littleton, A C. An Introduction to Corporate Accounting Standards, American Accounting Association Monograph No 3. Ann Arbor, Michigan : AAA, 1940.

Penrose, Edith T. The Large International Firm in Developing Countries. London : George Allen and Unwin, 1968.

Petroleum Intelligence Weekly. Various issues.

Petroleum Press Service. Various issues.

Porter, Stanley P. Petroleum Accounting Practices. New York : McGraw-Hill Book Co, 1965.

Roberts, Harry V. Conversational Statistics, Hewlett Packard University Business Series. Palo Alto, California : The Scientific Press, 1974.

Sampson, Anthony. The Seven Sisters - The Great Oil Companies and the World they Made. London : Hodder and Stoughton Ltd, 1975.

Schurr, Sam H and Haman, Paul T. Middle Eastern Oil and Western World. New York : American Elsevier Publishing Co Inc, 1971.

Shell Oil Company. Seminar on Oil Affairs. London : Shell International Company, 1970 and 1971 editions.

Shwadran, Benjamin. The Middle East - Oil and Great Powers. New York : Fredrick A Praeger, 1955.

Smillie, K W. An Introduction to Regression and Correlation. London : Academic Press Inc, 1966.

- Smith, Alan F. "Oil production and accounting in the extractive industry", Abacus, A Sydney University Journal. December, 1972. pp 100-111.
- Smith, C A and Brock, H R. Accounting for Oil and Gas Producers. Englewood Cliffs, NJ : Prentice-Hall Inc, 1959.
- Stocking, George W. Middle East Oil - A Study in Political and Economic Controversy. Nashville, Tennessee : Vanderbilt University Press, 1970.
- Succari, Owais Rikabi. International Petroleum Market : Policy Confrontation of the Common Market and the Arab Countries. France : Universite Catholique de Louvain, 1968.
- Tariki, Abdullah. Is it Possible to Nationalize Oil in the Arab World? A pamphlet published in Arabic. Baghdad : Dar Al-Jamhouria Press, 1967.
- Tiratsoo, E N. Oil Fields of the World. Beaconsfield, England : Scientific Press Ltd, 1976.
- Tomeh, George. "The role of oil in the Arab-World relations", Fundamentals of Oil and Gas Industry, Vol III. Kuwait : OAPEC, 1977. pp 183-204.
- Toriguian, S. Legal Aspects of Oil Concessions in the Middle East. Beirut, Lebanon : Hamaskaine Press, 1972.
- United Nations. Review of Economic Conditions in the Middle East, E/1910. New York : UN, 1951.
- USA. Economic Report of the President. Washington, DC, December, 1974.
- USA Federal Trade Commission. The International Petroleum Cartel. Washington, DC : US Government Printing Office, 1952.
- Vicker, Ray. The Kingdom of Oil. New York : Charles Scribner's Sons, 1974.
- Wixon, Rufus, ed. Accountants Handbook, Fourth Edition. New York : Ronald Press Company, 1960.
- World Oil. Various issues.
- Yamani, Ahmed Zaki. "Participation versus Nationalization : A better means to survive", Continuity and Change in the World Oil Industry. Z Mikdashi, S Cleland and I Seymour, eds. Beirut, Lebanon : Middle East Research and Publishing Centre, 1970.