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NAME OF SUPERVISOR/NOM DU DIRECTEUR DE THÈSE Prof. Lynn K. Mytelka

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POLITICAL PERSPECTIVES ON THE ECONOMICS OF OIL:
TOWARDS A MODEL FOR FORECASTING OPEC POLICIES

by

Chia Siew Wong, B.A.

A thesis submitted to the Faculty of
Graduate Studies in partial fulfilment
of the requirements for the degree of
Master of Arts

Department of Political Science

Carleton University

Ottawa, Ontario

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The undersigned recommend to
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"Political Perspectives on the Economics of Oil:
Towards a Model for Forecasting OPEC Policies"

submitted by Chia Wong, B.A. ,

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.....
Thesis Supervisor

.....
Chairman, Department of Political Science

Carleton University

For My Mother and Father.

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TABLE OF CONTENTS

Acknowledgements	i
Table of Contents	ii
List of Tables	iii
List of Figures	v
Abstract	vii
Introduction	1
Chapter I: A Short History of OPEC	3
Chapter II: 1960-1972: The Formation of OPEC to the Eve of the Second Oil Embargo	10
Chapter III: The Model and the Variables	34
The Model	34
The Variables	41
Chapter IV: 1973-1974: The Second Oil Embargo	81
Iran: 1973	87
Saudi Arabia: 1973	121
OPEC: 1973	150
Chapter V: Post-1977	168
Iran: Post-1977	182
Saudi Arabia: Post-1977	195
OPEC: Post-1977	214
Conclusion	239
Appendices	242
Bibliography	283

LIST OF TABLES

Table I: Crude Oil Prices F.O.B. Ports in Gulf of Mexico, Persian Gulf and Caribbean Sea. Selected Years 1948-1960	30
Table II: Estimated Crude Oil Reserves and Rates of Depletion in Major Developing Oil Exporting Countries in 1959	31
Table III: Petroleum Exports and Reserves of Selected OPEC Members	91
Table IV: Iran: 1970-1972 Budget	92
Table V: Absolute and Percentage Increases in Iran's Financial Allocations for the Third, Fourth and Fifth Development Plans	93
Table VI: Iran: Absolute and Percentage Changes in Oil Revenues	95
Table VII: Price Fluctuations of Arabian Light Marker Crude	108
Table VIII: Long and Short-term Interaction Matrices for Iran: 1973-1978	113
Table IX: Saudi Arabia: Government Oil Revenues	122
Table X: Saudi Arabia: Development Expenditures as a Percentage of Budgetary Expenditures. 1962-1972	126
Table XI: Saudi Arabia: Expenditures on Defence as a Percentage of Total Expenditures. 1968-1976	128

Table XII: OPEC Investible Surplus	129
Table XIII: Long and Short-term Interaction Matrices for Saudi Arabia, 1973-1978	144
Table XIV: Forecast of Saudi Arabian Oil Policy	145
Table XV: Long and Short-term Interaction Matrices for OPEC, 1973-1978	161
Table XVI: Forecast for OPEC: 1973-1978	161
Table XVII: OPEC Crude Oil Production	181
Table XVIII: Long and Short-term Interaction Matrices for Iran, Post-1977	191
Table XIX: Saudi Arabia's Five Year Plan. 1975-1980	199
Table XX: Long and Short-term Interaction Matrices for Saudi Arabia, Post-1977	210
Table XXI: Forecast of Saudi Arabian Oil Policy, Post-1977	211
Table XXII: Long and Short-term Interaction Matrices for OPEC, Post-1977	228
Table XXIII: Forecasts of OPEC Policy. 1977-1982	229
Table XXIV: Forecast of OPEC Policy, 1977-1982 in the Event of Another Arab-Israeli War	233

LIST OF FIGURES

Figure I: Forecast of Iranian Oil Policy	115
Figure II: Forecast of Saudi Arabian Oil Policy, 1973-1978	146
Figure III: Projected OPEC Policies for the Rate of Production, Probability of Embargo and Price. 1973-1978	163
Figure IV: Relative Strengths of the Saudi, Iranian and Other Arab Factions in the Breakup of the Middle-East Stalemate	163
Figure V: Comparison of Projected and Actual Price Developments	164
Figure VI: Comparison of Projected and Actual Developments in the Rate of Production	164
Figure VII: Forecast of Iranian Oil Policy	193
Figure VIII: Forecast of Saudi Arabia's Oil Policy, Post-1977	212
Figure IX: Predicted Changes in the Values of Rate of Production, Price and Probability of Embargo in a Middle-East Peace Settlement	230
Figure X: Projections of the Relative Power Positions of the Saudi, Iranian and Other Arab Factions in the Event of a Middle-East Peace Settlement	232

Figure XI: Forecasted Changes in the Values of
Price, Rate of Production and Probability
of Embargo in the Event of a Breakup of
the Middle-East Stalemate

234

Figure XII: Projections of the Relative Power
Positions of the Saudi, Iranian and
Other Arab Factions in the Event of a
Middle-East War

235

ABSTRACT

The central concern of this thesis will be to identify and isolate those factors which are hypothesized to contribute to the decision-making process (1) within the dominant OPEC members and (2) within OPEC as a whole. The decisions of particular concern will be those regarding the rate of oil production, the pricing of crude oil, and the use of oil as a political weapon.

The first and second chapters provide a brief history of oil and OPEC. The third chapter will concentrate upon the definition of those variables which are hypothesized to significantly influence decisions taken as national oil policy within Iran and Saudi Arabia. This process will be repeated for the study of decision-making in OPEC. In the same chapter, a model incorporating the variables relevant to the decision-making process within dominant members and OPEC will be developed for forecasting decisions relating to the rate of oil production, pricing and the use of the "oil weapon".

In the fourth chapter, the study of the 1973-1974 period will be primarily an exercise to test the validity of the model against decisions actually made. In Chapter V, the model will be used to forecast future OPEC decisions based upon trends evident in 1977. The final chapter will consist of a review of the exercise and an evaluation of the model as an appropriate tool for forecasting.

INTRODUCTION

Among many commentators, there is a tendency to evaluate the Organisation of Petroleum Exporting Countries (OPEC) in terms of an economic cartel. This approach not only obscures a very important aspect of the organisation as a political entity but in itself can be misleading when it imputes the concerns and motivations of OPEC to be dictated solely by economic considerations.

An organisation such as OPEC, whose members in 1975 produced 62.1 % of the non-communist world's crude oil supply¹ and possessed 68% of the world's total reserves, cannot exist as a strictly economic entity for it controls the production, pricing and sale of a commodity vital to the functioning of the world's industrial societies. Hence, in the context of OPEC's relationships with its major Western clients, a purely economic assessment of its decisions distorts the very powerful impact of international political constraints upon such seemingly economic decisions as production, pricing and sales, the

¹North Africa and Middle-East 1976-1977. p 93

regulation of which is not entirely within the control of OPEC but is strongly influenced by the needs of the industrialised economies of the West.

Furthermore, OPEC, being an association of less developed countries with common colonial or neo-colonial experiences, is, in varying degrees, regarded by its members as an instrument for correcting perceived political injustices. OPEC is also regarded as a potentially effective instrument for instituting a more equal international economic order by the Algerian President, Boumedienne. Decisions taken with such interests as primary concerns cannot be explained on the basis of economic rationale alone. The intrusion of the Arab-Israeli conflict into the affairs of OPEC is another such phenomenon in which an economic evaluation would confuse the understanding of the motive force of OPEC's response which is political.

The above argument is not designed to suggest that an economic evaluation of OPEC is altogether unjustified but merely a reminder that OPEC is as much a political organisation as it is an economic one, and that the constraints under which it operates are, in the final analysis, political.

CHAPTER I

A SHORT HISTORY OF OIL

In contrast to the practice of monopoly and virtual extraterritoriality that international companies enjoyed in the underdeveloped oil producing countries, the past two decades have witnessed a decline in the freedom of action of such companies. This has resulted primarily from recent changes in the international energy situation - in particular the growing dependence on petroleum at the expense of alternative fuels, from transport problems arising from inadequate facilities and closure of vital routes and pipelines, and from the spectacular political strategy of enforcing embargoes on oil. Secondly, the rise of economic and political nationalism among the underdeveloped oil producing countries increasingly caused foreign control of oil resources to be viewed as economic imperialism incompatible with the status of sovereign states. Economic nationalism has resulted in attempts to persuade and control the oil companies to act in greater accord with the national interests of the oil producing countries. The most common form of government intervention in what was considered the private preserve

of the international oil companies - deciding production quotas, instituting price controls and higher taxation schemes - were attempted.

An examination of the maturation of the oil industry in Latin America, the Middle-East and elsewhere in the developing world cannot neglect the significant roles played by the international oil companies, their home governments, the oil producing countries themselves and the Organisation of Petroleum Exporting Countries.

The first petroleum concession, the D'Arcy Concession, was granted by Iran in 1901. This gave the foreign operator rights of research, extraction, export and sale of petroleum with little or no hindrance from government supervision: government protection of the entire enterprise was guaranteed, as was immunity from taxation and customs duties. The D'Arcy Concession laid the rules for state and operator relations granted in Iraq, Saudi Arabia, Kuwait, Bahrein and Qatar in the 1920s and 1930s and, to some extent, is still the forerunner of rules of conduct for state and operator relations today.¹

The nature of early concessions was such that although provisions were made for periodic government inspections of the activities of oil companies, in practice the governments did not exercise real control over

¹Fuad Rouhani, History of OPEC (New York: Praeger, 1971), p 40.

concessionaires. To some extent this situation arose because concession terms did not distinguish between the stages of prospecting, extracting, refining, transporting, export and marketing of oil. These activities required an extensive infrastructure not present in the oil producing countries. Therefore concessionaire operations assumed gigantic proportions, and necessitated the granting of extensive powers. (To this date, the granting of extensive powers still characterise some government-operator agreements but certain non-technical areas are increasingly reserved for government agencies). Being able to exercise immense economic power in economically backward and politically dependent countries, concessionaires found themselves in an extremely powerful position vis-a-vis the local governments, and at the same time, they became the instruments of foreign regimes able to intervene in the internal affairs of the country.¹

Beginning in the 1930s, producer countries embarked on campaigns to remove those aspects of the concessionaire system which they regarded as detrimental to their interests. The indifference of the producer countries ended as soon as the financial obligations of the international companies to the producer countries became

¹Rouhani, History of OPEC. p 4.

tied directly to profits and the international market prices, rather than to fixed royalties.

A history of oil prices prior to the formation of OPEC cannot neglect the important role played by oil companies which control vast oil resources both in the Western and Eastern hemispheres. Determination of oil prices by major oil companies was possible because they had a virtual monopoly over sources of oil and hence exercised restriction of output of the lower cost Middle-Eastern crude, the expansion of which could threaten the more profitable Mexican Gulf based price for American oil. The operation of the Mexican Gulf plus price system hinged upon the United States being the major producer and exporter of crude. The challenge to an oil pricing system based upon American crude prices came from the Middle-East and Venezuela which promised tremendous potentials in terms of vast reserves and low costs of production. The expansion of Middle-East and Venezuelan crude production threatened the United States' position as a major exporter and, consequently, the American based Gulf price system as the sole determinant of prices of oil produced elsewhere. However, the commercial policy of the major international oil companies (which restrained production of Middle-East crude to prevent its competition with the more profitable Gulf crude), the lack of transport facilities and general war time problems delayed the expansion of the Middle-

East oil industry until the late 1940s. With increasing postwar demand for petroleum and the discovery of huge oil reserves in the Middle-East, oil companies, both majors and independents, proceeded to prospect for and extract the cheaper Middle-East crude.¹ The entry of a significant number of new independent companies into the oil industry and the subsequent increases in both actual production of oil and production capacity and still inadequate marketing and refining facilities, forced the independent oil companies into a policy of competitive price cutting, or volume discounting, which accounted to some degree for the depression of oil prices in the late 1950s and early 1960s. This problem was exacerbated by the 1959 U.S. oil policy which restricted the import of oil into the United States to 12% of expected demand in any one year. Consequently, oil from expanded production capacity and oil previously destined for the U.S. market sought outlets in an already depressed international oil market. As a result, oil companies unilaterally decreased oil prices in 1959 and 1960, effectively reducing revenues for the producer governments.

Nationalism among the Third World oil producing countries exerted itself in equating foreign exploitation of oil resources with economic and political exploitation.

¹Rouhani, History of OPEC. p 52

In a more concrete way, nationalism was expressed in terms of demands for higher returns from the exploitation of oil resources and national control over oil industries. The unilateral reductions of posted prices by companies in 1959 and 1960 and their deleterious effect upon revenues of the host governments catalysed the formation of OPEC. As oil producers enjoyed continuous and rapidly increasing post war demands for oil, they had not suffered from violent price fluctuations as had other primary producers. Hence the disappointment of higher government revenues emphasized the immediate need to curb the freedom of international companies to unilaterally price crude and determine levels of production.

Price weakness for most oil products left the Third World oil producing countries victims to company threats to diversify production from dissident countries to more accomodating ones as a penalty for issuing demands for higher income taxes on the revenues of oil companies. As no single country dominated oil production, it was possible for international companies to diversify their sources. This, and the fact that the oil companies controlled marketing outlets and transportation facilities, made nationalisation of the oil industry a very difficult prospect. Furthermore, most oil producing countries were in varying degrees dependent upon, or influenced by Western governments, and hence reluctant to infringe upon the freedom

of the oil companies which share a harmony of interests with, and are closely related to, their national governments. Robert Engler, in his book The Politics of Oil explains the relationship between an international company and its home government:

Both in deeds and in words, the U.S. government has implicitly and explicitly acknowledged its interdependence with United States international companies.... The acceptance of this symbiotic relationship between the international companies and their home governments is undoubtedly strengthened by two factors. First, the governments and oil companies both operate within conceptual frameworks which take for granted free enterprise and private property. Second, this is made even more significant by the fact that there is a continuing two-way flow of personnel between the government and the oil companies.¹

This sketch provides the background for the formation of OPEC.

¹Robert Engler, The Politics of Oil. (New York. MacMillan Press. 1961) pp 54-55.

CHAPTER II

1960-1972: THE FORMATION OF OPEC TO THE EVE OF THE SECOND OIL EMBARGO

The earliest attempts by oil exporting countries to organise formal institutions of cooperation began in the late 1940s and culminated in the 1960 formation of OPEC. The first attempt at cooperation was made in 1947 by members of the Venezuelan and Iranian diplomatic staffs in Washington. In the late 1940s and early 1950s, frequent exchange visits were made by Saudi Arabian, Iranian and Venezuelan delegations.¹ The primary instigator of cooperation was Venezuela. With post World War II development of the productive and cheaply exploited oil fields in the Middle-East, Venezuela became alarmed at the price competitiveness of the Middle-East crude and the increasingly larger share of the international market that these would undoubtedly capture. One manner in which price competitiveness of Middle-East crude could be partially remedied by the Venezuelans was to persuade the Middle-East governments to adopt higher and previously non-existent fiscal charges

¹ Zuhayr M Mikdashi, Community of Oil Exporting Countries: A Study in Government Cooperation. (Ithaca, NY. Cornell University Press. 1972) pp 22-23.

which would increase government revenues and simultaneously raise the cost of Middle-East crude. Government-company arrangements in the Middle-East and Venezuela were different in two respects. Middle-East governments received only notional royalty payments from the oil companies. This item was deductible from the taxation liabilities of companies in the Middle-East, while royalty payment received by the Venezuelan government was a separate item, over and above tax payments. More significantly, Middle-East governments, unlike their Venezuelan counterpart, were forbidden by their contractual agreements with the oil companies to unilaterally legislate changes in the concession terms, in particular, those relating to fiscal matters.¹ For example, under the Middle-East 50-50 agreements, the fifty percent income tax received by governments was the maximum to which total taxes could rise, regardless of future taxation changes. On the other hand, the Venezuelan arrangements conformed to those prevailing in developed countries where governments reserve the right to unilaterally change income as well as other taxes.²

¹ Mikdashi, Community of Oil Exporting Countries.
p 23.

² Ibid.

Information of this nature given by the Venezuelan delegation in the period 1947-1950 was partly responsible for raising the levels of payment by companies to host governments in the Middle-East. For example, in Saudi Arabia, government receipt of fifty percent of the imputed earnings from the exports of the oil companies replaced the original fixed royalty of approximately four shillings gold per ton (about 22 cents per barrel) in 1950.¹

The first formal agreement of cooperation was undertaken by Iraq and Saudi Arabia in June 1953. The nature of this cooperation involved exchange of oil information and holding of regular consultations on oil and oil-related matters. Commenting on this agreement, Mikdashi noted that it was revealing that this followed the abortive nationalisation of the Iranian oil industry in 1951. Hence, he concluded that the Saudi-Iraqi agreement was made primarily with the intention of cooperation to improve their bargaining positions vis-a-vis the companies following the disastrous unilateral attempt by Iran.²

The Iraqi-Saudi agreement of 1953 was also intended as a preliminary effort to assist oil producer governments to obtain "best terms" clauses from their concessionaires. This was designed to remove a major area

¹Ibid. p 23.

²Ibid. p 24.

of dissatisfaction among host governments which had obtained terms of contract less favourable than those available in the region or internationally. Through the efforts of Saudi Arabia and Iraq, "best terms" contracts were introduced in the Middle-East in the 1950s. Under this regime, host governments can insist on negotiations for contract revisions with their concessionaires to obtain best terms. Hence, in 1956, when the Iraqi government learnt of the Saudi government's arrangement with Aramco to reduce its "selling expense" allowance, Iraq obtained a reduction from 2% to 1% in the allowable deduction off the relevant price used in the calculation of tax liabilities of the concessionaire.¹ Again,

- learning of a Saudi precedent, the Iraqi government refused to allow volume discounts on prices at which oil was sold to concessionaire companies. Volume discounts were initially used as an incentive to encourage exports but simultaneously resulted in reductions of the tax liabilities of companies. The elimination of volume discounts from income tax liability increased the Iraqi government's revenue per unit of exports in 1958 by

¹The "selling expense" allowance was intended to compensate costs incurred by companies while arranging the export of oil. However, as most Middle-East oil was sold on long-term contracts or moved in integrated channels, little or no "selling expense" was actually incurred by the company. Ibid. pp 24-25.

approximately 7%.¹

The establishment of the Arab League in 1945 also fostered producer-government cooperation. The role of the League in encouraging cooperation of member states in economic and financial affairs, as well as safeguarding the sovereignty of Arab states, conferred upon oil, the region's most important resource, a growing strategic as well as economic significance. Arab concern over territorial integrity and national security increased markedly with the formation of Israel in 1948. In 1950, the Joint Defence and Economic Cooperation Treaty was signed by the five members of the Arab League -- Egypt, Lebanon, Saudi Arabia, Syria and Yemen. These were later joined by Iraq, Jordan, Morocco, Kuwait, Algeria, Tunisia, Libya and Sudan.

Proposals of both economic and political strategies to deal with the threat posed by the existence of Israel first appeared in the Committee of Oil Experts of the Arab League in 1952.² It was hoped that with the

¹Memorandum of Agreement between the Government of Iraq and the Iraq Petroleum Company Ltd. (IPC) and its Associated Companies (24 March, 1955). Ibid. pp 24-25.

²Arab League. Oil Affairs Department, The Efforts of the League of Arab States in Oil Affairs. (Cairo. 16 April, 1959). Ibid. p 9.

imposition of a general economic ~~boycott~~, including the boycott of oil supplies to Israel, Israeli military power could be sufficiently curtailed to prevent future expansion into Arab territory. Within the Arab League, oil was understood as an indispensable strategic tool in the defence of Arab territorial security.

The events that acted as a catalyst in the formation of OPEC in September 1960 were the two reductions in posted crude prices undertaken unilaterally by oil companies in 1959 and 1960. The first such reduction in posted crude price of approximately 8% was initiated by British Petroleum in February for Middle-East crude. The effect of this price reduction made the already higher priced Venezuelan product even less price-competitive. The Venezuelan government charged that the Middle-East crude price reduction made it possible for Middle-East crude to invade the U.S. market, a traditional preserve of Venezuelan producers, by taking

advantage of the adjustment which followed the Suez crisis (of 1956) and now of the economic recession in the American continent to break the logical tie between the international petroleum price structure and prices in the United States which is not only the largest producer but also the most important consumer in the world.¹

¹Memorandum from the Ministry of Mines and Hydrocarbons to the British Ambassador to Caracas relative to the British Petroleum Company and the reduction of the

Consequently, in March 1959, posted crude prices in Venezuela were reduced to compensate for the already low priced and higher reductions in the Middle-East crude postings.¹

The reductions in posted prices effectively reduced the incomes from taxation of producer governments, as tax liabilities of oil companies are calculated as a percentage of the realised price discounted from the posted price. Hence reduced posted prices meant lower realised prices as the percentages of discounts from the reduced posted prices remained unchanged. It is estimated that, following the next posted price reduction of August 1960, the Middle-East producer-governments lost approximately US\$300 million in curtailed proceeds.²

The posted price reductions of 1959 and 1960 in the Middle-East and Venezuela demonstrated the vulnerability of producer-states to adverse unilateral decisions taken by international oil companies. Realisation of the extent

price of petroleum, March 1959, in Republic of Venezuela, Venezuela and OPEC, (Caracas, Imprente Nacional, 1961.) pp 99-100. Mikdash, Community of Oil Exporting Countries. p 30.

¹Platt's Oil Price Handbook. (New York. McGraw-Hill Inc. 1959) pp 227-229. ²

²This calculation is based on a reduction of tax proceeds of 4¢/barrel assuming inelastic demand in the period of August 1960 to the end of 1963, OPEC, Background Information. (Geneva. 1964) p 5.

of interdependence and competition which characterised the relationship between the producer-governments in the Middle-East and Venezuela prompted them to cooperate in order to raise posted prices to pre-1959 levels and protect their per barrel tax revenues from further decline.

The first Arab Oil Congress met in 1959 following the posted price reductions in the Middle-East and Venezuela of the same year. The non-Arab producers, Iran and Venezuela were invited as observers. Beyond the educational value, the Congress provided an opportunity for all producers to articulate their frustrations with the powerful international oil companies. Later that year, the Oil Consultation Commission, an agency of multinational cooperation, was formed for the purpose of stabilising posted crude prices and employing these as the sole tax reference price. The Commission, the forerunner of the Organisation of Petroleum Exporting Countries, also advised Middle-East governments to increase tax-revenues, and companies to consult their respective host governments prior to making price changes.

In August 1960, posted prices were again reduced by approximately 6%. In the following month, representatives of the producing countries of Iran, Iraq, Kuwait, Saudi Arabia and Venezuela agreed to create the Organisation of Petroleum Producing Countries with the purpose of "coordinating and unifying the policies of the members".¹

¹Resolution 1.2. OPEC First Conference.

The countries of OPEC had much in common: they were all developing countries, heavily dependent upon income from the export of petroleum to finance both their budgets and development programmes. Furthermore, none were able to independently operate their oil industries without foreign assistance. Consequently, the OPEC members found themselves without effective control over the management or revenues from their oil industries. Hence, the agreements governing the relationships between the governments and companies were largely similar and members found themselves faced with the same disputes and problems with their concessionaires.

The main concern of OPEC was that members shall demand that the oil companies maintain their prices steady and free from all unnecessary fluctuations.... that they shall ensure that if any new circumstances arise that in the estimation of the oil companies necessitate price modifications, the said companies shall enter into consultation with the member or members affected in order to explain the circumstances.¹

The resolutions adopted at the First OPEC Conference in September 1960 demonstrated the members' concern over the extensive powers of the international oil companies which, in their view, posed the greater danger to their well-being. The First Resolution called upon members to refuse any offers of beneficial treatment from companies with the

¹First OPEC Conference, 1960. Rouhani, History of OPEC. pp 77-78.

intention of discouraging the application of OPEC decisions, thus circumventing the companies' tactic of "playing-off" one producer against another. The Second Resolution stated that

The principal aim of the Organisation shall be the unification of petroleum policies for the member countries and the determination of the best means for safeguarding the interests of member countries individually and collectively.¹

The immediate concern of OPEC between 1960 to 1970 was that posted crude prices should be restored to pre-1959 levels; that oil companies should be compelled to maintain stable prices; that companies must consult with governments on decisions relating to price modifications; a formula must be devised to ensure stable prices, through the uses of production control and posted price as the sole tax referenced price; that OPEC's operations should be conducted with the objectives of ensuring stable revenues to the producers, regular and economic supplies of petroleum to the consumers and an equitable remuneration for the operators; a system should be organised to ensure regular consultation among members to coordinate and unify petroleum policies and to determine the means to safeguard the collective and individual interests of members.²

¹Ibid. p 78.

²Ibid. p 79.

The first four concerns of OPEC -- to raise prices to pre-1959 levels, the maintenance of stable prices, the requirement of company-government consultation prior to price modifications and the use of posted prices as the sole tax-reference price -- were shared by all members. In particular, Iran, Venezuela and Iraq had especially high absorptive capacities for additional revenues and depended heavily upon reliable oil receipts to finance development programmes and bolster government revenues.

OPEC's goal of raising prices to pre-1959 levels was not immediately achieved. The Fourth OPEC Conference noted that oil production was the single most important source of revenue for its members and the decline in prices adversely affected social and economic development dependent upon these revenues. OPEC also complained that the fall in crude prices impaired the purchasing powers of its members with respect to manufactured goods. Hence the Conference recommended that members should enter into negotiations with their respective concessionaires with the view to raising posted prices to pre-1959 levels and using these as the sole tax-reference price. It was believed that the use of posted price for tax purposes would provide a floor price for crude oil by discouraging the granting of volume discounts and hence stabilising crude prices as well as oil revenues of governments. The Conference also recommended, for the first time, that members should

jointly formulate a rational price policy as a guide to a long-term price policy and this should link crude prices to an index of prices of imports. The explanatory memorandum accompanying the above recommendations made clear that as the fiscal liabilities of companies and revenues of governments were tied to posted prices, it made imperative the control of these prices by producer-governments. The memorandum noted that the posted prices for Middle-East crudes in 1962 were lower than those in 1953 by 13¢ per barrel. In the meantime, prices of imports rose 1% per annum. Hence, in real terms, the per barrel purchasing power of oil declined by 7.5% since 1953 while the costs of imports increased by 9%.

By the Ninth OPEC Conference in 1964, realised crude prices continued to fall as supply exceeded demand. At the same Conference, a resolution was adopted to counteract the unrestricted use of excess producing capacity.¹

¹Surplus capacity is defined as the potential low cost capacity readily available to a company in the immediate run (by drilling and connecting wells in already discovered oil reservoirs) for a remunerative increase in its sales at existing or expected prices. Realised prices have been held above long-run marginal or supply price, essentially through restraints exercised by the small group of international oil companies. But at such prices, new firms find entry into the industry attractive, which leads to additional production pressing for market outlets in the absence of any coercive power checking them. The

It again reaffirmed the recommendations of earlier Conferences to use the posted price as the sole tax-reference price.

Unable to restore posted prices, OPEC resorted instead to check the downward trend of realised prices. Realised prices were to some extent propped up by OPEC's insistence that royalty payments be made a non-tax deductible item in the Middle-East and that the tax liabilities of companies be based upon the frequently unrealised posted prices.

Continuing the efforts to check the downward trend of prices, the OPEC Conference of April 1966 again ruled that computation of taxes and royalties based upon posted prices should be practised in all member countries. A posted price for crude oil or oil products is a statement of the price at which oil is bought or sold in the quantities specified.¹ The use of posted prices as the basis for taxation was thought an apt response to the practice prevalent among multinational oil companies of

outcome is further erosion of realised prices, ultimately reaching the point at which they come under open competitive conditions, equal to the long-run economic cost or supply price. Mikdashi, Community of Oil Exporting Countries. p 112.

¹J. Hartshorn, Oil Companies and Governments: An Account of the International Oil Industry in its Political Environment. (London, Faber and Faber, 1962).

transferring crudes to their subsidiaries at artificially low transfer prices which were significantly below posted price levels. The effect of using posted prices as the tax reference price would greatly increase government revenues from the oil industry, as book-keeping transfer prices were deliberately understated to diminish the companies' tax liabilities. The adverse fiscal effects upon government revenues were especially serious as "more than 60% of crude moving to market in the U. S. is never actually sold at posted or any price: it is simply transferred to a refinery department or affiliate of the same group".¹ Hence, by compelling oil companies to use posted prices as the tax reference price, governments stood to gain much higher income taxes. The sole application of posted prices for taxation purposes would also reduce the ability of some oil companies to grant excessive discounts on petroleum products and thus have the general effect of stabilising prices. This particular effort was encouraged by the success of Libya which, in December 1965, when acting on OPEC recommendations revised its Petroleum Law and made mandatory the use of posted prices, rather than realised prices, as the basis for the calculation of tax liabilities and royalty payments. In 1966 posted prices replaced realised prices in Venezuela as the basis for tax liability

¹Hartshorn, Oil Companies and Governments. p 120.

calculation. The use of posted prices as the basis of tax liability and royalty payments gradually became the norm in OPEC following these examples.¹

Posted prices however remained at the 1959 level until 1970 when Libya, acting outside the framework of OPEC, forced its concessionaires to raise the posted price as well as the tax rate.

The dramatic reversal in the power of oil companies vis-a-vis host governments, signalled by the Libyan success in raising posted prices and tax rates, can be largely explained by the conditions of supply and transportation. The Tapline pipeline, capable of transporting 485,000 barrels of Saudi Arabian oil daily to East Mediterranean outlets, was damaged in May 1970 and repairs were delayed by the Syrian government, whose territory the Tapline crossed. Hence Europe was deprived of Saudi oil which supplied a major portion of its requirements. Libyan oil, characterised by low sulphur content permitting low levels of pollutants, is also ideally situated to supply Europe at short haul from Mediterranean terminals. Hence, when Saudi oil supplies to East Mediterranean outlets were radically reduced, pressure was put on already tight tanker market facilities to transport oil from the Arabian Gulf to Europe resulting in a four-fold increase in tanker

¹Rouhani, History of OPEC. pp 208-209.

requirements. Consequently, tanker rates contributed to an increase in the price of a barrel of crude transported from the Arabian Gulf to northwestern Europe in the 1970 period.¹ Partly reacting to a strong international economic climate, European oil demands exceeded expectations. European coal and hydroelectric power were not price competitive, nor readily substituted for oil. Furthermore, the development of the European nuclear energy programmes was a disappointment. As winter approached, the Libyan demand for increased posted price and tax rates became irresistible, first to the smaller independent companies and finally to the international oil companies, as non-compliance from companies was met with threats of curtailed or suspended production from the host government.

The Libyan demand was successfully met by an increase of 30¢ or 13.5% per barrel, effective from August 1970. In addition, the companies agreed to an increase in the tax rate from 50 to 54-55%.²

Following Libya's price increases, in October 1970 Iraq also forced increases in posted prices, first at the initiative of oil companies and then additional

¹ Mikdashi, Community of Oil Exporting Countries.
p 149.

² Ibid.

increases at the demands of the government. Iran exacted an increase of 5% in the tax rate and 9% per barrel in the posted price of heavy crudes from its concessionaires effective from November 1970.¹ Kuwait accepted an offer similar to Iran's. Comparable increases in the tax rates and posted prices were also won by Abu Dhabi, Dubai, Nigeria, Muscat and Oman, Saudi Arabia and Venezuela.²

Hoping to gain further improvements, the Twenty-First OPEC Conference of December 1970 called for a further upward revision of posted prices and a minimum of 55% income tax rate on concessionaires and the elimination, for tax purposes, of royalty and marketing allowances to become effective in January 1971.

When faced with a mandatory directive from OPEC to all its members to use appropriate measures, including a total embargo on the shipment of crude oil and petroleum products, the companies acceded to OPEC demands. The companies agreed to an increase in tax payments through higher postings and reduction of allowances of an average of 30¢ per barrel in 1971 to an average of 50¢ per barrel in 1975. In addition, the necessity of financial adjustments to price because of inflation and currency devaluations was also

¹Ibid. p 150.

²Ibid. p 157.

established. Hence the companies agreed to increase rates of taxation from 50 to 55%, to adopt a system for adjusting posted prices with a premium given for low sulphur oil and to increase prices to reflect higher freight rates for tanker transportation for the duration of the closure of the Suez Canal for Mediterranean exporters. Posted prices were increased in 1971 to offset a decline in the purchasing power of the oil producers affected by the 1971 devaluation of the U.S. dollar. In return, the oil companies obtained assurances from the governments of "security of supply and stability of financial agreements" over a period of five years. The agreement, in effect, bound governments to desist from "leapfrogging" for best financial terms and from using production restriction to induce better terms of agreements from companies. Libya and Algeria, due to their special situation of proximity to the European market, did not participate in the common agreement between OPEC and the oil companies. The Libyan government negotiated for and received better terms than the other OPEC members.^{1,2}

The Libyan settlement of 1970 marks the watershed

¹Ibid. pp 151-156

²Rouhani, History of OPEC. pp 9-19

in the relations between companies and governments. Through a combination of strong demand, overlaid transportation facilities, greater sophistication in oil matters among OPEC members and support by the Organisation for Libyan demands, Libya was able to successfully threaten oil companies with curtailment of oil supplies failing the agreement to fiscal concessions. Concessions granted by the oil companies to Libya and subsequently to other OPEC members in 1970 and 1971 marks the ability, for the first time, of governments to control supply and manipulate prices and tax rates, which in effect represented the successful wresting of substantial control from the hands of companies by the host governments.

The use of production control to ensure a stable international market for oil - another important OPEC goal - has yet to be achieved. Achievement of market stability through enforcement of a formula for production rationing, mandatory for all members, was most fervently championed by Venezuela.

The rise of both abundant and cheap oil from the Middle-East and its potential for invading the traditional Venezuelan market in the United States, prompted Venezuela in 1947 to initiate producer cooperation, specifically with the aim of containing the market for Middle-East crude. By persuading Middle-East governments to impose higher fiscal liabilities upon their concessionaires,

thereby adding to the costs of the Middle-East product, the Venezuelans hoped to alleviate the price-competitive edge of Middle-East crude. The second approach to containing Middle-East competition was to initiate a system of production rationing among producing countries. This approach would have the added advantage of conserving low Venezuelan crudes for future requirements. Tables I and II demonstrate the particular predicaments of Venezuela at the time of the formation of OPEC: uncompetitively high costs of production and low reserves. At 1959 rates of production, Venezuelan reserves could be depleted within 18 years compared to an estimated 126 years for Saudi Arabia.

Although recognized by OPEC as a crucial instrument for attaining price stability, production rationing particularly through the control of excess production capacity, has never received serious support from members, with the exception of Venezuela. Opposition to production rationing came first from the oil companies which raised legal objections to the infringement by governments on their freedom to decide volumes of production and their ability to allocate this volume among different countries. Consumer countries objected to the control of production on legal grounds as well as to its interference with the free play of supply and demand. Member countries feared control of production would stimulate competition from

TABLE I

CRUDE OIL PRICES F.O.B. PORTS IN GULF OF MEXICO, PERSIAN
GULF AND CARIBBEAN SEA. SELECTED YEARS 1948-1960.

(Dollars per barrel).

Year	Month	Texan ^a	Saudi Arabian ^b	Disparity between 3 and 4	Vene- zuelan ^c	Disparity between 6 and 4
		(3)	(4)		(6)	
1948	Mar.	2.66	2.22	0.44	2.55	.33
1949	April	2.66	1.88	2.55	2.55	.67
1953	June	2.91	1.75	1.16	2.80	1.05
1955	Sept.	2.91	1.97	0.94	2.55	.58
1957	Jan.	3.16	1.97	1.19	2.80	.83
1959	Feb.	3.00	1.94	1.06	2.65	.71
1960	Aug.	3.00	1.84	1.16	2.55	.71

a= 31 degree API, f.o.b. Gulf of Mexico

b= 33 degree API, f.o.b. Ras al Tannura, Arabian Gulf

c= 31 degree API, f.o.b. Puerto La Cruz, Caribbean Sea

SOURCE: Rouhani, History of OPEC. p 192

TABLE II

ESTIMATED CRUDE OIL RESERVES AND RATES OF DEPLETION IN
MAJOR DEVELOPING OIL EXPORTING COUNTRIES IN 1959

Country	Estimated crude oil reserves (millions of barrels)	Production (thousand barrels daily) 1959	Rate of depletion per year
Venezuela	18000	2768	5.61%
Iran	35000	920	.96%
Iraq	25000	845	1.23%
Kuwait	62000	1410	.83%
Saudi Arabia	50000	1084	.79%

. SOURCE: Oil and Gas Journal 58 (January 25, 1960).

alternative sources of energy and non-OPEC producers not subject to such controls. Countries with large oil reserves were particularly concerned that stimulation of competition from alternative fuels may eventually result in partial abandonment of the use of oil. Such producers would prefer a larger volume of sales at a lower per unit price. It was feared that high per unit prices achieved through production rationing would tempt members to withdraw from the Organisation in order to sell larger volumes than prescribed at advantageous prices. Should more members join the dissidents, a situation necessitating price reductions could result.¹

The first production rationing programme covered the period July 1965 to June 1966. The programme was plagued with difficulties from the start. Calculations of the growth of demand and rates of production were overestimated. Production allocations among members were not observed. The second programme of production rationing met with the same problems.²

Despite failures in the first two programmes of production control, OPEC Conferences of January 1968, June 1970 and December 1970 were strongly in favour of

¹Ibid. pp 127-142

²Mikdashi, Community of Oil Exporting Countries pp 114-115.

this policy. However, due to the incompatible interests of members, production rationing has not been credibly organized or enforced.

Only ten years after the creation of OPEC has it witnessed some success in its goals of restoring posted prices to pre-1959 levels, maintaining stable oil prices, enforcing compulsory consultation between governments and oil companies in the event of price changes and the use of posted prices as the sole tax-referenced price. Only one of its goals, the institution of production rationing, has not been achieved.

The events of 1970 and 1971, characterised by the wrestling of control of production levels and price rates from companies, signalled the rise of the power of producer governments in controlling their individual oil industries as well as the international oil trade. These years mark the most important phase in OPEC's transition from an ineffectual producers' organisation, given to pleading and reasoning with the oil companies, to an organisation synonymous with the international oil industry.

CHAPTER III

THE MODEL AND THE VARIABLES

The Model

The model used in this thesis is developed for the purpose of forecasting decisions relating to oil concerns (i) within individual OPEC member countries and (ii) within OPEC as a whole. The model incorporates a configuration of variables which are hypothesized to be strong determinants in the oil related decision making processes. This configuration, which prevails at the chosen points in time, is then projected into the future and will, on the basis of the binary interactive impacts of each variable upon the others, predict their future values, thus identifying the likely courses of action of member countries as well as of OPEC.

The variables hypothesized to be determinants in the decision making process for individual OPEC member countries are: (1) its oil reserves; (2) a member's absorptive capacity for additional domestic investments; a member's foreign relations with (3) fellow OPEC members and (4) with major western consumers; (5) the power of the international oil companies and (6) the international

economic climate in general and its impact upon the demand for oil in particular. Therefore, forecasts of future policies for individual members will evolve from a model incorporating this set of variables. The dependent variables of concern in the thesis are price, the rate of production of oil within the relevant countries and OPEC, and the probability of oil embargoes. The methodology employed is known as Kane Simulation or KSIM.

The determinants of decision making for OPEC as a whole are the policy preferences of the three major factions in OPEC: (1) Iran and its supporters; (2) Saudi Arabia and its supporters; and (3) the Other Arab faction consisting of the radical regimes of Libya, Algeria and Iraq; (4) relations between OPEC and major oil consumers; (5) break-up of the Middle-East stalemate; (6) the international economic environment; (7) oil prices; (8) the probability of an embargo and (9) prevailing production rates. The dependent variables are (1) price; (2) probability of an embargo and (3) production rates. The methodology used will be similar to that used in the forecast of individual member preferences.

Dynamic Modelling and KSIM.

The function of modelling techniques is to allow an examination of the logical consequences of assumptions made in a given study. Dynamic modelling techniques have

enjoyed a recent wave of public interest through the book The Limits to Growth¹ and the numerous criticisms to that approach to the study of major policy issues.

Dynamic modelling is however not necessarily limited to macroscopic world problems but can be applied to any system in which a relatively small number of variables can be identified and relations between these defined.

A particular technique of dynamic modelling, KSIM, has been developed by Julius Kane of the University of British Columbia with the purpose of tracing forward, over time, the implications of assumptions made in a study.²

The KSIM methodology is designed to take into account five types of variable interaction: (1) the direct impact of one variable upon another e.g. demand for oil contained in the variable "International Economic Environment" upon "Price"; (2) the indirect or synergetic impact of a variable upon another through one or more variables e.g. the effect of "Intra-OPEC Relations" on "Price" through the "Preference for No Embargo"; (3) the direct feedback effect e.g. high oil demand in a booming "International Economic Environment" stimulates upwards price adjustments which, in turn, dampen economic growth; (4) the indirect or synergetic feedback effect e.g. the dampening of the

¹Donella H. Meadows, Dennis L. Meadows, Jorgen Randers and Jorgen Behrens, The Limits to Growth (New York, N.Y.:Universe Books, 1972).

²Julius Kane, "A Primer for a New Cross-Impact

"International Economic Environment" from substantial price increases exerts a moderating influence on price through the "Relations with Major Consumers" variable; (5) the impact of a variable upon itself e.g. expenditures on the "Absorptive capacity" open new avenues for investment.

KSIM provides a didactic approach to incorporate "soft data" into mathematical simulation models together with "hard" data. It is this capability that makes KSIM an effective paradigm for policy planning. In allowing the inclusion of subjective (or "soft") variables within the simulation, it permits the consideration of those very variables that play a crucial role in decision making. Though the futility of purely objective studies for human decisions has long been recognized¹ techniques to handle subjective data have been lacking.

KSIM has the following features²:

- (1) It describes the complex interaction of both "soft"

Language - KSIM", Technological Forecasting and Social Change 4 (1972) : 129-142.

¹Document ALM-63-3735-LC, U.S. Army Logistics Management Center (Fort Lee, Va., 1963).

²Julius Kane, Ilan Vertinsky and William Thomson, "KSIM: A Methodology for Interactive Policy Simulation," Water Resources Research 9 (February 1973): 65-79.

and "hard" variables in a realistic non-linear fashion.

(2) It is designed to emphasize the dynamics and geometry of relationships rather than to make numerical predictions.

Though the precision of these predictions is limited only by the quality of the data and our knowledge of the

relationship between variables, the key feature of KSIM

is that it allows one to work with data ranging from subjective estimates to precise physical measurements.

(3) Though KSIM makes basic assumptions about growth characteristics ~~and~~ interaction behaviour, it is easily

modified and is completely flexible: the effects over time of certain policies may be examined by arbitrarily

defining the values taken by certain variables.

The basic assumptions of KSIM are these:¹

(1) All system variables are bounded.

(2) Variables change according to the net impact of all other variables where no arbitrary policy is defined for that variable.

(3) In general, the response of a variable to a given impact diminishes as the variable approaches either bound, threshold or saturation.

(4) All else being equal, a variable exerts greater effects on the system when it is larger.

(5) Complex interactions are described by an array of binary interactions.

¹Ibid.

It is appropriate at this stage to examine these assumptions further. The boundedness of the subjective system variables results from the definition of these variables: e.g. "Intra-OPEC Relations" will be described on a scale 0-1, where 0 represents war and 1 very close ties. The boundedness of hard data is a reflection of the real world: there is an upper limit to the price of oil at which it becomes economic to exploit alternative sources of energy.

The sigmoidal skewed growth curves that result from these assumptions are observed in social, political and economic institutions¹ and are characteristic of human systems.

Assumptions (2)-(4) suggest that to obtain realistic dynamic behaviour among variables, the impact of variables upon each other need to be scaled. The problems of scaling have been addressed by Kruzic.²

As complex interactions are described by an array of binary interactions, synergistic effects become evident in the course of time.

A detailed description of KSIM and its application

¹Ibid.

²Pamela G. Kruzic, "KSIM Techniques for Evaluating Interactions Among Variables", SRI Technical Note OED-016 Operations Evaluation Department (Stanford, Cal.: Stanford Research Institute, June 1973).

has been provided by Kruzic.¹ The first steps in the analysis require the definition of the problem and the period that the simulation will cover. The variables that are considered relevant to the problem are then selected, their ranges are determined and their initial values chosen. It is essential that there be no redundancy among these variables e.g. the balance of payments surplus is functionally equivalent to the deficit maintained by the rest of the world. Thus only one of these two variables should be considered for inclusion in the simulation.

A cross impact study of the variables is then made; the impact of each variable upon itself and the other variables is considered and assigned a value between -3 and 3. Resulting from this study is the cross impact matrix. These interactions are then scaled by comparison to realistic growth rates or trends, the simulation is made and a forecast of the behaviour of the system variables over time results. This forecast logically results from the selection of variables, the initial values assigned to these variables, the cross impact matrix and the growth curves associated with KSIM methodology. This forecast must then be reviewed: variables that contribute little to the system may be deleted and new ones incorporated. The interactions between variables

¹Ibid. See Appendix A

and the scaling are reconsidered so as to achieve sensible results. By this iterative process of forecasting and reviewing, a model is obtained that predicts realistic behaviour within the system variables. Variables may be reassigned arbitrary values and the interaction between variables may be modified. Thus using KSIM, the impact of different policies and events may be considered e.g. the impact upon oil prices of an oil embargo and the development of oil substitute fuels etc. It is with this technique that the study of the oil policies of OPEC is made.

The Variables.

Variable 1: Quantity of Oil Reserves.

It is hypothesized that no variable by itself determines the policies that are adopted but that a variable in combination or competition with other variables will influence decisions.

The quantity of oil reserves possessed by a country is an important consideration in determining its oil policy. One may hypothesize that the larger its oil reserves and production capacity, the less interested a country is in maintaining a high per unit price for oil, as it is capable of attaining larger total revenues through increased volume of sales. Producers with large reserves also fear that higher prices will eventually result in the substitution of other sources of energy for

oil. Taking such an argument to its logical extreme, a policy of high production rates is feasible since it ensures the country a larger slice of the market and provides it with a competitive edge over its higher priced competitors. However in reality, such factors never exert an overriding influence on decision making to the exclusion of other variables. Taking the two largest exporters of oil in OPEC, Saudi Arabia and Iran, as examples, we find that Saudi Arabia, with limited avenues of expenditures for its mounting oil revenues, favours a lower per unit price. On the other hand, Iran, faced with large but declining reserves and an ambitious and expensive programme of economic and military growth, prefers a concerted OPEC policy which demands a higher price in order to maximise its total oil revenues and conserve its oil reserves.

It can generally be stated that the prevailing structural characteristics of a country contribute to determining its oil policy: in particular, the size of its population, the level of national development, the absorptive capacity of the country and the quantity of known oil reserves. These provide clues to the types of production and price policies that will be adopted. One can visualise a situation where the higher the absorptive capacity of the country and the shorter the estimated period of oil yield before depletion, the more pressure

there will be upon decision makers for oil conservation through regulated rates of production and for demanding higher prices.

The "quantity of oil reserves" variable is also significant in itself for it identifies those exporters with the largest reserves and volumes of exports as those with the greatest capacity to influence overall OPEC decision making in their favour. Hence, on the basis of quantity of output and reserves alone, Saudi Arabia, Iran, Kuwait and Venezuela would emerge as the most important decision makers in OPEC. By logical inference, we conclude that those countries with low exports and reserves would have little capacity to individually shape OPEC oil policies. However some producers are under considerable domestic pressures exerted by large populations, undeveloped economies and a pressing need for additional finances and thus may pose a strain to the cohesion of OPEC should policies counter-productive to their well-being be adopted. In particular, one is reminded of the tremendous pressure those countries are under to maximise total oil revenues through production conservation and the maintenance of high prices. Hence although one is tempted to identify dominant decision makers in terms of their volumes of exports and reserves, such a criterion is not always adequate. The intrusion of Algeria, with relatively low levels of reserves and exports, into a position of

importance in the decision making process, as a leader of the radical faction favouring the institution of an equitable international economic system, demonstrates the importance of political factors in overall policy decisions. Although put forth as a significant factor, the "quantity of oil reserves" variable in itself does not explain decision making but when in conjunction with other variables it provides a more dependable clue to the policies that will be adopted.

Variable 2: Absorptive Capacity.

Nazli Choucri, in her book International Politics of Energy Interdependence, defined absorptive capacity as

the ability to use new capital productively, once initial costs are covered, to yield an acceptable rate of return.¹

This appears to be an unnecessarily narrow definition that restricts absorptive capacity to strict economic investment and economic rates of return. As such, it therefore excludes important avenues of expenditures which are non-economic and non-productive in nature. These include such large revenue absorbers as expenditures on military

¹Nazli Choucri, International Politics of Energy Interdependence (Cambridge, Mass.: MIT Press, 1976) p 103

hardware, luxury imports and prestige projects. Hence it is proposed that absorptive capacity should be expanded to include all expenditures that can be absorbed domestically, irrespective of positive or tangible returns. This definition will more lucidly admit all avenues of domestic expenditure, both productive and non-productive. By logical extension, the absorptive capacity variable excludes all revenues exported abroad in the form of foreign aid, investment in foreign economies or money markets, loans etc.

Hence the "absorptive capacity" variable is defined as the ability to absorb, in all possible manners, new volumes of capital expenditures domestically. Such absorption could take the form of investment, development expenditures, payments for military armaments, luxury consumption etc. Thus capital which could not be included in the absorptive capacity category would be that exported abroad.

The criteria for determining absorptive capacity by dividing capital between domestic and foreign uses can be justified. For most countries, domestic demands for investments are far more immediate than foreign commitments. Had not the windfalls in oil revenues occurred, some expenditures on military equipment would still have taken place or have been planned for. Similarly, economic waste in the form of luxury consumption would have

occurred, regardless of the windfall, because the oil industry, however insignificant in some OPEC countries, has created a class for whom the consumption of luxury items is a prerequisite. It is reiterated that, regardless of the domestic increase in oil revenues, these expenditures would have occurred but at lower levels. It should be noted that these expenditures are such that they can be absorbed domestically. On the other hand, the large capital exports - such as those from some OPEC members to the OECD countries - demonstrate the difficulties of immediately absorbing large volumes of new capital without inviting undesirable effects such as runaway inflation, economic dislocation etc. It is anticipated that should oil revenues in the capital exporting countries decline sufficiently, loans, investments, grants etc. exported abroad would be called back or cut off to accomodate domestic financial requirements.

The "absorptive capacity" variable is an important one in determining a country's policy preferences. Countries with high absorptive capacities relative to national incomes are likely to demand higher oil prices. On the other hand, countries with low absorptive capacities are likely to be less interested in raising oil prices.

Variable 3: Foreign Relations - Intra-OPEC Relations.

Intra-OPEC relations which affect pricing, production rates and the political use of the oil weapon, are those which relate to factional leadership and rivalry within the Middle-Eastern members of the organisation.

Choucri has characterized the main change in the tone of Middle-East politics as the shift from the radical politics of "symbolism" practised by President Nasser to the pragmatic politics representative of Arab foreign relations from the 1967 Arab-Israeli war onwards.¹

The 1967 Arab-Israeli war resulted in an humiliating defeat, suffered primarily by Egypt, and the consequence was a rapidly diminishing role for Egypt as the traditional leader of the Arab nations. Instead Egypt became financially dependent upon the oil rich but conservative Arab states, the most prominent of which was Saudi Arabia. Financial assistance from the Arab states was given on the condition that Egypt relinquished its predominant role in Middle-Eastern politics. Associated with the diminishing role of Egypt as the regional leader is the development of a political "sense of pragmatism" which arose after Arab humiliation in the 1967 Arab-Israeli war from a "reassessment of the basis of inter-

¹Ibid.

Arab politics and the development of a more realistic view of the possibilities for and types of cooperation in the area."¹ With regard to petroleum

This new sense of pragmatism provided much of the background for present attempts to develop viable policies toward petroleum prices and production. Increasingly, the Arab oil-exporters realized that such policies cannot be made on economic grounds alone, but that political objectives and aspirations of all Arab countries - resource rich as well as resource poor - must be taken into account.²

The 1973 oil embargo represented the first serious attempt to politicize what had largely been only an economic resource.

Diminishing ideological conflicts and the depoliticization of Arab community building championed by Egypt following the 1967 war and the death of Nasser introduced some easing of tensions among Arab states, and according to Choucri, allowed for a measure of cooperation. Choucri attributes this new spirit of collaboration to the outcome of pragmatic politics. The Arab success in the October 1973 war against Israel "provided the basis for greater cohesion and reaffirmed the need for a more pragmatic posture on the issue of Israel."³

Although Professor Choucri fails to define her

¹Ibid., p 93 ²Ibid. ³Ibid., p 94

concept of "pragmatic politics", it can nevertheless be deduced from the examples given that it contains the notion of adopting strategies of practical national consideration rather than those guided by ideology or emotion. The spread of the prevailing attitude of pragmatism in both Arab states and OPEC is characterized by the development of a class of new "Arab technocrats for whom political differences became less important as recognition of the need for coordinated policies."¹

By abandoning the notion of the desirability of creating an intra-Arab community of states, pragmatic political consideration allows the exercise of a more realistic form of inter-Arab collaboration where national interests are not suppressed but incorporated into a more harmonious compromise between an Arab stance characterised primarily by consensus in confronting Israel and simultaneously protecting national interests of all Arab states. An example of the spread of pragmatic political considerations is shown by Arab cooperation in the 1973 oil embargo:

The collaboration in October had become functionally specific. Different Arab countries made contributions towards a unified strategy in some areas but withheld their cooperation in others. For example, Iraq

¹Ibid., p 98

collaborated in the military sphere by sending troops to the Syrian front but refused to participate in the oil embargo, a somewhat uncharacteristic decision for an avowedly radical state. Libya assisted the Egyptians financially but withheld support of Egypt's policy of moderation towards Israel. Saudi Arabia and Kuwait assumed leadership of the oil embargo but made no contribution to the military confrontation. Nigeria, Morocco and Tunisia gave complete political support to the states bordering Israel but only symbolic military assistance.

Such selected and functionally specific cooperation reflects the evolving pragmatic approach to Arab politics. It also reflects differential political interpretations of national interests. Although this procedure prevents a complete coherence of politics, it reaffirms the new distribution of power in the area and development of substantial, yet selective cooperation.¹

Intra-OPEC politics in the Middle-East is increasingly dominated by the relations between the two regional giants, Saudi Arabia and Iran. Saudi Arabia's mounting oil revenues, limited absorptive capacity and large oil reserves place pressure upon it to adopt an alternative oil pricing policy. The proposed Saudi Arabian solution of decreasing crude oil prices to relieve the pressure of its mounting oil revenues, meets with strong opposition from

¹Ibid. pp 94-95.

other OPEC members in dire need of additional funds, and in particular from Iran. Immense oil reserves permit Saudi Arabia to unilaterally control oil prices. Saudi Arabia has not only asserted that should other OPEC members insist on raising prices, it will set its own price below those stipulated by OPEC directives, but has in effect attempted to lower petroleum prices below OPEC directives. The New York Times of March 17, 1974 reported a Saudi offer of two million tons of oil at \$8.50 per barrel, clearly below the prevailing price of \$9.00 to \$11.00 per barrel. However a Saudi attempt to formally and unilaterally decrease oil prices would threaten cohesion within OPEC, and result in the loss of Saudi Arabia's newly acquired leadership among Arab states. Hence, Saudi Arabia's pricing policy interjects potential strain into its relations with all other OPEC members, and in particular, its regional rival, Iran. Thus far, both Iran and Saudi Arabia have demonstrated their desire to maintain OPEC coherence through accomodating their differing petroleum policy preference.

The supremacy of Iran as the regional military power may be challenged by the buildup of arms capability by Saudi Arabia, which, in the long run, may place it in a position of future military, and strategic rivalry with Iran. This is likely to introduce another area of potential tension into regional politics. However, both Saudi

Arabia's and Kuwait's investments in arms are recent, and the interval between military build-up and actual capability postpones confrontation into the future. Nevertheless, it is clear that the military build-up in Saudi Arabia is designed to project it into the position of a regional military power, and at the same time, reinforce its status within OPEC. It is speculated that the Saudi Arabian build-up is also intended to restrain potential Iranian expansionism in the area.

Iranian military ambition, guided by the vision of a past Persian empire and a goal in establishing hegemony in the Gulf region will undoubtedly produce strain in regional relationships. So far, Iranian and Saudi differences have been contained in the interest of preserving OPEC coherence. Commitment to OPEC cohesion in both countries has certainly been reinforced by financial gains from producer unity. However, should future differences between Iran and Saudi Arabia be beyond compromise, these could exert a very strong impact upon petroleum prices. As Iran is heavily dependent on higher petroleum prices and revenues to sustain its economic and military growth, Saudi Arabia's large financial reserves and oil production permit it to unilaterally reduce crude oil prices in order to deny Iran additional funds for military expansion. Such an action would split OPEC into two camps, with Saudi Arabia and perhaps a few conservative Arab producers on

one side and the remaining OPEC members with Iran.

In the Middle-East region, it is speculated that the Iranian military build-up has advanced to the stage where it outstrips Israeli military capability, and hence places Iran, a close ally of the United States, in a position to defend American commitments and interests in the area, including Israel. This speculation is considered all the more likely since Iran is a member of the U.S. dominated Central Treaty Organisation. Should such an unlikely situation of overt Iranian military support for Israel arise, OPEC cohesion should come under severe stress.

However, a more realistic assessment of the Iranian military build-up vis-a-vis the Middle-East should take into consideration Iran's assumption of local hegemony and the military defence of the Gulf region following British military withdrawal from the region in January 1968. Furthermore, military build-up was also inspired by the fear of the spread of radical Arab ideology, especially that championed by President Nasser, and presently by Colonel Gaddhafi of Libya, which is opposed to the continuation of conservative monarchical rule. However, with the prevalence of a sense of "pragmatic politics" in the Middle-East and the relegation of Libya to the periphery of Arab politics, Iran appears to have little to fear on this score.

However, Iran is anxious to cultivate friendly relations with its Arab neighbours. The Iranian commitment of \$1.8 billion in investments and credits, primarily to Egypt and Syria, is exceeded only by Kuwait's (estimated to be approximately \$4 billion) and Saudi Arabia's (\$3 billion). Such investment outflows to Arab countries is an indicator of Iran's interest in promoting stability and confidence in its ties with Arab states.¹

It appears that the spirit of cooperation between Saudi Arabia and Iran is crucial to OPEC cohesion and the maintenance of stable OPEC petroleum policies. Conversely, it is likely that tension between the two most prominent members of OPEC will introduce strain into the Organisation and result in conflicting and diversified petroleum policies receiving divided member support.

In terms of quantities of oil reserves each country possesses, Saudi Arabia and Iran are dominant OPEC members and hence crucial to its decision-making process. It is unlikely that the remaining OPEC members are in a position to individually affect OPEC decisions, although they will certainly be supporters of OPEC policies which raise crude oil prices. Even though none are individually likely to affect OPEC decisions, it is possible that bloc action among these countries, for example in opposition to lowered crude prices, would certainly

¹International Monetary Fund, IMF Survey. Vol. 3, # 1-23, Vol. 4, # 1-12.

pose a threat to the Organisation's survival, and hence exert an impact on the decision-making process.

It is hypothesized that the friendlier the relations between Iran and its Arab neighbours and amongst the Arab members themselves, the greater will be the cohesion within OPEC and the greater the unified support for its petroleum policies. However, should regional relations be strained beyond compromise, this will be reflected in instability and division within the Organisation and the profusion of conflicting policies adopted by factions within the Organisation or by individual member countries.

Variable 4: Foreign Relations. Relations with Major Consumers.

The dominant fear in the Gulf region is the spread of communism and communist appeal. The United States is looked to by many states as the guarantor of resistance to Communist expansion. The intrusion of the U.S. into the region as a superpower is welcomed by conservative regimes such as Iran and Saudi Arabia, tolerated by Syria and Egypt, and opposed by Iraq and Libya. Nevertheless, all countries, in varying degrees, see the U.S. as an ally or potential ally in the deterrence of Communist strategic expansion in the Middle-East.

The aftermath of the 1973 embargo on oil demonstrated the interdependent nature of U.S. relations with major producers in the Middle-East. In return for American insurance against revolutionary or other disruptions of internal and regional stabilities, and the continued supply of technological and military hardware, these oil producers are likely to adopt policies that do not directly or seriously damage American economic interests. It is hypothesized that the more dependent these countries become upon American arms and technology, the less likely will be their insistence on extremely high petroleum prices or upon oil embargoes that can seriously affect American domestic interests. Furthermore, such countries may be less likely to reduce rates of production to accomodate domestic interests. Nevertheless, policy considerations are not dominated entirely by foreign policy concerns to the exclusion of powerful domestic and regional interests.

Closer ties between some Middle-Eastern states with the Soviet Union, especially those which involve military agreements, could also function to drive the more conservative states closer to the West. Saudi fears were awakened with the signing of the Iraqi-Soviet Treaty in April 1972. Iran and Saudi Arabia feared that an agreement of cooperation and coordination of defence policy

would invite a permanent Soviet presence in the Gulf.¹ The effects on their relations with the United States and upon petroleum policies would be a greater accommodation of Western interests.

The close harmony of interests between oil companies and their parent countries provides for a large measure of cooperation in which, in return for guaranteed supplies of fuel and large profit remittances to their home countries, governments of oil companies would exert as much diplomatic, economic or military pressures upon host governments as possible in the interests of the oil companies. However, since the Tripoli agreement of 1971, doubts have been increasingly raised over the efficacy of American multinational oil companies in serving American national interests.²

The 1973 embargo on oil sales to the allies of Israel and the subsequent dramatic oil price increases have functioned to excite strong indignation against the Arab producer states. The threat of ever increasing oil

¹See R M Burrell, "Iranian Foreign Policy During the Last Decade" in Asian Affairs. Vol. 5, 1974. pp 7-15.

²See Frank Church, "The Impotence of Oil Companies" in Foreign Policy. # 27, Summer 1977. pp27-51.

prices and the fear of another oil embargo has led some major oil consumers, in particular the United States, to contemplate the employment of force as a strategy to solve the problems of high prices and unstable supplies of oil. The employment of force as a solution has been frequently voiced as threats to the producer states. In January 1975, the United States Secretary of State, Henry Kissinger, threatened oil producer states with violence should they attempt to initiate "strangulation of the industrialised world". Furthermore, it is alleged that during the 1973-1974 embargo, the U.S. had actually devised plans for the invasion of Abu Dhabi.¹

Reactions to threats of military coercion are likely to vary according to perception of the seriousness of the threat, and with the length of interval between statement of threat and actual behaviour. It is likely that a bluff would incite no more than derision. On the other hand, both a bluff or belief in the intention of the threat could induce more radical states like Libya, which possesses sufficient financial reserves, to sharply curtail oil supply. In that event, it is likely that Europe, which depends heavily upon Libyan oil, could be expected to pressure the offensive state to withdraw the threat or discontinue plans for invasion.

¹New York Times. June 11, 1974.

During the 1973 Arab-Israeli war, economic sanctions were instituted as a complementary Arab war strategy. Economic sanctions involved an oil embargo on sales to the numerous allies of Israel, (which was later restricted to the Netherlands and the U.S.), and a policy of production cutbacks at rates of 5% per month to be enforced until Israel was compelled to withdraw from Arab territory occupied since 1967. In response, the U.S. Secretary of State threatened the organisers of the embargo, the members of the Organisation of Arab Petroleum Exporting Countries with "what the U.S. would do if other countries treat us unreasonably". In response, Saudi Arabia threatened cutbacks of as much as 80% should the U.S., Europe or Japan retaliate. The Saudi response clearly implied massive destruction of its oil wells. In response to another threat, nine Arab oil ministers agreed three days later to an additional 5% reduction in the following month.

Hence, threats may have the counter-effect of inducing greater OPEC cohesion in the face of perceived common danger. Furthermore, milder threats in the form of denials of access to financial assistance, may also foster mutual cooperation and assistance. However, as the threat assumes greater proportions of reality, producer response may accede to its demands. Nevertheless the interval between mere statement of threat and actual permissible behaviour is sufficiently large to make

military coercion an unlikely option in the face of more acceptable avenues of responses. Not the least of anticipated complications is a Soviet countermove to an American invasion of the Middle-East. In view of the close relationship of the U.S. and the three largest oil producers in the Middle-East, diplomatic pressure would more easily be put to bear upon the Middle-Eastern states than an actual invasion. It should also be noted that the threat of military coercion becomes less credible with continued and expanding military build-ups in Iran, Saudi Arabia and Kuwait.

The response of producer-governments to threats of coercion can take three forms: non-response, greater OPEC cohesion in common resistance or accession to demands. Depending on the nature of the dispute, the effect upon petroleum policies of a response of solidarity could take the form of production cut-backs, increase in crude prices, nationalisation of foreign oil companies, or mutual assistance to offset the effects of consumer retaliation.

Economic retaliation from the major developed consumers for the adoption of recalcitrant oil policy generally takes the form of denial of economic assistance, both bilaterally and through multi-lateral agencies. Among the international financial institutions which developing countries most frequently turn to for financial assistance, such as the International Monetary Fund and the International Bank for Reconstruction and Development,

voting power is determined, as in any private corporation, by the amount of resources put in by member governments. As such, overall policy is basically determined by Western governments, which have supplied the majority of funds, and particularly the U.S. Neither the World Bank, nor the I.M.F. explicitly have any role or policy as far as international oil is concerned. In fact, however, through their considerable power vis-a-vis the underdeveloped countries, they frequently influence the formulation of economic policy, including oil policy. Thus, the Bank, in its role as a major creditor to many underdeveloped countries, an important source of future foreign aid, and a spokesman for Western government aid consortiums, has generally been opposed to the growth of public investment in the oil industry. The Bank has been unwilling to make loans to underdeveloped countries for investment in the oil sector, since it feels such investments could be provided by the international oil companies. The Bank also conveyed the view to the underdeveloped countries that they ought not to utilise their own scarce resources for developing a public oil sector.¹

The reluctance of international financial institutions to make loans available to poorer countries for the development of national oil companies or a public oil sector, constitutes a direct constraint upon the ability of producer governments to control or participate in their oil industries through an effective national oil regulatory

¹Michael Taylor, The Political Economy of International Oil and the Underdeveloped Countries. (Boston, Beacon Press. 1969). pp 26-27.

agency or a national oil company. Hence we expect to find among the poorer oil-exporting countries, dependent on Western dominated financial institutions, a lower level of government participation and control over their oil industries and greater constraints to initiate these. However, as these countries do not individually determine OPEC policies, they are considered peripheral to the concerns of this study. Threats of confiscation of the investments of oil producing states in the West also constitutes a real deterrent to the freedom of action of oil producers.

Relations with major consumers serve to moderate or induce conservative oil policies. However, under extraordinary circumstances, Western intransigence to Arab or OPEC demands can provoke radical reactions. The Arab oil embargoes and the price increases of 1973 and 1974 serve as examples. In general, the influence of major consumers on OPEC policy tends towards lower price increases, high levels of production to satisfy demand, and avoidance of the punitive "oil weapon".

Variable 5: Power of the International Oil Companies.

Initially, the strongest resistance to the exercise of control and regulation of the oil industry by host governments was posed by the major oil companies. The power of the oil majors was based upon

their monopoly of technology, knowledge and skills (which) gave them an unparalleled advantage for perpetrating their management and control of the petroleum market. Second, they supplied the necessary capital for exploitation and development to a degree that could not, until very recently, be done by the oil producing countries. And third, they have traditionally managed all transactions between exporters and importers of crude petroleum. Over the years, the oil companies have kept tight control of operations in the producing countries, thus effectively limiting the role of host governments in decisions affecting exploitation of indigenous fields. In addition, the governments could increase prices only through the corporations.¹

Initially, the power of oil companies was also based upon indifference to the oil industry on the part of rulers of the producing states. However, beginning in the 1930s, as the host governments became gradually aware of the potentials of oil, they demanded the right to participate in the oil industry.² Despite company attempts to block government participation, as producers became more knowledgeable of the technical and economic aspects of the oil industry, the oil companies became less able to exclude producer governments from participation, and in some cases

¹Choucri, International Politics. pp 31-32.

²For relations between states and foreign operators, see Raymond F Mikesell, "Conflict in Foreign Investor-Host Country Relations: A Preliminary Analysis" in Raymond F Mikesell (ed), Foreign Investment in the Petroleum and Mining Industries: Case Studies of Investor-Host Relations. (Baltimore. Johns Hopkins Press. 1971). pp 29-55. See also

were unable to prevent nationalisation of the oil industry.

The power of the major oil companies also stemmed from their ability to form united fronts against various producer-governments. Oil company solidarity has been especially successful in "punishing" uncooperative producer-governments. The most notable case is presented by the joint company boycott of the sale of nationalised Iranian oil at the request of British Petroleum (then the Anglo-Iranian Oil Company) whose property was nationalised, without compensation, by the Mosadegh government of Iran in 1951. This joint boycott resulted in the failure of the nationalised Iranian oil industry to independently survive and forced its eventual compromise with the Consortium, composed of various multinational oil companies, to jointly operate the Iranian oil industry.

The operations of multinational oil companies were such that their sources of oil extend over a number of countries. This provided the companies with a convenient device to punish governments that made demands upon them, by shifting operations to more cooperative countries. This successfully deterred many producer-countries from making new demands.

Gertrude G Edwards, "Foreign Petroleum Companies and the State in Venezuela". Ibid. pp 101-128.

Furthermore, relations between producer-governments and the oil companies are complicated by the intrusion of the close relationship between the multinational oil companies and their parent countries. The commitment of companies and their home governments to the prosperity of the multinational corporations and free enterprise, together with substantial contributions these make to their home economies help to make governments especially sensitive to threats of expropriation or nationalisation voiced by host-governments. Concern for the security of American investments abroad prompts the U. S. government to exert pressure upon host-countries, frequently in the form of threats to deny them assistance of all forms. Although such threats may be successful in securing the desired effect, they may induce cohesion among OPEC members in the face of a perceived threat to the sovereignty of a fellow member. This response was voiced by the Secretary-General of OPEC, who stated that

Pressure and duress exercised by the great powers on behalf of their companies to discourage or handicap the owners of hydrocarbon wealth from obtaining their legitimate rights would increase the determination of producer-countries in the face of a common danger.¹

¹ Press release by OPEC Information Department on the 32nd meeting (extraordinary) of OPEC Conference. Dated March 17, 1973. Middle-East Survey Supplement. March 23, 1973. pp 3-4.

The fact that major OPEC oil exporting countries are in varying degrees dependent upon, or influenced by the United States, makes the U.S. government an invaluable ally of the multinational corporations overseas. Hence, in the event of disputes between host-governments and international oil companies, it is likely that pressure may be exerted on behalf of the companies by the American government. U.S. governmental support for its oil companies was evident in the period 1910-1920 when the U.S. government pressured Great Britain and France, the successor powers to Turkish domination in the Middle-East, to concede grounds to American companies.¹ However, the U.S. government cannot always be assumed to be a firm ally of its international companies. The 1958 U.S. government intervention in the disagreement between the Accion Democratica Government in Venezuela and American oil companies over the government's intentions to nationalise the oil companies and provide support for demands for wage increases by the oil worker's union, provides an instance where the oil companies' commercial interests were temporarily sacrificed. As the result of the defection of Cuba to the socialist camp, the U.S. saw Venezuela as the key to Caribbean

¹For a summary of the assistance given to American oil companies by their government, see Frank Church, "The Impotence of Oil Companies" in Foreign Policy, #27. Summer 1977. pp 27-52.

regional stability and hence was in favour of promoting a strong Venezuelan economy, through expansion of its oil industry which constituted 85% of Venezuela's GNP, and provided 60% of governmental revenues together with 90% of all exports. As a result of the pressure exerted on the companies in the interests of American foreign policy, the companies were forced to compromise and accede to some of the demands of the Venezuelan government.¹

The decline in power of the seven major oil companies was preceded by the emergence of independent oil companies in the international oil industry. The independents were distinguished from the majors by their lack of vertically integrated facilities and operations. Hence, it is common to find the operations of the independents confined to a single stage of the oil trade -- the most common being the extraction stage. As the independents were new-comers to the oil trade and anxious to become established in the oil business, they found themselves obliged to offer better terms to oil producer-governments for oil exploitation rights than did the established majors. The Italian state petroleum agency, Ente Nazionale Idrocarburi, was the foremost independent oil company in initiating new government-

¹See account in Peter Odell, Oil and World Power: Background to the Oil Crisis. 3rd ed. (Harmondsworth. Penguin. 1974). p 86.

company agreements and relations. At the same time, producer-governments were more receptive to the independents as they were competitive with the majors and served to reduce their power while offering governments more attractive financial and participation terms.

As a result of the substantial increase in demand for oil in the post-war period, more independent companies entered the world trade. Consequently, the production of crude oil increased rapidly. Although ~~the~~ independent companies were successful in locating new sources of oil, they lack adequate facilities to refine and market the product, and in desperation resorted to price-cutting in order to compete with the major companies.

The significance of the rise of the independent oil companies was that they reduced the control of the majors over pricing and rates of production -- two areas vital to continued domination of the oil trade by the major companies. The control over production rates and prices are considered critical as devices of deterrence or punishment by slowing down the incomes and consequently, the growth rates of host countries troublesome to the oil companies. In the process, the producer-governments found themselves in a position to benefit from this competition. As there were numerous independent oil companies eager to enter the oil industry, producer-governments, through control of selection of operators, were able to dictate

terms of exploitation agreements which ensured them greater control over lengths of time of prospecting rights, size of areas where such rights can be exercised, financial returns to governments in the form of taxes and royalties, rates of production, etc. As the result of the new terms of agreements drawn up by producer-governments and independent companies, major companies found themselves constrained in the exercise of their previously immense powers and were obliged instead to comply with the new terms of government-company agreements in order to secure future concessions.

Another factor which contributed to the decline of the power of major international oil companies is the emergence of political and economic nationalism among the oil producer states. As countries became aware of the immense profits which the oil companies received, but of which little percolated to the producer-governments, their perception of exploitation by imperialist powers was reinforced by perceptions of economic exploitation by the oil companies which were seen as the economic extensions of their colonialist governments. In practical terms, the rise of political and economic nationalism made the issue of national control of vital natural resources imperative. Indignation at the lack of national control over exploitation and returns from oil made producer-governments increasingly adamant in their demands for greater control and

was instrumental in the establishment of national oil companies for whose control are reserved increasingly larger portions of the oil industry. It is felt by producer-governments that the promotion of national enterprise, both public and private, would induce greater responsiveness of the economy to the needs and priorities of the government and the national private sector, and restore a greater measure of control over the means of national development. The favoured position of national oil companies vis-a-vis foreign oil companies can be seen in the case of the National Iranian Oil Company (NIOC) in a joint venture with the Italian state agency ENI in 1957. In this enterprise, NIOC ownership shares constitute no less than 30% of the total. But NIOC owned 50% of the crude produced, and did not bear the cost of risk in the exploration and exploitation stages. In addition, 50% of taxable income of the joint enterprise accrued to the Iranian government as taxes. Hence agreements of this sort eliminated the traditional 50-50 profit sharing between companies and governments and instituted instead a 25-75 sharing scheme in favour of governments. The Iranian joint venture is representative of the trend towards greater government receipts and control of the oil industry, and paved the way for the emergence of "service-contract" agreements in which foreign operators are reduced to the role of contractors for the

extraction of oil and assume no decision-making powers.¹

The intrusion of national oil companies into the domestic oil trade and the reservation of special terms of agreement for them by their governments, ensure for them a foothold in the international oil business and an agreeable rate of profits.

This intrusion has in some cases reduced the profit margins of international companies, significantly diminished their previously complete control over oil industries and hence constrained their freedom to manipulate the oil business, in particular, over the critical issues of pricing and production rates. However, national oil companies cannot always be regarded as a challenge to the power of international companies. Among more conservative regimes, state oil companies are seen as complementing the operations of foreign oil companies rather than competing with them. In such countries, their national oil companies are active in the provision of auxiliary facilities and services needed by the oil industry, such as professional and technical training of nationals, construction of roads, schools, clinics and residential facilities for oil workers, provision of water, etc.²

¹Fuad Rouhani, A History of OPEC. pp 52-53.

²Ibid. p 113.

Finally, producer solidarity as ~~was~~ apparent in OPEC also greatly facilitated the decline of the international oil companies.

The variable "Power of the International Oil Companies" is expected to be a very significant one in any analysis beginning with the formation of OPEC in 1960 to approximately 1972, but diminishes greatly after that period, as the power of international oil companies to restrain the producer-governments' control over production rates, prices and direction of sales declined.

The decline in company power has been so serious that their ability to defend American national interests has been called into question. Senator Frank Church concluded that the 1973 embargo on oil demonstrated the fact that the "multinational oil companies are not really susceptible to the direction of their home governments."

He added

...the Saudis demonstrated that they had a clear conception of how to use four major American oil companies to achieve their objectives. They also demonstrated that they have effective control of the companies' decisions as to whom they will sell to and what profit margin they will be allowed.... Are Exxon, Mobil, Texaco and Socal (constituent companies of Aramco) any longer "American" companies in the sense of being responsive to the assertion of American foreign policy interests? Or is their stake in Saudi Arabia so crucial to their financial viability that they are effectively instruments of the foreign policy

of Saudi Arabia?¹

Simultaneously, other commentators have raised doubts over the ability of international oil companies to defend their own interests.²

It is generally agreed that the erosion of company power has been so severe that the decisions over levels of production and pricing are out of their control. Although this has not proved detrimental to their financial interests, it has clearly made them less important as a determinant of the dependent variables in this study. For this reason, the "Power of the International Oil Companies" variable is included only in the study of the first time period. Its salience to the decision making process will be demonstrated to be slight and the variable will then be discarded.

Variable 6: The International Economic Environment.

The international economic environment exerts an impact upon petroleum policies in two ways. Firstly, changes in demand for petroleum in periods of economic growth and recession affect prices which respond to such

¹Frank Church, "The Impotence of Oil Companies" Foreign Policy 27 (Summer 1977): 27-52

²Geoffrey Chandler, "The Innocence of Oil Companies", Foreign Policy 27 (Summer 1977): 52-72.

changes.¹ Production capacities in the oil industry do not effectively respond to declines in demand in the short run because the fixed costs in petroleum production significantly outstrip variable costs and hence exert an economic imperative to continue production once facilities for production have been established. As supply does not effectively respond to declines in demand in the short run, excess production capacity and mounting supplies push prices downwards. As well as the economic difficulties of balancing supply with declining demand, the resistance of producer-governments to production cut-backs, which negatively affect government revenues, also mitigates against balancing supply with demand. This situation was exemplified in the crude price reductions in 1959 and 1960 in the face of excess production capacities and static demand. However, as petroleum is generally thought of as a price inelastic commodity, it is unlikely that the prices should be reduced dramatically.

Since OPEC functions as a cartel and a price regulatory agency, it is expected that prices will decline

¹Robert Mabro argues that the overall level of production at a given price is determined by the level of market demand and that production levels, when the free-play of supply and demand is in operation, are determined by relative prices. These decisions, he emphasized, are not made by OPEC or the international oil companies.
(Robert Mabro, Millenium: Journal of International

to some extent but not significantly in the face of a decline in demand. As consumer governments are unable to respond in the short run to a fall in the price of crude, due to limited facilities for transportation, refining and storage, it is anticipated that under the pressure of mounting supplies of crude oil and limited storage facilities, production will be ultimately reduced until market forces are again balanced. Hence in the short run, a decline in demand will result in a moderate price reduction and, over a longer period, in production cut-backs. In a situation of increasing demand, oil prices will be raised but subject to constraints imposed by international relations and dominant members within OPEC opposed to significant price increases.

Secondly, levels of production and pricing may also be affected by the rate of inflation, interest rates prevailing in European capital and money markets, and currency stabilities, especially in areas where large volumes of petrodollars are traditionally invested.

Although this variable did not significantly affect petroleum policies in the past, it is likely to become an increasingly important variable as more petrodollars are accumulated than can be employed domestically and when the international financial situation is in a

state of flux. Under such circumstances, it is probable that those countries which have accumulated large oil revenues and see some need for conservation may curtail production. This situation becomes acute when the currencies that oil producing states deal in most frequently become unstable and threaten financial investments and the values of oil receipts, or when interest rates on loans are inadequate to ensure acceptable returns. Similarly, when inflation raises the price levels of commodities commonly imported by wealthier oil producing states relative to prices received for petroleum, the effect may be a reduction in rates of oil production or an increase in demands for higher petroleum prices.

Although the situation in which producers demand higher petroleum prices to offset changes in the rates of inflation or poor returns from low interest rates, or cover the risk element in investing in areas of currency instability is entirely conceivable for all petroleum producers, perhaps with the exception of Saudi Arabia, the other options of production cut-backs are foreseeable only for radical regimes, such as Libya, and less conservative regimes like Kuwait.

The absolute dependence upon oil makes it a commodity whose production is not strictly dictated by economic reasons or national interests, but instead heavily influenced by pressures exerted upon producer-governments

by the international community of petroleum consumers, in particular, the United States, western Europe and Japan. Hence, it is hypothesized that the greater the identification of economic interests with the dominant economic system, the greater the dependence of countries upon the West, and the closer their philosophies of the containment of Communist expansion and the maintenance of the international status quo coincide, then the greater will be their reluctance to cut back production in a manner that hampers the functioning of Western economies. The situation of production cut-backs is also not conceivable for the poorer small producer-states heavily dependent upon oil revenues.

Production cut-backs in response to poor financial returns from petrodollar investments do not constitute an acceptable reason for curtailing supplies in the eyes of Western consumers, and hence would be unlikely to be adopted as a policy option by the more conservative states. Nevertheless, it becomes a probable course of action in the face of a consumer response that is collectively viewed as confrontational, eg. the freezing of members' financial assets overseas or the nationalisation of their foreign investments or a consumer counter-embargo on development goods and agricultural products or other commodities particularly needed by producer states. Since substitution possibilities and alternative trading partners in these goods do exist, this is not likely to be an

effective counter-strategy, although it is not a proposal without supporters.

The producer response of production cut-backs should not be ruled out as an improbable solution to poor economic returns, especially by such countries as Algeria and Libya which have accumulated sufficient financial resources for the immediate future and see the necessity for petroleum conservation. This is a particularly attractive course of action for the producers who view the extraction of petroleum at a higher rate than necessary to accommodate domestic requirements as a "sacrifice" for the international community. The Prime Minister of Libya, Jallud, complained,

Libya as an oil producer is making sacrifices. We should be exporting 800,000 barrels per day in accordance with our spending requirements, but in response to would be energy demand, we are exporting more than our requirements. This is a great sacrifice, particularly in view of the currency movements. If we are making a sacrifice, others must sacrifice too.¹

If "sacrifice" from the West is not forthcoming, in the form of higher prices and assistance in the development of producing states, then production cutbacks of a depleting resource cannot be ruled out in the more radical states.

¹Choucri, International Politics of Energy Inter-Dependence. p 119.

When safeguards against erosion in the value of currencies that petroleum receipts are held in and adequate returns from investments in the money and capital markets are unavailable, the option of leaving oil in the ground becomes a profitable one. This option arises when it is assumed that untapped oil is appreciating at a higher rate than interest in the bank.

In conclusion, it is emphasized that producer response in the form of demands for petroleum prices to keep pace with, or offset higher rates of inflation is a conceivable course of action for all states, and one that is viewed with less repugnance by consumer nations. On the other hand, production curtailment to avoid possible losses from currency instability and poor returns on petrodollar investments, is a strategy viewed with considerable opposition by consumer states and therefore not a likely policy option for producer states that have close ties with dominant consumers. However, it is a probable option for radical states with limited absorptive capacities and rapidly depleting reserves.

This variable will become an increasingly significant one when more petrodollars are amassed, and during periods of international financial instability. Although such situations exert an impact on pricing and production policies, they are nevertheless circumscribed by other variables, the most important of these being the constraints imposed by international relations.

It is expected that not all six variables will exert the same degree of impact on decision-making, and it is probable that the importance of variables will change in time, for example, the variable "Power of International Oil Companies" was extremely important in the period 1960 to approximately 1971, but diminishes greatly from 1971 onwards. On the other hand, the impact of currency instability and poor returns on petrodollar investments on pricing and production policies will be minimal prior to the accumulation of large petrodollar reserves but is likely to become more significant in the post 1977 period.

Hence the model presupposes that each variable exerts some impact upon decision-making and that the salience of each variable changes over time, and furthermore, in the process of interaction with other variables, the impact of each variable is circumscribed or reinforced by other variables.

The model projects future trends in petroleum pricing, production and the employment of the "oil weapon", based upon (i) the salience of each variable and (ii) the salience of each interaction.

CHAPTER IV

1973-1974: THE SECOND OIL EMBARGO

The "oil weapon" was conceived by the Committee of Oil Experts in 1952. This Committee was sponsored by the Political Committee of the Arab League with the purpose of formulating a plan for the protection of the territorial integrity of Arab states. An Arab defence plan had become increasingly compelling after the formation of the state of Israel on predominantly Arab Palestine. The first conception of the "oil weapon" called for a general economic boycott, including an embargo on oil to Israel with the aim of curtailing Israeli military capacity for expansion into Arab territory.¹ However, the Department of Oil Affairs of the Arab League proved to be an ineffective agency, as many of its policies and projects had never been ratified or implemented by members of the League. Hence, its importance in the role of formulating economic and strategic oil policy diminished.² Attention shifted to the Organisation of Arab Petroleum Exporting Countries (OAPEC).

¹Mikdashi, Community of Oil Exporting Countries.

p 29.

²Ibid.

The organisation was founded by three Arab states, Kuwait, Libya and Saudi Arabia, in 1968. This organisation thus cemented ties between the conservative states. Besides planning to ultimately integrate the national economies of its members into an Arab regional economy, OAPEC also fulfills a political function that OPEC, as a non-homogeneous organisation, could not, or was unwilling to fulfil. In particular, OAPEC was created to carry out an immediate function -- the settlement of the Arab-Israeli conflict.

The June 1967 Arab-Israeli war, which acted as the catalyst in the formation of OAPEC in 1968, resulted in Israeli occupation of over 20,000 square miles of Egyptian, Jordanian and Syrian territory. The use of what the Middle-East Economic Survey¹ called the "petroleum defence line" was initiated by some Arab states. The strategy consisted of a selective embargo on petroleum to the United States, the United Kingdom and West Germany. The object of the "petroleum defence line" was to exert sufficient pressure on the allies of Israel to compel them to pressure the Israelis to withdraw from occupied Arab territory. The embargo was suggested by some observers as a pre-emptive measure to avert potentially explosive Arab hostility

¹Middle-East Economic Survey. 12 January, 1968, p 3.

towards the United States.¹ It was feared that such sentiments would lead to massive sabotage of oil installations by the irate Arab populace. The United States in particular was the object of Arab hostility as it was charged by Egypt and Jordan as having provided Israel with air support in the 1967 war. The allegation later turned out to be unfounded.

In retrospect, the embargo was considered by its proponents as an action prompted more by impulse in the heat of the moment. In 1968, the Saudi Arabian Minister of Petroleum and Mineral Resources remarked that the situation in June 1967 was such that political pressures overrode economic considerations. The decision to employ the "oil weapon" was made on the eve of war, June 3rd and 4th, 1967, under urgent pressure to avert an impending Israeli attack and prove the credibility of the "oil weapon" as a deterrent.²

On reflection, Ahmad Zaki Yamani said that the oil embargo "hurt the Arabs themselves more than anyone else, and the only ones to gain any benefit from it were

¹Fuad W Itayim in the unpublished address "Middle-East Conflict and the Continuity of Oil Supplies", delivered at Harvard University Centre for Middle-Eastern Studies on May 7th, 1970.

²Mikdashi, Community of Oil Exporting Countries.

the non-Arab producers".¹ The embargo brought on a wave of anti-Arab sentiment in the West, and consumers, including those unintentionally affected by the embargo, substituted for Arab oil that from the United States, Venezuela and Iran. Furthermore, the embargo, which generated fears for future supplies, prompted major consumers to seek direct access to oil producers outside the Middle-East. The United States, a principal target of the embargo, was unaffected by it. Import restrictions in the United States limited oil from the Middle-East to a relatively small quantity of approximately 300,000 barrels daily.² Trans-shipment of non-embargoed oil to the United States further alleviated the problem of oil shortage.

After the failure of the embargo, two diametrically opposed solutions were proposed: Iraq and Algeria advocated a three month total embargo on oil to Europe, since a partial selective embargo could easily be circumvented by trans-shipments, as the events of 1967 proved. The three conservative states of Kuwait, Libya and Saudi Arabia proposed instead the maximisation of oil revenues

¹ Ahmad Zaki Yamani, "Aspects of Oil Policy for the Arab Countries and the Relation of Arab Policy to that of OPEC". Address at the American University at Beirut, June 3rd 1968. MEES Supplement. June 7th, 1968. p 1.

² Mikdashi, Community of Oil Exporting Countries. p 86.

and the use of oil proceeds to support the efforts of the front-line Arab states to regain their territories. The Arab Summit Conference held in Khartoum on August 29th, 1967, adopted the proposal of revenue maximisation and financial assistance for Arab states. The embargo was then terminated.¹ Consequently, large financial contributions were made by Kuwait, Libya and Saudi Arabia to Egypt, Jordan and Syria.

In hindsight, the embargo of 1967 and the drastic change in company-government relations following the 1970 and 1971 negotiations predict to the events of the 1973-1974 period. The embargo of 1968 set a precedent and suggested that, in the event of a political crisis, the "oil weapon" could again be employed, in a modified form and with greater enforcement than the half-hearted attempt of 1967. Furthermore, company-government negotiations in 1970 and 1971 suggested that with the threat of production curtailment, governments had gained effective control over both pricing and production and increasingly over the entire oil industry operating from OPEC countries. These two factors, crucial to a successful embargo, were absent in the first embargo. The precedent of an oil embargo in 1967 and the reversal of power relations between companies and governments suggest that despite the failure of the

¹ Ibid.

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1967 embargo, a second embargo would likely be attempted with greater probability of success.

The following section analyses and forecasts the policies likely to be adopted by the two OPEC members considered to be dominant in the 1973-1974 period -- Iran and Saudi Arabia. Saudi Arabia and Iran are chosen because they hold different approaches to the question of price: the former is generally reluctant to effect significant price increases while the latter is generally understood to be moderately aggressive in the quest for higher prices. Secondly, as both are major producers and hold the largest oil reserves, they are in the best position to affect policy. Thirdly, they illustrate the diametrically opposed perceptions of OPEC: as a political arm of Arab foreign policy by Arab members and as an economic cartel by the non-Arab members.

The first and second sections analyse and forecast probable petroleum policies in Iran and Saudi Arabia respectively. The concluding section concentrates on the identification of OPEC policy.

IRAN: 1973

The following section identifies Iranian petroleum policies based upon the interactions of the previously illustrated six variables. The methodology employed is KSIM.

International Economic Environment

The agreements of 1970 and 1971 marked the first stage of the reversal of power relations between companies and governments and set the stage for greater independent action on the part of governments. The conditions of supply and demand in the early 1970s favoured the ability of OPEC to manipulate the oil companies and the international oil market. In 1970, marginal surpluses which contributed to the price depressions of the early 1960s disappeared. As the industrialised economies entered a period of upturn, higher than expected demand for oil was stimulated. In addition, a shortage of tankers and a growing tightness of refinery facilities in Europe aggravated the already tight supply situation. Consequently, oil companies were left with little flexibility to deal with changes in the conditions of supply.¹

This variable is expected to influence petroleum policy in the direction of higher levels of production and

¹North Africa and Middle-East. 1976-1977. pp 86-87.

market shares and higher prices, but for Iran exerts no impact upon the decision to participate in launching the "oil weapon".

The "mini-boom" in the IEE evident in 1973 is represented by the value 0.7 on a scale of 0 to 1, where 0 indicates an economic depression and 1 an economic boom. As the development of IEE is independent of the variables used, its values will be externally imposed to reflect projected trends.

The Power of International Oil Companies.

The power of oil companies to independently influence oil affairs was largely curtailed in the series of company-government negotiations in 1970 and 1971. The result was a shift in the relationship of power. Host-governments found themselves in control of decisions relating to the production and pricing of oil. Sheikh Yamani, the Saudi Arabian Minister of Petroleum and Mineral Resources, attributed the shift in power relations between governments and oil companies to the advent of participation. Participation, he said,

resulted in the shift in the control of oil exploitation and trade, away from the oil companies to the producing countries' governments. The governments retain now almost entirely the decision-making powers for price determination, production levels in their countries, future expansion of oil facilities and

to a great extent, the destination of oil exports.¹

Aside from losing direct control over prices and production decisions, the oil companies continue to remain significant in the oil business: through "buy-back" agreements they possess control over production from nationalised concessions in many parts of the Middle-East, including Iran and Saudi Arabia. In addition, through large scale ownership of tanker fleets, oil companies retain control over transportation, as well as marketing outlets for oil.²

Thus the success of an oil embargo depends heavily upon the extent of control host governments have, and are willing to exercise over the marketing and transportation arrangements of the oil companies. The failure of the 1967 oil embargo can be attributed to the half-hearted efforts of participant-governments, as well as to transshipments of oil from non-embargoed to embargoed areas by oil companies. These operations were undertaken in order to ensure smooth supplies to all customers, thereby circumventing the spirit of the host-governments' directives.

Negotiations between companies and governments in 1970 and 1971 have demonstrated the ability and

¹Ahmad Zaki Yamani, "Oil: Towards a New Producer-Consumer Relationship" in The World Today. November 1974. p 480.

²Christopher Rand, Making Democracy Safe for Oil. (Boston. Little-Brown. 1975). p 422.

willingness of governments to assume full control over pricing and production decisions. For this reason, the relevance of the "power of international oil companies" variable has been made virtually obsolete by the events of 1970 and 1971 and therefore will be given a low initial value of 0.1 where 0 represents no impact upon the dependent variables and 1 represents absolute power to affect outcomes.

Quantity of Oil.

As Table III indicates, Iran's oil reserves constitute the third largest within OPEC, after Saudi Arabia and Kuwait. On this basis, we anticipate Iranian oil policy would lean towards capturing a larger share of the market, while agreeing to accept a lower per unit price for oil. However, at 1972 rates of production, Iranian oil reserves will be depleted within 40 years, as compared to 70 years in the case of Saudi Arabia, and 76 years for Kuwait. We can therefore expect this factor to moderate Iran's satisfaction with a larger market share and at a lower per unit price. Hence a more realistic prediction, based upon Iran's past behaviour and its reserves and production record, is that it will seek both a larger share of the market while insisting on the highest price it can secure. This strategy appears to most efficiently maximise revenues by achieving a balance

between large reserves and a rapid rate of depletion.

As Iran, (together with Kuwait), own the second largest reserves in OPEC, its "QR" variable is given an initial value of 0.8 on a scale of 0 to 1, where 0 represents the lowest quantity of reserves and 1 the highest.

TABLE III

PETROLEUM EXPORTS AND RESERVES OF SELECTED OPEC MEMBERS

Country	1972 Reserves (Billions of barrels)	1972 Exports (Millions of barrels/day)	Number of years before depletion
Saudi Arabia	138	5.4	70
Iran	65	4.5	40
Kuwait	64	2.3	76
Libya	30	2.2	38
Iraq	29	1.4	57
Abu Dhabi	21	1.0	58
Qatar	7	0.5	40
Oman	5	0.3	47
Dubai	2	0.1	39

SOURCE: North Africa and Middle-East. 1973-1974. p 246.

TABLE IV

1970-1972 BUDGET

(in million rials)

Expenditure on	1970	% of Total	1971	% of Total	1972	% of Total
General Services	26,487	6.0	32,762	5.6	36,539	5.3
Defence & Security	58,349	13.3	78,593	13.4	100,941	14.5
Social Services	49,477	11.2	66,049	11.3	83,094	12.0
Economic Services	91,733	20.8	117,739	20.1	138,140	20.0
Debt Repayments	12,879	2.9	20,655	3.5	28,202	4.1
Profit-making Enterprises	25,362	5.8	40,871	7.0	50,887	7.3
Commercial Agencies	169,755	15.8	213,413	36.4	249,049	35.8
Social welfare Institutions	6,343	1.5	8,088	1.4	9,297	1.3
Total	440,385		587,170		696,149	

SOURCE: Middle-East and North Africa. 1972-1973. p 314.

TABLE V

ABSOLUTE AND PERCENTAGE INCREASES IN IRAN'S FINANCIAL
ALLOCATIONS FOR THE THIRD, FOURTH AND FIFTH DEVELOPMENT
PLANS

Plan	Duration	Cost* (million rials)	Increase (%)
Third	Sept. 1962-March 1968	202,160	-
Fourth	March 1968-March 1973	810,400	300.9
Fifth	March 1973-March 1978	4,364,000	438.5

*Figures do not reflect inflation.

SOURCE: North Africa and Middle-East. 1962-1977.

Absorptive Capacity

Iranian budgetary allocations have stressed modernisation of Iranian society, economic growth and military armament. As Table IV illustrates, the budgetary allocations for 1970, 1971 and 1972 tended to favour expenditures on economic growth, expansion of the armed forces, and social development. Of Iran's five development plans to date, the Fourth Development Plan of 1968-1973 appears to have been the most successful, producing an average

growth rate of 9.4% per annum. Growth records of succeeding years averaged 11%. The impressive growth rates can be attributed to the high proportion of budgetary expenditures allocated to capital formation and investment in projects with high-yielding returns requiring little or no additional infrastructural development.¹

Despite encouraging growth rates, limitations to Iran's absorptive capacity remains. These are concentrated in three major areas -- agriculture, manufacturing industry and in manpower and management. Additional immediate investment in agriculture is hindered by poor seeds, poor communications, cultivation techniques and lack of water. Expansion of manufacturing industry is curbed by a small domestic market and strong competition from foreign producers. Further capital investment is constrained by a shortage of manpower and management personnel.² Nevertheless recent growth will undoubtedly contribute to enlarging possibilities for future capital investments by pushing back limitations to absorptive capacity and introducing new avenues for growth and expenditure. Evidence of Iran's expanding absorptive capacity is seen in the spectacular increases in the sums of financial allocations

¹Choucri, International Politics of Energy Interdependence. p 104.

²Ibid.

TABLE VI

IRAN: ABSOLUTE AND PERCENTAGE CHANGES IN OIL REVENUES

Year	Revenue (US\$ million)	Change from Previous Year (%)
1966	581	-
1967	710	22.2
1968	804	13.2
1969	905	12.6
1970	1076	18.8
1971	1902	76.8
1972	2430	27.7
1973	4000	64.6
1974	20000	400.0

SOURCE: North Africa and Middle-East. 1966-1967 to 1975-1976.

for each development plan (see Table V). Despite Iran's heavy development expenditures and expanded capacity to absorb new capital investments, its mounting oil revenues, in particular in the years 1970 onwards, added significantly to a financial surplus (see Table VI). It is estimated that Iran's investible surplus for 1973 was US\$1090 million, and US\$10,680 million in 1974.¹

Although presently a net exporter of capital, it was then anticipated that due to Iran's large population of 28 million and its development and military requirements, Iran's surplus earnings would be fully utilised and it will revert to a net importer of capital by 1975 to 1977.²

The expense of development suggest that Iran would prefer a high per barrel price while moderating that with an optimal balance between high price and a large share of the oil market. The speeches of the Shah and Prime Minister Hoveida suggest that the rate of production would be entirely subordinated to Iran's development and military requirements.³ Iran's rush to industrialise before the depletion of its oil reserves suggests that

¹U.S. Dept. of the Treasury, Office of the Asst. Sect., Trade, Energy and Financial Policy Coordination, "The Absorptive Capacity of OPEC Countries". Sept. 1975. p A4.

²Ibid. p A5.

³See speeches on p 102.

the high rate of oil production would be maintained to satisfy immediate requirements. Conservation, in terms of lower rates of production, would unlikely be an attractive option, as immediate investments in, and returns from development are judged to be more attractive than the form of savings with "oil in the ground". Iran's high absorptive capacity will not influence its use of the "oil weapon".

Due to heavy pressures exerted by a large population and underdeveloped economy, Iran's absorptive capacity is given an initial value of 0.8 on a scale of 0 to 1, where 1 represents inadequate resources to meet requirements and 0, saturated absorptive capacity.

Foreign Relations: Intra-OPEC Relations

The relations between OPEC members that can potentially exert the greatest impact upon oil policy are those between Saudi Arabia and Iran. Both countries are economically and politically dominant OPEC members and major oil producers. Despite mutual protestations of friendly relations, both are engaged in a quiet struggle to gain leadership over the Middle-East region as well as over smaller OPEC producers.¹

¹R M Burrell, Iranian Foreign Policy During the Last Decade" in Asian Affairs. Vol. 5. 1974. p 7-15.

Iran is striving to become the regional military power. The heavy emphasis placed on military armament in Iran's budget attests to this (see Table IV). Iran's national priorities appear to be the development of an industrial infrastructure, followed by expansion of its military capability.

In the Middle-East, Iran's military ambitions are countered by the eagerness of Saudi Arabia to assume regional economic, if not military, power. Iran's expanding military capability is viewed with concern by Saudi Arabia and other Arab countries, which are without the requisite manpower or military technology to equal Iranian military superiority.

Another area of potential conflict between Iran and Saudi Arabia centered upon their conflicting claims over the Gulf. The issue was important for both countries since the dispute involved oil drilling rights in the seabeds. But for Iran, the Gulf represents the only means for transportation of its oil. This problem has been successfully negotiated in 1968 and is unlikely to spark conflict.

However, another problem existed with Iran's claims to Bahrain and the islands of Tums and Abu Musa. Iranian claims to Bahrain ended after a 1970 United Nations mission found Bahrainis preferred independence to political association with Iran. The conflicting claims of Iran

and the Gulf States of Sharjah and Ras al Khaymah to the islands were settled by Iranian invasion of the Tumb Islands in 1970 and by agreement of the Sheikh of Sharjah to share Abu Musa with Iran. These islands were subsequently developed into Iranian military bases. Iran protests the necessity of these islands in safeguarding its tanker routes in the Straits of Ormuz, which the Shah of Iran described as Iran's "jugular vein", vital to its economic and strategic interests. Iranian territorial expansion with the capture of these islands has renewed and confirmed the fears of neighbouring Arab states of Iran's imperial ambitions. In another area of dispute, the abrupt end of the six year old Iraqi-Iranian frontier conflict over the Shatt-al-Arab waterway at the OPEC Conference of March 1975, attests to the importance Iran attaches to allaying such fears of its neighbours.¹ That the Iraqi-Iranian conflict was so amicably settled at an OPEC Conference suggests the importance both radical and conservative regimes alike attach to the pragmatic purpose of subordinating political quarrels to further mutual economic gains.

Iran's anxiety to allay the expansionist fear of its neighbours is reflected in the direction of its

¹See R.M.Burrell, "Iranian Foreign Policy During the Last Decade" in Asian Affairs 5 (1974): 7-15

investment and loan programme. Although Iran's programmes of foreign aid and investment in the Arab states is not as extensive as are Saudi Arabia's or Kuwait's, they are nevertheless significant. Iran committed over US\$ 600 million of industrial investments to Arab countries or approximately US\$ 400 million less than Saudi Arabian commitments. In addition, US\$ 150 million worth of credits was granted to Syria.¹ Iran's financial commitments to the Arab states should be seen as part of its foreign policy strategy of gaining friendship and neutralizing potential Arab resistance to Iran's ascendance as the regional power. Iran's tendency to re-emphasize its Islamic connections with the Arab world in the October 1973 war (without simultaneously breaking its tacit liason with Israel) is also seen as part of concerted efforts in this direction. More importantly, Iran's courtship of the Arab states could also be interpreted as an attempt to dislodge Saudi Arabia as the regional economic and political leader. Although the implications for investment flows are obvious, less so are the more tenuous implications for petroleum policy. It is hypothesized that on the question of oil price, Iran will cling tenaciously to its preference for higher prices, thus offering a rallying point for smaller producers whose interests are at variance with

¹Choucri, International Politics of Energy Interdependence. p 124

low-price advocating Saudi Arabia. By holding this position, Iran gains for itself the reputation of defending the legitimate interests of smaller OPEC producers. By dispensing its economic largesse in the direction of Arab states heavily subsidized by Saudi Arabia, it presents itself as a viable alternative to Saudi leadership in the Middle-East.

Implications for Iran's rate of oil production also arise in the unlikely situation of Saudi Arabia flooding the international oil market with its lower priced product to maintain low prices. In that event, to retain Iranian leadership of the high-price faction in OPEC and to sustain higher prices Iran will, of necessity, reduce its oil production and absorb some or all of the excess production capacity.

Outside of this situation, it is unlikely that Iran's relations with other OPEC members and Middle-East states will affect its production policy. With regard to participation in an oil embargo against Israel, Iran's eagerness to gain favour with Arab states would suggest that such an option would be considered. However, other aspects of Iran's international relations, in particular its close ties with the United States, make the adoption of this option extremely unlikely.

On the question of production rationing to stabilise oil supply and support prices, Iran's response poses

problems to its relations with other OPEC states. The Shah upholds Iran's "right" to high production and a large share of the market.

We, as the owners of this oil and the master of this land, must have a say in the production of this wealth because the needs of this country are clear. No firm, no company, no organisation can tell us, merely because it has an agreement with us, that we will produce and export so much of your national wealth but you cannot touch the rest as we do not wish to exploit it. What this means in fact is that they want to deprive Iran of this wealth which rightfully belongs to it.¹

Iran's determination to secure a larger share of the market for itself, even at the expense of competitors in OPEC, is also made clear in the speech of the Iranian Prime Minister, Amir Abbas Hoveida.

Iran is determined to maintain her historical role as the biggest exporter of oil in the Middle-East through export of oil from the Agreement Area. Besides Iran's historical role, this position is regarded by the Government of Iran as an undeniable and conclusive fact in view of the country's population, its size, the needs of its development plans, as well as the regional commitments of Iran, which serves as a factor for peace and stability in this part of the world. This principle forms the basis of the country's oil policy.²

The value of 0.6 describes the situation where

¹Speech of March 14, 1968. Middle-East Economic Survey. March 22nd, 1968. p 29.

²Speech of 12th December, 1970. MEES Supplement. December 18th, 1970. p 2.

competition for regional supremacy is muted by the cultivation of bi-lateral economic ties with important Arab states. A value of 0 on the scale indicates a cessation of diplomatic relations and 1, very harmonious ties.

International Relations: Relations with Major Consumers.

There exists a tendency among political commentators to describe Iran as a client state of the United States. In view of Iran's fiercely nationalistic foreign policy emphasizing the primary goal of attaining regional superpower status, it is perhaps more accurate to say that the interests of Iran and the United States in the Middle-East are coincident. Nevertheless, it should not detract from Iran's heavy reliance upon the United States for economic assistance, investment opportunities and civilian and military purchases. To date, U.S. foreign aid to Iran amounts to \$3.3 billion or 13% of all economic and military assistance given to countries of the Middle-East including Israel.¹ On the other hand, in recent years, Iran's purchases of consumer and military goods from the United States amount to approximately \$10 billion per year.²

¹U.S. News and World Report. November 1, 1976. p57

²See interview with the Shah of Iran in Business Week. January 24, 1977. p 36).

Iran's total financial allocation to the United States amounts to over \$12.4 billion in investments and an additional \$15 billion of purchases, largely involving military armaments and nuclear reactors.¹ These transfers therefore repatriate to the United States an important portion of what was spent on higher oil prices. Furthermore, as a non-Arab producer, Iran is seen by Americans as a far more reliable supplier of energy than even Saudi Arabia, another staunch U.S. ally. Hence ties between Iran and the United States should more realistically be seen as relations of interdependence rather than of Iranian dependence.

On the subject of foreign policy in the Middle-East, Iranian and U.S. interests coincide to a remarkable degree: both are opposed to the entry of the Soviet Union into the politics of the region; both are committed to maintaining the status quo in the area; they also favour containment of the influence of radical Arab regimes. Iran's emergence as a military power in the region, with generous assistance from the United States, greatly facilitates the achievement of these goals.

Do Iranian-American relations provide the U.S. with leverage to affect Iran's oil policies? Iran has emerged as a regional power whose military capability is

¹New York Times. February 9, 1976.

said to parallel that of Israel and could potentially equal that of the Soviet Union and the United States in the Middle-East.¹ This development makes the employment of force by the United States to persuade Iranian oil policy less and less of a credible option as arms transfers to Iran increase. U.S. threats to cut off arms supplies to Iran as a lever to influence oil prices is countered by the Shah's reply that he would not hesitate to "shop around".² Therefore, as near equals, the United States can exert limited effective pressure upon Iran to moderate oil prices as Iran's ambitious programmes of economic and military development depend so heavily upon them. On the other hand, Iran's good relations with the United States, Israel's foremost ally, would act as a deterrent against its participation in an oil embargo, either to Israel or to its western allies. Iranian participation in an embargo would only have negative repercussions. As a non-Arab state, Iran is relatively uninvolved in the Arab-Israeli conflict and, through its tacit liason with Israel, benefits from its continued sale of oil to the

¹Middle-East and North Africa. 1976-1977. p 33B

²Indeed, Iran has already made arrangements with the Soviet Union for the purchase of a series of arms. See interview with the Shah of Iran in Business Week. January 24, 1977. p 36.

latter. Participation in an embargo would deprive Iran of receipts from sales to its largest customers in the West and would not allow it to take advantage of the situation of short supply to increase market shares and oil prices to effect further gains. Participation in an embargo could also solicit a punitive reaction from the U.S. in the form of curtailment of arms sales or development assistance. In addition, Iran could be deprived of the services of the United States as an ally and final guarantor of Soviet absence from the region.

What leverage do the oil importing countries of Western Europe and Japan have in influencing Iranian and OPEC oil policy? These countries are either entirely dependent or at best heavily dependent on imported oil and are simultaneously important recipients of petrodollar investments. Being extremely vulnerable to the curtailment of oil supplies, these countries are therefore left with very little leverage to influence OPEC policy. Consequently, this group of countries have behaved with greater accommodation to OPEC price increases in contrast to the relatively vigorous objections of the United States. Energy sharing programmes, such as the U.S. proposed International Energy Association, have received lukewarm support from European countries with some, in particular France, preferring to make more advantageous bi-lateral agreements with OPEC exporters.

Shared ideological commitments, in particular the containment of Soviet expansionism, and mutual reliance are offset by conflicting responses to the issue of oil price increases. "Relations with major consumers" is assigned the initial value of 0.7 where 0 represents the cessation of diplomatic relations and 1, very harmonious relations.

Price

Although the agreements concluded in the 1971 Tehran talks between oil companies and OPEC provided for a five year period of stability between 1971 and December 1975 in exchange for increased payments to governments, these were subsequently broken in the rash of price explosions beginning in the following year. The floating of the US dollar in August 1971 and its formal depreciation in December led to a compensatory 8.4% increase in the price of oil in January 1972. The second depreciation of the dollar by 10% in February 1973 led to a price revaluation upwards by 5.8% in April of the same year. However the dissatisfaction of OPEC members with the delay in the financial adjustments made, as well as the inadequate compensation, led to another dollar compensation of 11.9%, which included the existing 5.8% increase of April and an additional compensation for the continuing slide in the parity

TABLE VII

PRICE FLUCTUATIONS OF ARABIAN LIGHT MARKER CRUDE*

Date	Posted Price (\$ per barrel)	Government Revenue (\$ per barrel)
Pre-November 14, 1970	1.80	0.91
January 1, 1971	1.80	0.99
February 15, 1971	2.18	1.26
June 1, 1971	2.29	1.33
January 20, 1972	2.48	1.45
January 1, 1973	2.59	1.62
April 1, 1973	2.74	1.72
June 1, 1973	2.90	1.81
September 1, 1973	3.07	2.01
October 16, 1973	5.12	3.41
January 1, 1974	11.65	9.27
July 1, 1974	11.65	9.37
October 1, 1974	11.65	9.69
January 1, 1975	11.25	9.98
October 1, 1975	12.38	11.00

*API 34. Sulphur content 1.7%.

SOURCE: North Africa and Middle-East. 1976-1977. p 95.

of the dollar in May. It was also agreed that future prices should be adjusted monthly according to a weighted monthly movement of eleven major currencies against the dollar. Consequently, further increases were made in August and September and a reduction in October.¹

Large increases in demand beginning in the 1970s provided further impetus to new price levels. Oil production in the United States declined after 1970 and it turned to the Middle-East to supply not only the difference between its declining domestic production and consumption but also an annual increment in demand that was nearly as large as that of the whole of Western Europe's. American imports from the Middle-East expanded from 0.6 million barrels per day in 1971 to one million barrels per day in 1973.² These increases were reflected in higher prices.

Although OPEC prospered from higher prices, it charged that excessive profits really accrued to the oil companies. Profits realised by OPEC members were derived from bids approximating posted prices received on the sale of small quantities of oil made by members on the international market. As the bulk of oil produced was still tied to buy back agreements at earlier prices, host governments were

¹North Africa and Middle-East. 1976-1977. p 89.

²Ibid. p 87.

excluded from participating in the boom of higher prices with the largest benefits going to the companies. The host governments charged that the effective profit split had changed from 80-20 in favour of the governments in 1971 to 64-36 in favour of the companies.¹

The conditions prior to the renewed outbreak of the Arab-Israeli conflict in 1973 were characterised by strong and extreme dissatisfaction felt by the host governments on being excluded from adequate participation in the lucrative upturn in oil prices. These conditions suggest that strong pressure would undoubtedly be exerted by host governments to capture a larger share of the oil profits from companies and perhaps renewed attempts to raise prices. At this point, it seems unlikely that the rate of oil production would be cut back as governments appear eager to attain larger total revenues from both increased output as well as higher prices.

¹North Africa and Middle-East. 1976-1977. p 87.

The dependent variables in the study are:

Preference for High Price. As Iran faces strong financial pressures from a large population and underdeveloped economy, its needs for additional oil revenues are pressing. Consequently, the starting value of PHP is given as 0.8 where 0 represents complete rejection of high prices and 1 a preference for very high price. The second dependent variable is Preference for No Embargo. Iran's studious avoidance of entanglement in the Arab-Israeli conflict and its rejection of an embargo on oil is offset by the large gains it stands to make in the event of curtailed supplies. Therefore, PNE is given an initial value of 0.5 where 0 denotes rejection of the embargo, 1 very strong support and 0.5, no preference for either option. The third dependent variable is the Rate of Production. The curtailment of production rates represents an alternative strategy to an embargo on oil to specific consumers. As Iran is uninvolved in the Arab-Israeli conflict, curtailment of production is not a relevant option. Instead, requirements for growth and armament dictate increased levels. This variable is given an initial value of 0.1.

Forecast of Iran's Oil Policies

The forecast is based upon the interaction of all variables, independent as well as dependent, and upon the initial values assigned to each variable in the cross-impact matrixes. The matrix comprises both the long-term binary impact between each pair of variables as well as the short-term. The length of the long-term impact is projected over a $5\frac{1}{2}$ year period. The short-term matrix provides for the short-term or sudden influence of one variable upon another. The short-term is defined as less than one year. To forecast a realistic growth pattern, both the long-term and short-term interaction impacts must be assessed. The results are symmetric or assymmetric growth curves which more realistically reflect growth patterns in social phenomena than do straight line graphs.

The strength of the impact may vary between -3 to +3 where -3 indicates the strongest negative impact i.e. an increase in the value of one variable induces the most substantial decrease in the value of another; 0 indicates no effects; and +3 denotes the strongest positive effect, i.e. an increase in the value of one variable leads to the most substantial increase in another. Entries in the matrixes are determined by the strength and direction of the interactions.

In the following interaction matrixes for Iran, entries represent the impact of column variables upon row variables. The notation QR stands for "Quantity of Reserves", AC for "Absorptive Capacity", IOR for "Intra-OPEC Relations", RMC for "Relations with Major Consumers", IEE for "International Economic Environment", PIOC for the "Power of International Oil Companies", PHP for "Preference for Higher Price", PNE for "Preference for No Embargo" and RP for "Rate of Production". Values in the IEE row have been arbitrarily imposed to reflect developments in the international economic environment. These values were imposed as the IEE variable is influenced by other factors outside the scope of this study.

TABLE VIII

LONG AND SHORT-TERM INTERACTION MATRICES FOR IRAN, 1973-1978

LONG-TERM INTERACTION MATRIX									
	QR	AC	IOR	RMC	PIOC	IEE	PHP	PNE	RP
QR	0	0	0	0.	0	0	0	0	-1.5
AC	0	.5	0	.5	0	.2	0	0	0
IOR	0	0	0	.3	0	1.4	1.	0	-.2
RMC	0	2.	.5	0	.3	-.2	-1.	0	1.
PIOC	0	-1.5	-1.	.5	0	-1.5	.1	-.4	-.5
IEE	0	0	0	0	0	0	0	0	0
PHP	-.3	2.	1.	.5	.5	1.5	-.4	0	-.1
PNE	0	0	0	2.	-1.	1.	0	0	2.
RP	.2	.5	-.2	.5	0	.5	.3	0	0

SHORT-TERM INTERACTION MATRIX*

	QR	AC	IOR	RMC	PIOC	IEE	PHP	PNE	RP
QR	0	0	0	0	0	0	0	0	0
AC	0	0	0	0	0	0	0	0	0
IOR	0	0	0	-1.	-.5	1.	1.	-1.	0
RMC	1.	.5	-2.	0	.3	0	-2.	2.	2.
PIOC	-.2	-1.2	-1.	.3	0	-.2	0	.2	0
IEE	0	0	0	0	0	0	0	0	0
PHP	-.05	2.5	1.	-.5	0	.8	0	0	1.5
PNE	0	0	0	2.	0	0	0	0	3.
RP	.5	.5	-1.	.3	0	.2	-1.	0	0

POLICY FORECAST FOR IRAN

PHP	PNE	RP	DATE
.8	.5	.1	1973
.82	.57	.12	1973.5
.83	.67	.15	1974
.85	.76	.18	1974.5
.87	.81	.21	1975
.9	.85	.23	1975.5
.92	.88	.25	1976
.93	.91	.27	1976.5
.95	.93	.3	1977
.96	.95	.32	1977.5
.97	.96	.35	1978

*For details of entries, see Appendix 1.

FIGURE I

Before commencing with a discussion of the forecasts, it should be emphasized that the KSIM methodology is designed to stress the geometry and dynamics of relationships rather than to make numerical predictions. Consequently, forecasts indicate trends rather than precise quantities. The predicted decision making variables are shown in Fig. 1.

The PHP curve indicates that Iran's Preference for High Price is sustained. From an already high level of 0.8 in the first half of 1973, it rose to 0.83 by early 1974. Subsequent increases have been gradual and taper off when approaching 1. This prediction has been born out by Iran's actual price policies. Prior to the 1973 embargo, Iran was among oil producers demanding a greater than 50% increase in oil prices in the October negotiations with international oil companies. Following the oil shortage caused by the 1973 embargo, Iran auctioned a portion of its oil for the highest price yet obtained for a barrel of light sulphur crude: \$17.40, a substantial increase over the previous price of \$4.90 to \$5.25 per barrel.¹ Iranian officials added that the price of oil would henceforth be based on market action.²

¹New York Times. December 16, 1973

²Interview with Prime Minister Hoveida. New York Times. November 12, 1973.

However, the Shah of Iran commented that the price of \$17.40 could not remain the permanent market price.

At the December 1973 OPEC Conference, a general need to stabilize spiralling oil prices was discerned. The outcome was a new posted price of \$11.65. It was widely rumoured that the doubling of prices from \$5.11 was instigated largely by the Shah of Iran, who proposed that the price of oil should be linked to prices of other fuels, which were still priced considerably higher than oil.¹

However, following the substantial price increase of 1973, Iranian price policy appeared considerably less hawkish and shifted instead to a general advocacy of moderate price increases.²

Where Iran's "Rate of Production" is concerned, the predictions indicate very gradually increased levels despite Arab pressures to join in an embargo to Israel's allies. Indeed, due largely to Iran's large absorptive capacity for investments, its production policy tends to favour higher rates of production and larger market shares.

¹New York Times. December 25, 1973.

²See Chapter V for details of Iran's price policy.

Dissatisfied with the refusal of the Consortium members to double Iran's 1973 rate of production of 8 million barrels per day over a six year period, the Iranian government nationalized the Western oil companies, giving "full and real control" of the Iranian oil industry to the National Iranian Oil Company.¹

While the international market faced a temporary supply shortage caused by cutbacks in Arab oil exports, Iran continued full production and exports. Iran's production schedule, which had been fixed prior to the embargo, was not altered to take advantage of the supply shortage. However, an increase of 41% over 1972 production was recorded for 1973.² That Iran had not taken full advantage of the short supply to capture vacant market shares can partially be explained by the political constraints of its relations with Arab members of OPEC. Iran reportedly had been pressured by Arab producers to participate in production cutbacks and export embargoes as well as to expel the Israeli trade mission.³

¹New York Times. March 21, 1973.

²Ibid. November 12, 1973.

³Ibid. December 18, 1973.

Failure to respond to these pressures undoubtedly damaged Iranian-Arab relations, and increased Iranian market shares at the expense of the success of the oil embargo would dangerously exacerbate already tense Arab-Iranian relations. In addition, technical constraints limited Iran's ability to immediately increase production to meet demand.

During the 1974-1975 economic recession, all major producers reduced oil production in response to a slackening in demand. Among the top three producers, Iran recorded the lowest decline in production, 11.1% compared to 16.6% for Saudi Arabia and 19.2% for Kuwait for the period 1974-1975.¹

As a non-Arab producer, Iran's "Preference for No Embargo" increases steadily from a level of 0.5 (indicating indifference) in 1973 to a level approaching 1.0 in 1977. The prediction is again supported by actual events. Throughout the embargo, Iran studiously avoided partisanship. While urging the U.S. to adopt a "more even-handed" policy in the Middle-East in favour of the Arabs, and tilting emotionally towards the Arab side in the Middle-East dispute and stressing its Islamic ties with the Arab states, Iran simultaneously resisted joining the

¹North Africa and Middle-East. 1976-1977. p-92

oil embargo, maintained its ties with Israel and the U.S. and publicly suggested an end to the embargo. However, towards the end of the embargo, Iranian concerns over the severity of its international economic consequences were manifested in the increased number of public statements urging an end to the embargo.¹ In part this arose from Iran's desire to dissociate itself from the Arab states and avoid the backlash in public opinion from industrialized countries which were feeling the impact of the oil embargo. Under these conditions, it is fair to say that Iran's "Preference for No Embargo" did increase.

In general, the forecast for Iranian policy preferences appear satisfactory.

¹Interview with the Shah of Iran. New York Times. December 22, 1973; see also interview with the Iranian Ambassador to the U.S., Mr Zahedi, New York Times. December 5, 1973.

SAUDI ARABIA: 1973

As the foremost oil producer in OPEC, Saudi Arabia enjoys a pivotal position in determining OPEC price and production policies as well as one in defining the "oil weapon" among Arab producers.

Quantity of Oil

Among oil exporting countries, Saudi Arabia has the largest reserves and proportionately, one of the lowest rates of production. Its oil reserves are more than twice the size of its nearest competitor, Iran¹, and calculated at 1972 rates of production, Saudi Arabian reserves will take 70 years to deplete, compared to 40 years for Iran.

The petroleum statistics for Saudi Arabia suggest some logical courses of action. Ownership of the world's largest oil reserves will prompt Saudi Arabia towards attempting to capture larger shares of the oil market, while remaining relatively unconcerned about lower per unit prices for its oil. Fear that high oil

¹See Table III, p 91.

prices will steer consumers towards alternative fuels will also play a role in persuading policy-makers to advocate maintaining low prices or reducing those seen as being excessive. This variable is given an initial value of 0.99 indicating the largest quantity of reserves possessed by any member country.

TABLE IX

SAUDI ARABIA: GOVERNMENT OIL REVENUES

Year	Government Oil Revenues (Million US\$)	Percentage Change (over previous year)
1965	655	-
1966	777	18.6
1967	852	9.7
1968	966	13.4
1969	1008	4.3
1970	1202	19.0
1971	2160	80.0
1972	3107	43.9
1973	7200	131.7
1974	29000	302.8
1975	27000	-6.9

SOURCE: North Africa and Middle-East. 1964-1975.

Absorptive Capacity

The main concern of Saudi Arabia and some of its neighbours on the Arabian Gulf centres around the preservation of traditional values in a period of rapid social change. Despite its immense oil wealth, the Saudi population continues to remain relatively poor, enjoying only limited social goods and services. Social change, although encouraged by King Faisal's ascent to the throne in 1964, continues at a moderate pace without benefit of huge infusions of oil wealth to quicken the transformation.

The assumption of power by King Faisal helped bring about far-reaching improvements in the Saudi economy. Economic reorganisation, characterised by astute resource management, transformed the Saudi economy from heavy indebtedness in the 1950s and 1960s to economic power in the 1970s.

Like the United Arab Emirates and Kuwait, Saudi Arabia represents a class of OPEC members characterised by high oil reserves, relatively low rates of production, and large financial reserves.¹ Besides having limited domestic claims upon their oil wealth, these nations are simultaneously faced with internal blockages to the expenditure of their resources. In common with all

¹See Table IX for the size of Saudi Arabian oil revenues.

countries with limited absorptive capacities, they lack social and economic infrastructures capable of productively absorbing additional capital investments. In particular, internal blockages exist in the form of inadequate skilled manpower and administrative talent and limited transportation and port facilities...

Although the proportion of total Saudi government expenditures assigned to development is significant, the sizes of these allocations are deceptive in that these sums frequently fail to be spent in their entirety. Similarly, budgetary allocations always fall short of actual disbursement, again because of the shortage of infrastructural support and administrative inefficiency. Of the expenditures allocated for the fiscal year 1972-1973, only 50% was actually spent.

Heavy government expenditures for development promise the expansion of Saudi Arabia's limited absorptive capacity. Saudi Arabia like

almost all OPEC countries (has) recognised the importance of emphasising the building blocks of a modern economy, by concentrating on the development of modern and adequate infrastructure.... Direct government expenditures will mean continued emphasis on imports for infrastructural development and other forms of investment, in addition to food, and in some cases, military imports.¹

¹US Dept. of the Treasury, "The Absorptive Capacity of OPEC Countries". 1975. p 3.

Even with Saudi Arabia's existing problems, it is estimated that its economy can presently absorb large and costly capital projects as well as military imports that can increase its absolute level of import by 20% to 30% if some bottlenecks to delivery and implementation can be removed.¹

Saudi Arabia's military expenditures fluctuated in the late 1960s but picked up steadily in the early 1970s and climbed astronomically from 1973 onwards. Expenditures on expansion of military capacity will ease to a great extent the pressures of mounting oil revenues. Despite these large expenditures, Saudi Arabia nevertheless enjoys the best balance of payments of all countries.

Due to limited facilities for domestic investments, the bulk of Saudi Arabia's financial surplus has been exported in the form of investments, loans or grants. Of these, large amounts enter the European money and capital markets as well as the United States in the form of investments in American real estate. In addition, several billion dollars have also been invested in U.S. Treasury bonds as of August 1974. Investments in the West are estimated to total 28 billion dollars, of which \$14 to \$17 billion is believed to be in the U.S.² Surpluses have also been exported as loans and aid to the less developed

¹Ibid. p 1.

²US News and World Report. May 30th, 1977.

TABLE X

SAUDI ARABIA: DEVELOPMENT EXPENDITURES AS A
PERCENTAGE OF BUDGETARY EXPENDITURES. 1962-1972

Year	Development Expenditure (m. rials)	Budgetary Expenditure (m. rials)	Percentage (%)
1962	400	-	-
1963	550	-	-
1964	702	2656	26.4
1965	1205	3112	38.7
1966	1402	3961	35.4
1967	1717	5025	34.2
1968	2147	4937	43.5
1969	2570	5885	43.6
1970	2682	5966	45.0
1971	2596	6380	40.6
1972	-	10782	-

SOURCE: North Africa and Middle-East. 1962-1972.

countries. Saudi assistance to the countries of the Middle-East have been variously estimated between US\$2.4 billion (by the World Bank) and US\$2.5 billion (by Middle-East sources). Assistance to other less developed countries amounts to over \$4 billion. Of Saudi Arabia's exported financial surplus, over 60% is concentrated in the West, less than 10% in the Middle-East and the remainder in other less developed countries. The direction of Saudi Arabia's financial outflows is not only indicative of its limited domestic absorptive capacity but also of its political orientations.¹

Saudi Arabia's embarrassingly large oil wealth has made it particularly susceptible to Western charges of hoarding the world's financial resources without adding to its productive capacity. Without an adequate infrastructure to absorb large expenditures, Saudi Arabia is increasingly concerned over the lack of compensatory financial flows. The problem suggests two solutions: reducing petroleum exports to dampen revenue increases, or reduction of prices to achieve the same effect. As the former is politically difficult to implement, Saudi Arabia has availed itself of the second option. The large increase in oil revenues from 1971 onwards suggests that Saudi Arabia's problem with increasing surplus revenues will

¹Choucri, International Politics of Energy Interdependence. p 60.

TABLE XI

SAUDI ARABIA: EXPENDITURES ON DEFENCE AS A
PERCENTAGE OF TOTAL EXPENDITURE. 1968-1976

Year	Defence Expenditure (m. rials)	Total Expenditure (m. rials)	Percentage (%)
1968-1969	841	5885	14.3
1969-1970	1743	5966	29.2
1970-1971	925	6380	14.5
1972-1973	1138	10782	10.6
1973-1974	1427	13200	10.8
1974-1975	8813	45743	19.3
1975-1976	23724	110935	21.4

SOURCE: North Africa and Middle-East. 1968-1977.

TABLE XII

OPEC INVESTIBLE SURPLUS
(US\$ million)

Country	1973	1974	1975
Algeria	-870	405	-1990
Ecuador	-40	110	-95
Indonesia	-350	230	612
Iran	1090	10680	9615
Iraq	470	1970	510
Kuwait	1520	7335	7128
Libya	-600	2540	650
Nigeria	260	5220	1905
Qatar	140	1290	1315
Saudi Arabia	3120	20800	20055
U.A.E.	290	4360	4215
Venezuela	-135	3995	1770
Total	4895	58935	45690

SOURCE: U.S. Dept. of the Treasury, "The Absorptive Capacity of OPEC Countries". p A3-A4.

prompt it to lobby for low increases or steady prices within OPEC. However, it is envisaged that the expenditure of large sums upon development will expand Saudi Arabia's presently limited absorptive capacity, enabling it to absorb larger domestic investments. As this condition is gradually realised, pressure will be exerted to increase prices if fiscal problems are anticipated or actually develop.

Curtailement of oil revenues through production cutbacks poses only a facile solution for it raises larger problems, in particular, the antagonising of Saudi Arabia's powerful customers.

Low domestic requirements and large surpluses leave Saudi Arabia with great flexibility in the pricing and production of its oil, and suggests a policy of steady or slowly increasing oil prices, and higher rates of production to dampen price increases. However, the "absorptive capacity" variable does not impact directly upon the political decision to employ the "oil weapon".

As Saudi Arabia's absorptive capacity is limited, the initial value of this variable is given at 0.2.

Foreign Relations: Intra-OPEC Relations

The central concern of Saudi Arabia's relations with other Arab states is the reinforcement of its position of ascendancy in the political, economic and spiritual leadership of the Arab world. The upturn in Saudi Arabia's fortune is the direct result of the spectacular increase in petroleum prices and revenues. The use of financial disbursements as the economic means to secure political power has been a particularly successful strategy in its dealings with economically dependent front-line Arab states, espacially Egypt.

Like all conservative Arab states, Saudi Arabia views the existence of radical regimes as a threat to the well-being of its monarchical system. Saudi Arabia also fears the susceptibility of the region to Communist expansionism. Lacking both manpower and military capability, Saudi Arabia's close ties with the United States are perceived not only as a guarantee of stability and defence of the status quo in the Middle-East but also as indispensable to its economic and military expansions.

In the Arab world, Saudi Arabia's role in assisting the Palestinian cause emerged clearly following the Arab defeat in the 1967 war with Israel. Opposing the Iraqi and Algerian proposal for a three month stoppage of oil exports from Arab states, Saudi Arabia, Kuwait and the then conservative Libyan monarchy instead advocated

the maximisation of oil revenues and their use in the support of front-line Arab states to regain lost territories. The proposal by the conservative states was adopted by OAPEC. It is important to note that besides functioning as an agency for cooperation in oil affairs, OAPEC provides a forum for defining the political strategies for oil.

Saudi Arabia's rise in prominence as a leader in the Arab world was achieved very much at the expense of Egyptian importance. The priorities of Egyptian foreign policy under President Nasser -- the fostering of Arab nationalism, Arab victory over Israel and Arab socialism under Egyptian leadership -- was widely resented by the more conservative Arab states. In particular, Egypt's championing of Arab socialism brought it into deep ideological conflict with Saudi Arabia¹. Saudi relations with Egypt further deteriorated when, in 1958, President Nasser accused King Saud of plotting his assassination. Relations again deteriorated when Egypt and Saudi Arabia backed opposing sides in the Yemeni civil war.² However, the economic costs and humiliating defeat in the 1967 war blunted Egypt's leadership of the Arab

¹ Congressional Quarterly Inc., Middle-East: US Policy, Israel, Oil and the Arabs. (Washington, DC. Congressional Quarterly Service. 1974). p 63.

² Ibid. p 66.

world and placed it in a position of economic dependence upon the conservative states of Saudi Arabia, Kuwait and Libya. In return for financial assistance, the bulk of which was provided by Saudi Arabia, Egypt agreed to moderate its unmitigated dominance over Arab affairs, to disperse its political influence and to consider the interests of politically less prominent Arab states. Professor Choucri defines the most significant outcome of the Egyptian-Saudi exchange as the depoliticisation of the Arab community building effort, thus allowing for new channels of communication and cooperation among Arab states. The new mood permitted the development of pragmatic strategies in dealing with Israel as well as a new basis for the definition of the "oil weapon". Unlike what was referred to as the politics of symbolism practised by President Nasser, the new flexible pragmatic approach solicited greater overall support from each Arab state. Grounded in the new realities reflecting the shift in power to a number of previously less powerful states and taking into account the diverse national interests, the new approach ensured a more realistic form of cooperation, balancing a concerted Arab strategy towards Israel and the West with an acknowledgement of political sovereignties and diversities.¹

¹Choucri, International Politics of Energy Interdependence. pp 91-97.

The course of pragmatic politics and the ascendancy of the conservative wing of the Arab world was further assured with the death of President Nasser in 1970.

The defeats of 1956 and 1967 reinforced Arab hostilities to Israel's Western allies, especially the United States. The stalemate following the 1967 war was regarded by Arabs as favouring Israel by permitting it to consolidate its occupation of Arab territories. Israeli para-military and civilian settlement of the Golan Heights and the West Bank further aggravated Arab fears.

Hence, Saudi Arabia on assuming a position of leadership, found itself in a difficult situation of furthering its national interests which it perceives as being tied to the well-being of the West and balancing them with a seeming willingness to "stand-up" to the West, in order to blunt criticism from radical regimes and maintain its legitimacy as the champion of the Palestinian cause.

Saudi Arabian relations with Iran pose further problems. Suspicion of the conspicuous expansion of Iranian military capability has to some extent prompted Saudi Arabia to invest heavily in the expansion of its weapons system. While military expansion is in part a move to reduce the predominance of Iranian military power in the region, it is simultaneously a reflection of Saudi Arabia's aspiration to regional military leadership, in

particular of the Arab world, by reinforcing its prestige and ability for regional political control. Thus far however, Saudi Arabia and Iran compete for leadership in mutually exclusive areas. Iran is the undisputed military leader, while Saudi Arabia has had to emphasize economic power in its foreign policy calculations. However, large scale Saudi acquisition of weapons systems and the implications of Iran's financial flows to the Arab states suggest that the areas of competition are beginning to overlap and may pose future problems of strain to relations.

The implications of Saudi Arabia's new role as spiritual, economic and political leader of the Arab world compel it to adopt a "defiant" posture vis-a-vis the West in its petroleum policies. It is inevitable that other Arab states and OPEC members, the majority of which face pressing economic problems, will exert pressure upon Saudi Arabia to increase oil prices, both as a means of securing additional finances as well as furthering the Arab cause. On the use of the "oil weapon", Saudi Arabia is in a less isolated position being able to rely upon support from other conservative states such as the United Arab Emirates and Qatar in the face of pressure from radical regimes. Pressure will also be exerted upon Saudi Arabia, an advocate of low prices, by all OPEC members to restrain production in order to sustain higher prices. Refusal to comply would strain OPEC cohesion and

isolate Saudi Arabia politically and may deprive it of its new found prominence in the Arab world.

Uncertainty in relations with Iran is anticipated to steer Saudi Arabia towards preferring low prices and maintaining a high rate of production as well as large market shares to deprive Iran of additional finances for military expansion and diminish its challenge to Saudi Arabia for the position of regional economic power. Saudi Arabia's inclination to employ the "oil weapon" in a punitive form may to some extent be discouraged by the often predicted role of Iran as an American military surrogate. However, the attendant risks to Iran are enormous, notably the jeopardising of its carefully constructed image in the region as a non-expansionary power. Inevitably, economic gains to Iran by capturing shares of the international market vacated by Saudi Arabia, and higher price opportunities in the face of curtailed supplies, make its non-interference in an embargo situation more plausible. However, the predominance of Iran as a military power cannot be completely discounted in Saudi strategic calculations.

The underlying uncertainties in Saudi Arabia's relations with Iran, and its differences with other Arab states over the definition of the "oil weapon" and price levels indicate slightly strained intra-OPEC relations. The initial value of IOR is given at 0.4.

International Relations: Relations with Major Consumers

Saudi Arabia's conservative outlook and its concern for internal and regional stability, especially from threats of disruption from radical Arab regimes, Iran or Communist intervention, place it in natural alignment with U.S. foreign policy in the region. For Saudi Arabia, the United States represents

a guarantee against forceful expansion of Communist influence, a potential ally against the growth of radical forces in Arab politics, a major supplier of advanced technology and a potential intermediary in any direct conflict with Iran over spheres of influence in the Gulf area.¹

To the United States, Saudi Arabia is seen as a stabilising influence in the region, a possible agent for repairing United States' relations with leading Arab countries and a major actor in any resolution to the Arab-Israeli impasse.²

Japan and Western Europe represent important markets for Saudi oil, another source of manufactured goods and technology and, like the United States, a destination for investment capital. With an economy suffering from limited absorptive capacity, investments in the West provides a secure and profitable long-term solution to the problems of accumulating petrodollars. At the same time, investment

¹Choucri, International Politics of Energy Interdependence. p 127.

²Ibid.

in the West provides a partial reply to the complaints of the lack of compensatory financial flows.

Financial flows to the United States in the form of investments in U.S. Treasury Bonds and American real estate account for several billion dollars of outflows. In addition, \$1.4 billion is committed to the purchase of American weapons systems and another \$6 billion to American directed programmes of military expansion and other development in Saudi Arabia. Loans to Japan constitute \$1 billion to be spread out over a period of five years. In addition to sizeable commitments to the European money and capital markets, Saudi Arabia is spending \$800 million for imports of military goods from France. Of the \$142 billion to be spent over the five years of the existing development plan, a very large portion will be spent in the West for development goods and services.¹

Like Saudi Arabia's financial flows to the Middle-East and Africa, investments in the West should also be seen as an instrument of Saudi foreign policy.² As the repository of large quantities of the world's financial reserves, Saudi Arabia enjoys a measure of maneuverability with regard to the direction of its investments. Financial

¹US News and World Report. 29th August, 1976.

²For an account of the difficulties of estimating financial outflows from oil exporting states, see Choucrist, International Politics of Energy Interdependence. pp 120-121.

flows to the West can be redirected to the Arab and non-Arab developing countries -- the difference in lower financial returns can be compensated with increased political influence. That Saudi Arabia has chosen to direct the bulk of its investments to the West appears to be a conspicuous foreign policy strategy to gradually extend and transform its financial power from the Middle-East region to political power in the West.¹ Already, through financial disbursement to Arab states, Saudi Arabia has secured for itself the pivotal political role in the settlement of the Arab-Israeli conflict. Through its prominence in Middle-East politics, Saudi Arabia has gained international political and diplomatic prestige. Control of enormous oil resources has been used to transform a situation of Arab dependence upon the West for assistance in the settlement of the Arab-Israeli conflict into one of interdependence characterised by high Western dependence on Arab oil. One commentator has described the transformation of Saudi-Western ties as "counter-penetration" of the West.²

¹ See Ali A Mazrui, "The New Interdependence" in Guy F Erb and Valeriana Kallab (eds), Beyond Dependency: The Developing World Speaks Out. (Overseas Development Council. 1975) pp 38-56.

² Ibid.

Although internationally isolated in its support of Israel, the U.S. government appeared satisfied to maintain the post-1967 stalemate. After prolonged debate in the United Nations in the summer of 1973, the United States alone used its veto to prevent the passage of a resolution presented by eight non-aligned members strongly condemning continued Israeli occupation of Arab territory. In retrospect, it is clear that this instance confirmed Arab fears that the United States, in whose hands were placed Arab hopes for a peace settlement, was unwilling to carry out this responsibility. American veto of the resolution contributed to the Arab conviction that only by a renewal of war could the stalemate be broken and the attention of the West be concentrated upon an urgent solution of the dispute.

With hindsight, the expression of Arab economic power in the form of embargoes on oil, price fluctuations, and investment flows, has been used to command the attention of the West to address the Arab-Israeli conflict. Thus far however, neither Saudi Arabia nor all the OAPEC states together have the power to independently address, with satisfaction, these problems. The status of Saudi Arabia in international politics can be likened to that of a powerful pressure group.

In its identification with and support of the Western status quo, we can expect Saudi Arabia to moderate

oil prices, to raise the rates of production to meet demand and to reject the use of oil embargoes as a foreign policy strategy. However, the circumstances between 1971 and 1973 were such that the Arab states grew increasingly impatient with the lack of efforts on the part of the West to end the stalemate with Israel, which they believed to be harmful to the settlement of the dispute and reclamation of Arab territory. Despite the agreement of the Egyptian and Jordanian governments to recognise the state of Israel and to negotiate a settlement, Israel and its American ally appeared determined to maintain Israel's overall supremacy without willingness to make territorial or other concessions necessary to a peace settlement. Consequently, frustrated Arab states can be expected to exercise its oil leverage in prodding the attention of the West to this problem. If pressed, Saudi Arabia would certainly do no less in a future embargo than it did in the 1967 effort.

Growing Arab frustrations with Israeli and American intransigence contributed to creating a mood of confrontation. Consequently, the initial value of the variable "relations with major consumers" is fixed at 0.3 reflecting the strain in Saudi-Western relations.

International Economic Environment and Power of International Oil Companies

These factors are common to both Iran and Saudi Arabia. Accordingly there is no need to elaborate upon them as they have been previously discussed.

The Dependent Variables: Preference for High Price; Preference for No Embargo; and Rate of Production

Large oil reserves, low absorptive capacity and commitment to the maintenance of Western supremacy prompts Saudi Arabia towards preferring steady or slowly rising oil prices. However, its ties with other OPEC members, in particular the Arab states, and strong consumer demand for oil moderates its preference for low prices. The variable PHP is given an initial value of 0.4 on a scale where 0 indicates rejection of high price and 1, a very high preference.

The joint Saudi-Kuwaiti-Libyan proposal to substitute contributions of oil revenues for a three month embargo on oil suggests its opposition to such a strategy. Rejection of participation in an oil embargo is further reinforced by close ties with the United States and ideological commitment to Western supremacy. However, high PNE is balanced by Arab pressure for a demonstration of Saudi independence vis-a-vis the United States in the

settlement of the Arab-Israeli conflict. An initial value of 0.2 is assigned the PNE variable on a scale where 0 indicates total rejection of an embargo on oil and 1, full support.

Curtailement of its rate of production offers Saudi Arabia an alternative strategy to participation in an embargo on oil. Curtailement of "RP" and exports to all consumers allows Saudi Arabia to demonstrate its support of the Arab cause without being compelled to single out its Western allies for punitive measures. In the first half of 1973, this variable is assigned a value of 0.4 where 0 indicates ceasure of production and 1 indicates more than adequate production to meet demand.

TABLE XIII

LONG AND SHORT-TERM INTERACTION MATRICES FOR SAUDI ARABIA,
1973-1978*

	QR	AC	IOR	RMC	PIOC	IEE	PHP	PNE	RP
QR	0	.1	0	.2	0	0	0	0	-1.5
AC	0	.1	0	.5	0	0	.5	0	0
IOR	-.2	2.5	0	-.4	0	.8	.8	-.1	-.4
RMC	0	.5	-.8	0	.2	.2	-.4	2.	.2
PIOC	0	-.5	0	.05	0	-.05	0	0	0
IEE	0	0	0	0	0	0	0	0	0
PHP	-.5	.5	.8	-.5	0	-.6	-.1	0	-.4
PNE	0	.5	-2.	3.	0	-1.	-2.	0	-.4
RP	.5	.2	-.4	.6	0	.8	.2	0	0

SHORT-TERM INTERACTION MATRIX

	QR	AC	IOR	RMC	PIOC	IEE	PHP	PNE	RP
QR	0	0	0	0	0	0	0	0	0
AC	0	0	0	0	0	0	0	0	0
IOR	0	1.	0	-1.2	0	.5	1.5	-.3	-1.
RMC	0	0	-1.5	0	.2	0	-.8	.5	1.
PIOC	0	0	-.5	.2	0	0	0	0	0
IEE	0	0	0	0	0	0	0	0	0
PHP	0	.2	1.5	-1.5	0	.3	.4	1.3	-1.
PNE	0	0	-1.	1.	-.2	0	0	0	-1.
RP	0	0	-1.5	1.5	0	1.5	-.5	-.5	0

For details of interaction entries, see Appendix

TABLE XIV

FORECAST OF SAUDI ARABIAN OIL POLICY, 1973-1988

Date	PHP	PNE	RP
1973	.4	.2	.4
1973.5	.36	.18	.39
1974	.3	.17	.41
1974.5	.22	.17	.45
1975	.12	.19	.54
1975.5	.05	.22	.65
1976	.03	.25	.70
1976.5	.02	.28	.73
1977	.01	.31	.77
1977.5	.01	.35	.79
1978	0	.39	.81

FIGURE II
FORECAST OF SAUDI ARABIAN OIL POLICY, ~~1973~~-1978

Policy Forecasts for Saudi Arabia

The forecast indicates a declining trend in Saudi Arabia's "Preference for High Price". It declines steadily from 0.4 in 1973 to 0 in 1978.

In reality, Saudi Arabia's opposition to high prices became evident only after the four-fold price increase of 1973. Commenting on the price of \$17.40 reached for Iranian crude in an oil auction in December 1973, the Saudi Arabian oil minister, Sheikh Yamani said it should not be taken as the basis for determining new prices and that Arab producers should be "reasonable" in setting new prices.¹ The new price of \$11.65, agreed upon in December 1973, was largely made at the insistence of Iran. At the March 1974 OPEC Conference, when most members pressed for a new price increase, Saudi Arabia threatened to unilaterally lower its own prices, thus stifling those demands.

The lifting of the oil embargo and the slowdown in demand in 1974 strengthened Saudi Arabia's insistence on a price reduction of \$2.50 per barrel for the Arabian light marker crude. The Saudi proposal was vigorously opposed by other OPEC members. They voted instead for an increase in royalty rates on the companies' crude entitlements at the Third 1974 Conference in Quito. At subsequent conferences, Saudi Arabia was successful in

¹New York Times. December 22, 1973.

forcing price freezes by threatening a unilateral price reduction. Due largely to Saudi Arabia's dampening influence, the posted price of \$11.65 established in January 1974 remained in effect until September 1975 despite the efforts of other members to increase prices. The 10% increase in posted prices established in October 1975 was unsuccessfully opposed by Saudi Arabia. At the December 1976 Conference, while most members insisted on a 25% increase, Saudi Arabia urged another price freeze of 6 months in duration. Saudi Arabia later moderated its proposal to a low 5% increase as contrasted to a 10% immediate increase followed by a subsequent 5% in July 1977 favoured by other members.

From the record of Saudi Arabia's price policy, we can deduce a trend away from "high" prices and towards extensions of existing levels and increases of less than 10%.

Saudi Arabia's "Preference for No Embargo" increases steadily from an initial value of 0.2 in 1973 to one near 0.4 in 1978. However, during the crucial 1973.5 to 1974.5 period, its decreasing "Preference for No Embargo" coincided with a decreasing "Rate of Production". The slightly decreasing preference against an embargo, and production slowdown suggest that a definitive Saudi oil strategy had yet to emerge. As late as May 1973, Saudi officials stated their opposition to the stoppage of oil exports as a

political strategy, but reaffirmed commitments to hold steady its rate of oil production until the United States abandoned its support of Israel.¹

Disillusionment with the continued intransigence of the U.S. and Israel to a Middle-East settlement, the outbreak of the October war and the steady pressure exerted by the radical and moderate Arab regimes favourably influenced the Saudi embargo decision.

However, forecasts of increasing Saudi sentiments against production cutbacks and embargoes as the forms of the "oil weapon" are supported by the numerous repetitions of official statements rejecting the use of the punitive "oil weapon" as disruptive to the international economy and facilitating the ascent of the oil self-sufficient Communist bloc at the expense of the West.

The 1973 and long-term projections of disaffection with oil embargoes, high prices and production curtailments as political strategies appear to hold.

¹New York Times. May 16, 1973.

OPEC 1973

The British Petroleum Company Limited's annual statistical review of the world petroleum industry noted that international dependence on Middle-East oil increased sharply since 1969. It reports that 1973 exports from the Middle-East represented 58% of all international oil sales, compared to 50% in 1967. Middle-East exports increased from 9.1 million barrels per day in 1967 to 10.9 million barrels per day in 1972.¹

The Model

The model for forecasting OPEC policies is structured around nine variables. The first three represent the preferred policy options of the most divergent and significant factions in OPEC: that of Iran, Saudi Arabia and the Other Arab faction (consisting of Libya, Algeria and Iraq). While membership in these groups is fluid, the three factions nevertheless represent the radical, moderate and conservative responses to the decisions of pricing, production and the "oil weapon". The fourth variable,

¹New York Times. May 28, 1973.

"Relations with Major Consumers" (RMC) represents the impact of Western consumers, in particular, the U.S., on the other variables. The fifth variable, "Breakup of the Middle-East Stalemate" (BMES) describes the political and military developments in the Arab-Israeli conflict. Like the sixth variable "International Economic Environment" (IEE), the BMES is independent of the variables in this study and hence arbitrarily imposed to reflect forecasts of future developments. The last three factors, the dependent variables, Price, Probability of Embargo and Production Rates remain unchanged in their definitions from the previous two studies of Iranian and Saudi behaviour.

The new variables, the "Iranian", "Saudi Arabian" and "Other Arab" factions and the "Breakup of the Middle-East Stalemate" are further described.

Breakup of the Middle-East Stalemate

The catalyst to the chain of events beginning with production curtailments and culminating in the four-fold price increases was in large measure the Arab-Israeli war. This political climate constitutes the variable "Breakup of the Middle-East Stalemate".

Exasperation with the lack of efforts from the West in pressing Israel to settle the question of occupied Arab territory became intense. The atmosphere of Arab frustration and perceived urgency of the problem provided the catalyst to the definition and implementation of the "oil weapon". Indications of the form of its use became apparent in the first half of 1973. On May 13th, 1973, Colonel Gaddhafi stated that Arab states would not hesitate to use oil as a weapon of self-defence.¹ Two days later, the nature of the "oil weapon" emerged more clearly as Kuwait and the radical regimes of Libya, Iraq and Algeria temporarily halved their oil flow as a symbolic protest against continued existence of Zionist Israel. Iraq, in particular, urged the use of the "oil weapon" against Israel, and Kuwait affirmed its willingness to shut down its pipelines as soon as the battle against Israel commenced.² (At this stage, the term "battle" implied only the use of the "oil weapon"). However, Saudi Arabia opposed the stoppage of oil exports but reaffirmed its stated position that it would not increase its rate of production until the United States revised its policies towards Israel. In the same month, President Sadat of Egypt urged Arab producers to use their oil resources to press the United States into abandoning its support

¹ New York Times. May 14, 1973.

² Ibid. May 16, 1973

of Israel.¹

The four-fold increase in oil prices in 1973 and 1974 can be directly attributed to the oil embargo resulting from the October war of 1973. Any forecast of the embargo and its attendant increase in petroleum prices must hinge upon the ability to predict the outbreak of the war. Although the preparations for war were a well-kept secret between Egypt and Syria, oil related Arab activities indicated a possible break in the Arab-Israeli stalemate. In view of these difficulties, values reflecting political and military developments in the Arab-Israeli conflict will be arbitrarily imposed and incorporated under the variable "Breakup of the Middle-East Stalemate".

The events leading up to the October 1973 war provided OPEC with two most probable courses of action. The first was a "business as usual" option, represented by the policy preferences of Iran and non-Arab OPEC members. The second possible outcome was the use of oil as a political weapon. This option was championed by the radical Arab states and supported to various extents by the other Arab members of OPEC.

The model assumes that three sets of policies are proposed for adoption. Each set of proposals reflect the policy preferences of the three dominant factions in OPEC

¹New York Times. May 16, 1973.

policy-making in 1973: Iran and other non-Arab members of OPEC, the conservative Arab faction led by Saudi Arabia, including the United Arab Emirates and Qatar, and the radical faction consisting of Kuwait and the radical states of Libya, Iraq and Algeria.

The Iranian-led Faction

This group is characterised by members which possess low oil reserves and experience pressing needs for oil revenues. Members of this group include Iran, Ecuador, Nigeria, Venezuela and Gabon. Unlike the Arab members of OPEC, those included in this group share few political and religious ties and no cultural similarities. However, shared structural characteristics provide the only rallying point for them: they seek the highest price possible and enlarged market shares but are reluctant to substantially increase rates of production from their limited reserves. As small producers, and consequently limited to the periphery of OPEC decision-making, these countries are unable to independently sway decisions in their favour, and therefore are dependent upon, and supportive of Iran, whose interests coincide with theirs, to sway OPEC policy.

An economic "mini-boom" characterised by strong consumer demands for petroleum and impending disruptions of oil supply strengthen the demands of the Iranian-led

faction. This variable is given an initial value of 0.6 on a scale of 0 to 1 where 1 represents certainty of adoption as OPEC policy and 0 indicates no possibility of adoption.

The Saudi Arabian-led Faction

The previous section elucidated the policy preferences of Saudi Arabia: a low price for oil and a preference for maintaining production rates instead of engaging in an embargo on oil sales to specific Israeli allies. However, the previous section also elucidated the impingement of other factors, primarily the pressures exerted upon Saudi Arabia by other Arab states to adopt a more radical version of the "oil weapon", causing it to reluctantly abandon its previous preferences.

Increasing Arab hostility to the United States and pressures on Saudi Arabia to conform to the confrontational tactics of the other Arab states reduce the potential, starting value of the Saudi-led faction to 0.3.

The Other Arab Faction

The second option, to use the "oil weapon" was championed by the Arab members of the Organisation of Petroleum Exporting Countries. The unifying rationale for the petroleum policies of this group is Israel. Unlike the first group, the varying political orientations,

national interests and sensitivities of this group make it a far more complex entity.

The role of the radical regimes in OPEC decision-making appears to be that of a pressure group. Due to their limited petroleum reserves and comparative ideological isolation in the Arab world, Algeria, Iraq and Libya can neither individually nor collectively determine decisions. Their impact upon Arab petroleum strategy appears to be exerted by threatening to undermine the leadership position of conservative regimes through preemptive action, thereby goading the conservative regimes into adopting strategies incorporating a compromise between conservative and radical approaches. When Egypt ceased its ideological confrontation with other Arab states, the radical regimes, in particular Libya picked up and expanded upon radical rhetoric and political symbolism. Under Colonel Gadaffi, Libyan oil revenues have been generously expended upon a number of Arab causes and the settlement of the plight of the Palestinian people is elevated to high national priority. Like Libya, Iraq is critical of the leadership of the Arab states by the conservative regimes and is also in the forefront of states opposed to the existence of Zionist Israel. Algerian radicalism on the other hand is more international than regional in scope. Its primary interest appears to be the restructuring of international economic

relations with the Palestinian cause assuming only secondary importance. Algeria's seeming ability to motivate support from leaders of other developing countries may, to some extent, explain its tendency to stray away from the concerns of the Middle-East, an area of apparently greater immediacy for the other Arab states. Nevertheless, these radical states do share a set of common oil strategies to deal with the Middle-East conflict. From past statements and actions, it is possible to deduce preferred courses of action: unlike the conservative states, the radical regimes appear more willing to adopt a confrontational posture vis-a-vis the developed countries and in particular, the United States. They therefore have a greater propensity to use stronger forms of the "oil weapon" -- oil embargoes, high prices and low rates of production. However, it would be misleading to believe that ideological cohesion inevitably contributes to a concerted approach. The most striking example to the contrary is found in Iraq's tendency to effect minor price cuts in defiance of the other members to bolster prices. In 1973, Iraq denounced the decision of OAPEEC members to reduce production, claiming that this would have a punitive effect upon Western Europe which had been supportive of Arab states. Similarly, during the 1973-1974 oil embargo, Libya and Algeria surreptitiously continued

oil exports in order to accomodate aid commitments to Syria and Egypt and finance national development.¹ These instances demonstrate the intrusion of other factors: the most significant being perceived national interests.

The role of Kuwait in Arab and oil politics is less intensively studied and understood. Because its structural and political characteristics approximate those of Saudi Arabia, it is frequently thought of as a Saudi ally, in the same manner as the United Arab Emirates. However, its financial disbursement policy, which concentrates on regional development in the Middle-East rather than heavy investment in the West, and its willingness to use oil production curtailments and high prices in aiding the Palestinian cause, suggest Kuwait's political orientations are much closer to the radical regimes, especially Algeria's than they are to Saudi Arabia's. Because the similarities of Kuwait's economic and political oil policies approximate those of the radical regimes, it will be included with these in the following analysis.

Frustration and anger with the United States contribute to a general Arab mood of confrontation and strengthen the position of the Other Arab faction. This variable is given an initial value of 0.5.

¹New York Times. December 29, 1973.

Forecast of OPEC Policy: 1973-1978

The six factors determining OPEC policies are:

(1) the policy preference of Iran and non-Arab members which has an initial value of 0.6 (2) the policy preference of Saudi Arabia with an initial value of 0.3 (3) the policy preference of radical Arab states which is assigned an initial value of 0.5. The values of the above three variables span a scale of 0 to 1 where 1 represents the certainty of adoption as OPEC policy and 0 represents no possibility of an option being adopted by OPEC. The fourth variable "Relations with Major Consumers", weakened by continued American support for Israel, is valued at 0.4 initially where 0 denotes cessation of diplomatic relations and 1 very harmonious ties. The values of the fifth variable, "Breakup of the Middle-East Stalemate" is imposed on the study in a manner reflecting the political developments from 1973 to 1978. The arbitrary imposition of values was undertaken as the outcome of "BMES" is not affected by other variables in the study. The value of the sixth variable, "International Economic Environment" is also arbitrarily imposed for the same reasons.

The dependent variables are (1) Price, which is affixed an initial value of 0.14. This value is calculated from the assumption that 1 represents US\$20.00 or the maximum price which oil can fetch without calling in substitutes. The prevailing price of \$2.74 represents a

fraction of 0.14 of the maximum. The second dependent variable is the "Probability of an Embargo". It is given an initial value of 0.6 where 0 stands for no possibility of an embargo and 1 for complete certainty of its occurrence. The third dependent variable is the "Rate of Production", which has an initial value of 0.78 on a scale of 0 to 1 where 0 denotes minimum OPEC production, that is the 13.14 million barrels per day remaining if all Arab producers completely stopped production. 1 represents the maximum OPEC output of 35.95 million barrels per day or 15% in excess of OPEC's pre-embargo 1973 production levels of 30.95 million barrels per day.

In the following Tables (Tables XV and XVI), the notation I stands for the influence of the Iranian led non-Arab faction in OPEC, SA denotes the influence of the Saudi Arabian led conservative faction including the United Arab Emirates, and OA indicates that of Kuwait and the radical regimes of Libya, Iraq and Algeria. RMC stands for "Relations with Major Consumers", BMES for "Break-up of the Middle-East Stalemate" and IEE for the "International Economic Environment". The dependent variables are "Price" (P), "Probability of Embargo" (PE) and "Rates of Production" (RP).

TABLE XV

LONG AND SHORT-TERM INTERACTION MATRICES FOR OPEC 1973-1978 *

Long-Term Interaction Matrix ()

	I	SA	OA	RMC	BMES	IEE	P	PE	PR
I	0	-.5	.5	-.2	1.0	.5	-.2	1.2	-.3
SA	-1.0	0	-.3	1.5	-2.0	-.1	1.0	0	.8
OA	.5	-1.0	0	-.3	2.0	.3	0	0	-.5
RMC	1.0	2.0	-2.0	0	-1.2	.2	-.5	-2.0	.3
BMES	0	0	0	0	0	0	0	0	0
IEE	0	0	0	0	0	0	0	0	0
P	.5	0	1.1	0	.6	.4	.4	.3	-.1
PE	-.8	-2.5	1.0	-3.0	1.5	0	0	0	0
PR	.3	.6	.5	0	-.6	.5	.3	-1.2	0

Short-Term Interaction Matrix ()

	I	SA	OA	RMC	BMES	IEE	P	PE	PR
I	0	-.2	2.0	0	2.0	1.0	.4	.5	-.1
SA	-2.0	0	-3.0	1.0	-3.0	-1.0	0	-2.0	-1.0
OA	2.0	-.5	0	-.3	3.0	1.0	.4	.2	-.5
RMC	-1.5	-2.0	-3.0	0	-3.0	0	-1.5	-3.0	1.0
BMES	0	0	0	0	0	0	0	0	0
IEE	0	0	0	0	0	0	0	0	0
P	2.5	1.0	3.0	-.1	3.0	.5	1.6	2.5	.5
PE	-.3	-1.0	3.0	-1.0	3.0	1.0	.5	0	0
PR	1.0	-1.5	-3.0	.5	-3.0	.5	.4	-3.0	0

* See Appendix 3 for details of interaction entries.

TABLE XVI

FORECAST FOR OPEC: 1973-1978

Date	I	SA	OA	RMC	BMES	IEE	P	PE	PR
1973	.6	.5	.4	.6	.6	.6	.14	.6	.6
1973.5	.8	.09	.71	.03	1.	1.	.6	.85	.29
1974	.84	.03	.77	0	1.	.4	.74	.89	.22
1974.5	.74	.22	.59	.06	.6	.3	.74	.77	.49
1975	.63	.52	.4	.23	.4	.3	.74	.56	.68
1975.5	.53	.73	.25	.45	.3	.35	.74	.32	.8
1976	.49	.81	.2	.57	.3	.35	.74	.19	.85
1976.5	.4	.89	.11	.72	.2	.35	.74	.06	.9
1977	.38	.91	.09	.77	.2	.4	.74	.02	.92
1977.5	.48	.86	.20	.65	.4	.4	.85	.06	.88
1978	.51	.84	.22	.62	.4	.4	.88	.06	.88

FIGURE III

PROJECTED OPEC POLICIES FOR THE RATE OF PRODUCTION,
PROBABILITY OF EMBARGO AND PRICE: 1973 to 1978

FIGURE IV

RELATIVE STRENGTHS OF THE SAUDI, IRANIAN AND OTHER ARAB
FACTIONS IN THE BREAKUP OF THE MIDDLE-EAST STALEMATE

FIGURE V

COMPARISON OF PROJECTED AND ACTUAL PRICE DEVELOPMENT

FIGURE VI

COMPARISON OF PROJECTED AND ACTUAL
DEVELOPMENTS IN THE RATE OF PRODUCTION

The projections in Figure III demonstrated the coincidence of a rapid increase in price, a lowering of the rates of production and a large increase in the probability of an embargo with the outbreak of the October 1973 war. To a large extent, the military and political climate in the Middle-East determined the dramatic behaviour of the "P", "PE" and "PR" variables in the second half of 1973 and the first half of 1974. The return to normalcy, represented by the declining values of BMES after 1975, significantly reduced the probability of another embargo on oil, increased the rate of production and stabilised prices. However, when the values of BMES was defined to increase again after 1977, PE increased slightly, RP dipped and prices, which had been stable, increased significantly in response to the change in political climate.

Figure IV demonstrates that the ascendance of the radical OA faction and the decline of the conservative SA faction also coincided with the outbreak of the October war in the second half of 1973. Consequently, conservative oil policies were abandoned, and the radical version of the "oil weapon" was adopted for that brief period. Radical oil politics, characterised by the curtailment of oil supply, and high prices strengthened the Iranian faction's preferences for larger market shares and higher prices. The easing of military tension caused the decline of the radical "OA" faction and the resumption of conservative oil policies. Hence a high value in

the variable "BMES" can be seen as a catalyst to the adoption of radical oil policies, and a low value denotes its declining significance in the influence of OPEC policies.

In Figures V and VI, projected values for the "P" and "RP" variables were converted into figures denoting dollars per barrel and million barrels per day respectively. The forecasted price trends in Figure V approximate actual developments. However, the predominance of political variables distort sensitivity to non-political variables, causing problems in forecasting the more subtle price increase in the 1973 to 1974 period. Figure VI demonstrates the gulf between projected and actual figures on OPEC's rate of production. The problem also arises from the weight of political variables which exert strong impacts upon production rates during periods in which political factors do not predominate.

On the whole, projections for OPEC policy have been satisfactory. We have been able to forecast with a fair degree of accuracy the probability of an embargo in 1973 and 1974, a decline in the rate of production (although the projected production rates were vastly exaggerated when compared to actual developments) and a reasonably precise forecast of price trends. In addition, the causal relationship between dominant factions and types of OPEC policy has been demonstrated. In particular,

the ascendance of the radical "OA" faction predicts to high prices, higher probabilities of embargoes and output restrictions, and conversely, the ascendance of the conservative SA faction anticipates the adoption of conservative oil policies characterised by lower prices and very low probabilities of embargoes or production restrictions.

CHAPTER V

POST 1977

The second forecast will be based upon the events of the post-1977 period. Like the previous studies, it will also attempt to identify the policies of Iran, Saudi Arabia and that of OPEC as a whole.

Price Developments

OPEC's official price levels, which had remained almost constant since its inception in 1960, rose moderately in 1970 and maintained a steady but gradual increase until September 1973. From September 1973 to January 1974, prices for the Arabian light marker crude increased from \$3.07 per barrel to \$11.65 per barrel, an increase of 280% in four months. However, the OPEC price declined in January 1975 by 40¢ to \$11.25 per barrel.

The event of the sudden price explosion in 1973 coincided closely with political developments in the Middle-East. At the OPEC Conference in Vienna in September 1973, members sought to negotiate with oil companies for a

sizeable increase in the posted price. Negotiations between companies and governments, which began on October 8th, proved difficult as the positions of both sides were far apart, with governments demanding a 70% increase in posted prices, but companies offering only 20%. Before both sides were due to adjourn their negotiations, the Arab-Israeli war of 1973 had broken out. The producer-governments abandoned negotiations and unilaterally increased the Arabian light marker crude price by 70% from \$3.01 to \$5.12 per barrel. Libya, taking advantage of its proximity to European markets and the quality of its crude, increased prices by 94%, from \$4.60 to \$8.92 per barrel. Both the size of the October increases and the fact that they were unilaterally made were unprecedented, marking the total transfer of control from the companies to the host governments after a transitional three and a half years of negotiated prices.

Shortly after the outbreak of the October war, members of the Organisation of Arab Petroleum Exporting Countries (OAPEC) decided to use their "oil weapon" in support of Egypt and Syria. With the exception of Iraq, OAPEC members decided to initiate 5% cumulative monthly cuts in oil production from the levels of September until Israel was forced to withdraw from Arab territories occupied since 1967 and the "restoration of the rights of

Immediately upon the imposition of 5% production cutbacks, decreases in output escalated rapidly. Within days, all Arab producers, including Iraq, placed embargoes on oil shipments to the United States and the Netherlands. In addition to reductions for October, Saudi Arabia and Kuwait also incorporated the 5% cutback scheduled for November in their initial cutback. Irritated by the lack of response from the West, the Arab producers decided in November to reduce output across the board by 25% of the September level and gave notice of a further cut of 5% in December. However the cutback turned out to be larger than planned, and by mid-November, output in Saudi Arabia declined by 30% and that in Kuwait by 40%.¹

With the approach of winter and an oil shortage which was just becoming apparent, cargoes of short-haul Algerian and Nigerian crude were sold for as much as \$16 per barrel. In December 1973, the National Iranian Oil Company auctioned its crude entitlement for \$17.40 per barrel.

In the face of variations and sudden increases in price levels, both the OPEC Economic Commission and oil companies suggested that no changes in the official price be made before the market stabilised. However, at the December meeting of the Gulf producers, the price of crude was officially increased by nearly 130% from

¹Ibid. p 88.

\$5.11 to \$11.65 per barrel, largely at the insistence of the Shah of Iran. The Libyan price was then raised from \$8.92 to \$15.76 per barrel.¹

However, at the OPEC Conference in January 1974, the full extent of Saudi Arabia's opposition to new price levels became obvious. Nevertheless, members endorsed the new price levels and agreed to a three month price freeze. At the following Conference in March 1974, most members expressed desire for a further price increase. But as Saudi Arabia threatened to unilaterally lower its prices, a compromise decision was reached to freeze prices again for another quarter.

Simultaneously, members of OAPEC decided to lift the embargo to the U.S. when its Secretary of State arranged a disengagement of Egyptian and Israeli forces. The resumption of exports to the United States was accompanied by the restoration of production to pre-September levels. Saudi Arabia announced that it would raise its output to levels slightly above those of September 1973.

A slackening of demand became evident in February and market prices weakened in the following months. Various members made adjustments to their asking prices.

The situation of excess supply facilitated the Saudi call for the adoption of lower prices. The extent of the Saudi preference became evident when its oil

¹Ibid.

minister, Sheikh Yamani, asked for a price reduction of \$2.50 per barrel for the Arabian light marker crude. When the third OPEC Conference of 1974 was held in Quito, other members vigorously resisted the Saudi proposal and instead favoured the adoption of the slightly higher price suggested by OPEC's Economic Commission. Despite the repeated Saudi warnings to unilaterally lower its price, OPEC decided (with the dissent of Saudi Arabia) to raise the royalty rate on the companies' crude entitlement (known as equity crude) from 12.5% to 14.5%.¹ The Conference ended in stalemate over the pricing question.

In 1974, a dual pricing system emerged on the international crude market. Participation agreements concluded in 1974 increased the proportion of government's participation crude. Participation crude was either sold on the market by governments at prices closely approximating the official OPEC price or sold to companies at either 93% or 94.8% of the posted price. Hence a dual price system emerged where companies bought and sold their crude to third parties at average prices well below those demanded by governments in their direct sales. The lower prices asked for by companies undermined not only state prices but prevented government auctions of their oil, enabling the companies to make large profits.

¹Ibid.

At OPEC's fourth Conference in 1974, members addressed the dual price problem by affecting a 3.5% increase in the government take through increasing both the royalty and tax rates on equity crude. These prices were designed to increase government revenues at the expense of the profits of the oil companies, and to narrow the margin between crude prices charged by governments and companies. At the OPEC Conference in February 1975, the nine month price freeze had already come under pressure, as the result of the devaluation of the dollar in early 1975. Kuwait and other producers suggested the substitution of a different unit of account for denominating oil prices. Simultaneously, suggestions were made for the institution of a programme of joint production rationing in order to support prices against continued fall in demand. However, the Conference failed to produce a decision.

At the Conference in Libreville in June 1975, Saudi Arabia, with the tacit support of Venezuela, managed to postpone until the expiry of the price freeze in September 1975 the demands of Algeria, Iraq and Nigeria for immediate implementation of the IMF's Special Drawing Rights as OPEC's unit of account for oil prices. Other members made it clear that upon the expiration of the price freeze they would demand a significant price increase of approximately 35% and thereafter the indexing

of the official OPEC price.

Between June and September 1975, the expected upturn in demand failed to materialise. At the September Conference, Saudi Arabia, supported by Kuwait, the United Arab Emirates and Qatar, favoured a three month continuation of the price freeze. On the other hand, Iran, supported by Iraq, Nigeria and Libya, proposed an increase of at least 20%. After difficult negotiations, OPEC agreed to a 10% increase in the 93% of posted prices that constitute the sale price of host government marketed crude and a further nine month freeze. Neither the issue of substituting SDRs for U.S. dollars as the unit of account for denominating oil prices nor indexation were seriously discussed.

Following the Conference it became apparent that the unilateral price adjustments members made to certain crudes were below the 10% recommended. In particular, price increases to light crudes were significantly below 10%. It was obvious that light crudes had been overpriced.

In the meantime, heavy crudes, which had not undergone price adjustments to reflect lower demand, came under pressure. However, by April 1976, the problem of an excess of heavy crude supply was partly obliterated by an upturn in demand. At the next Conference, in May 1976, in Bali, OPEC's attention focussed on new price levels. Kuwait, Qatar, Abu Dhabi and Algeria, led by

Saudi Arabia, opposed any increase and were able to overcome the demands of Libya, Iraq and Nigeria (which were enjoying limited support from Iran) for a price increase of 5% to 10%. As no agreement was reached with regard to new price levels, the price freeze continued.

At the OPEC Conference of 1976 at Doha, Qatar, the advocates of new price increases, which had been suppressed in the face of adamant Saudi opposition, emerged stronger. The strongest price increase advocates were Libya, Venezuela and Algeria, which, led by Iran, demanded a 25% immediate increase. Although it was understood that other OPEC members, with the exception of Saudi Arabia and the U.A.E., were also in favour of a price increase, they were however less vocal. Iran, which had previously mentioned an acceptable increase of 40%, later reduced its asking figure to 25%, and softened further in negotiations, settling for a moderate 15%.¹ Saudi Arabia, which originally proposed another price freeze of six months in duration, later moderated its opening position to a low increase of 5%. Again, the Saudi justification for its position was the desire to avoid jeopardising the tenuous economic recovery in the West. Saudi Arabia's proposition for a low price increase was supported by Indonesia and the U.A.E.

¹New York Times. December 17, 1976.

As the bargaining between the high, moderate and low price factions proved to be extremely difficult, the OPEC rule of unanimity before a joint decision was bypassed and the Conference emerged with two decisions. Saudi Arabia and the U.A.E. agreed to raise prices by only 5% to remain in effect until the end of 1977. The remaining eleven members agreed to raise prices by 10% on January 1, 1977 and by another 5% on July 1, 1977.

International Economic Environment.

The four-fold increase in oil prices and the uncertainties caused by the oil embargo in 1973-1973 did much to contribute to the international economic downturn which became more apparent towards the last quarter of 1974. The economies of the industrialized nations were already unbalanced by inflation when oil prices were quadrupled. Instability was severely aggravated by the OPEC oil price decisions, and the moderate boom evident in the short period before 1973 turned into an economic recession. Developed countries and non-oil developing countries alike faced problems of rapid inflation, declining gross national product, mounting foreign debts, unemployment, balance of payments difficulties and currency instabilities.¹

¹See New York Times, December 19, 1976, for effect of oil price increases on the developed, under-developed and oil exporting economies.

However by mid-1975, an overall strengthening trend could be detected in the current accounts of developed countries. At the end of the first quarter of 1975, the economies of the U.S. and Japan began a hesitant recovery. The process was repeated for Germany in mid-year and, by the fourth quarter of 1975, an upturn in both industrial production and orders was shown for most OECD members. By mid-1975, OECD import demand began to revive and a rapid expansion of their exports to OPEC and Comecon countries was initiated.¹

However, the economic downturn of 1974 and 1975 had not left OPEC unaffected. Statistics published in June 1975 in the British Petroleum Company's annual review of the world oil industry showed that world oil consumption (including the communist bloc) in 1974 (the first full year following the 1973 price increases) totalled 2,743 million tons, compared with 2,776 million tons in 1973 or a drop of 1.2%. The decline in consumption in 1974 was the first recorded since the publication of the statistical review in 1956 and compares unfavourably to average annual growth rates of 6.8% since 1964.² However, the 1974 rate of consumption was even lower when

¹World Financial Markets, January 1976, p 4.

²Keesing's Contemporary Data, October 5, 1975, p 27349.

consumption in the Communist countries (which increased by 7.7% in the Soviet Union, 4.7% in Eastern European countries and 1.7% in the People's Republic of China) was excluded. After adjustments for consumption in the Communist bloc were made, consumption declined by 2.9% in 1974.¹

According to OPEC estimates, total OPEC exports declined by 2.4% while export earnings increased from \$22,800 million to \$88,000 million in 1974. The disequilibrium in market forces in 1974 gave rise to predictions of a decline in the OPEC official price. By July and August 1974, oil supply was estimated to be outstripping demand by between 1,500,000 and 3,000,000 barrels per day. The decline in output was absorbed by production cutbacks in Libya (of 29.9%), in Kuwait (of 17.3%) and in Venezuela (by 11.6%). On the other hand, exports increased in Nigeria by 13.3%.²

Despite the minor upturn in the economies of the OECD oil consuming countries, the general decline in petroleum exports from OPEC continued into the first half of 1975. Demand for oil in the major oil consuming countries was depressed by various factors including the exceptional mildness of the 1974-1975 winter, the effects of energy conservation programmes, the continuing low

¹Ibid., p 27349 (see Table XVII) ²Ibid.

level of industrial activity and the high stock levels built up by the oil companies since the 1973 embargo.¹ Despite the decline in demand, oil prices were sustained, largely through reductions in output in Saudi Arabia. Saudi Arabia's willingness to absorb OPEC's excess production capacity can be attributed to its mounting oil income and limited domestic absorptive capacity. The "balancing wheel" effect of Saudi production cut-backs permitted members with greater domestic development commitments to minimize their own production cut-backs, thus sustaining high price levels through the first half of 1975. Nevertheless, some downward price adjustments were made, especially by members who charged premiums based on their relative proximity to markets. The move was necessary as premium rates ceased to be a significant factor following the collapse of tanker charter rates.

However, by the first half of 1976, demand and output increased. OPEC output increased by 8.4% over the same period in 1975 and its share of total world production increased 1% to 51% over the corresponding period of the previous year. Major increases in output were made by Saudi Arabia (by 21%), Libya (by 66%), Nigeria (by 20%) and Indonesia (by 19%). Iran, the world's second largest exporter, made only a slight increase in

¹Ibid.

output of 1%.¹

Worldwide economic recovery appeared stronger in the second half of 1976 and was reflected by corresponding increases in demand for oil.

The value of this variable is imposed on the model to reflect projected developments in the international economy. It is assigned an initial value of 0.55 on a scale where 0 represents economic depression and 1, an economic boom.

¹Globe and Mail, October 27, 1976.

TABLE XVII

OPEC CRUDE OIL PRODUCTION

(Million barrels per day)

	1965	1973	1974	1975	1974-1975 (% change)
Saudi Arabia	2.210	7.612	8.620	7.220	-20.55
Kuwait	2.335	3.023	8.620	7.220	-23.15
Iran	1.910	5.895	6.065	5.395	-11.1
Iraq	1.315	2.020	1.975	2.230	12.8
Abu Dhabi	0.280	1.305	1.410	1.400	-0.6
Qatar	0.235	0.570	0.520	0.435	-15.8
Libya	1.225	2.180	1.525	1.490	-2.2
Algeria	0.575	1.095	1.040	0.965	-7.2
Venezuela	3.505	3.460	3.065	2.410	-21.3
Nigeria	0.275	2.055	2.260	1.785	-20.9
Indonesia	0.485	1.335	1.395	1.315	-5.9
Ecuador	0.010	0.240	0.175	0.160	-9.0
Gabon	0.025	0.162	0.200	0.208	0.4
Total OPEC	28.81	30.965	30.975	27.095	-12.0

SOURCE: North Africa and Middle-East. 1976-1977, p 92.

IRAN

Since 1973, Iran's co-equal position with Saudi Arabia in OPEC politics has suffered a minor decline. In large measure, this is due to Saudi Arabia's deliberate expansion of its links of interdependence with the developed countries and its influence over certain developing countries. The former ties have been achieved by the adoption of "moderate" oil policies and the latter through dispersal of economic assistance. Both strategies have enormously increased Saudi diplomatic prestige and political influence within OPEC and internationally. This factor in conjunction with Saudi Arabia's production of nearly one third of OPEC's oil propels it into a position of dominance in OPEC. Although some of this predominance was achieved at the expense of Iran, the latter nevertheless continues to occupy an important position in OPEC.

Quantity of Oil

Iran ranks third after Saudi Arabia and Kuwait in the quantity of oil reserves it possesses. At its 1975 levels of production, Iranian oil fields will be depleted in 33 years compared to 101 years for Kuwait, which has reserves approximately 10% larger. The rapid rate of

3

production in Iran suggests that conservation is not a priority in its oil policy, but instead that the rate of oil production will be subordinated to the fiscal needs of development and military build-up. The "quantity of reserves" variable will sway Iranian oil policy towards a sustained high rate of production and market shares and towards the highest price attainable.

Absorptive Capacity

Iran's absorptive capacity, although significant, was comfortably met by oil revenues especially between the years 1970 to 1976. In particular, after the four-fold price increase of 1973 and 1974, Iran, along with other major oil exporters, became a net exporter of capital. However, it is anticipated that Iran's heavy commitment to development and military build-up will greatly deplete its surplus capital and, by 1977, Iran will revert to being a net importer of capital.¹ The U.S. Treasury reported that Iran's investible surplus declined from US\$10.7 billion in 1974 to US\$4.5 billion in 1975.² The revaluation upwards by 119.2% of financial allocations

¹US Dept. of the Treasury, "The Absorptive Capacity of OPEC Countries". p 24.

²New York Times. February 3, 1976.

to the Fifth Development Plan after only seventeen months in operation is indicative of Iran's large capacity for additional capital investments. The Iranian Minister of State for Planning and Budget, announced that Iran experienced a budget revision deficit of US\$2.4 billion for the year 1976-1977. This was attributed to the decline of oil revenues.¹ Iran's recent borrowing of US\$4 billion to meet its balance of payments problems is widely interpreted as a sign of growing financial difficulties and gave rise to concerns over Iran's future ability to meet its extensive bi-lateral and multi-lateral aid programs and domestic commitments. Iran's capital exports in the form of investments and aid amounted to 176.5 billion rials (US\$12 billion) in 1975-1976 but decreased to 105.9 billion rials (US\$7.3 billion) in 1976-1977. This represented a decline of 40%. However, Iran's Euro-currency bank credit, which rose from US\$335 millions in 1972 to US\$722 millions in 1973 dipped to 115 million in 1974 and rose again in 1975 to 315 million.² The fluctuations in indicators suggest that a situation of financial difficulty has not yet definitely emerged. However, Iran's monetary reserves are expected to be steadily eroded and from 1977 onwards, its absorptive capacity will again outstrip Iran's independent ability to meet its requirements.

¹ New York Times. February 4, 1976.

² Morgan Guarantee Trust Company: World Financial Markets. January 21, 1976. p 14.

However Iran's financial difficulties has not curbed its arms purchases. Through a series of barter or "parallel" arrangements with international oil companies at discounted prices, Iran has been able to exchange oil for armaments. An arrangement between the National Iranian Oil Company and Ashland Oil Incorporated yielded US\$3.8 billion for the purchase of 160 General Dynamics F-16 fighter planes. Sales to New England Petroleum Company of 100,000 barrels of oil per day for five years will finance the construction of a US\$2.1 billion naval base at Chah Bahar. Other such contracts have been concluded with German, French and Japanese firms in return for the construction of desalination plants and nuclear energy facilities. In 1978, it is anticipated that 300,000 barrels of oil per day or 5.6% of Iran's total oil exports will be exchanged in this manner.¹

The implication of increased absorptive capacity and inadequate resources for production and price policies during periods of slack demand is obvious. Despite depleting reserves, production levels will be maintained or increased to meet the needs of military expansion. The perceived importance of immediately increasing Iran's military capabilities override concerns for low per unit returns from oil sales. During periods of sluggish demand for oil, Iran will pursue a policy of

¹Business Week. February 20, 1978.

expanded market shares and price discounts if necessary, to secure immediate additional revenues. However, should demand for oil strengthen, price discounts will be eliminated but Iran will continue an aggressive policy for market shares to secure higher total returns.

As Iran is already facing financial difficulties, the absorptive capacity variable is given a high value of 0.9 on a scale where 1 represents inadequate resources to meet commitments.

Intra-OPEC Relations

Relations between Iran and Arab OPEC members deteriorated in 1973 and 1974 following Iran's continued oil exports to those countries against which the Arab producers had directed an embargo on oil. However, relations assumed an apparent amiability until the December 1976 OPEC Conference in which Saudi Arabia threatened expansion of its production capacity to sustain a low price increase of 5%, thereby diverting large market shares from the higher priced Iranian oil. Asked if Saudi-Iranian relations will deteriorate over the most recent two-tier price system, the Shah of Iran replied, "Differences between myself and Saudi Arabia never existed, except at the last meeting of OPEC."¹

¹Interview in Business Week. January 24, 1977.

One outcome of the two-tier price system has been a scaling down of purchases from exporters imposing the 10% increase. The two major higher priced exporters, Iran and Kuwait, have suffered significantly lower sales. The National Iranian Oil Company disclosed that its oil sales declined from nearly 1 million barrels per day in December 1976 to 693,000 barrels per day in January 1977. Actual production also compares unfavourably with the anticipated 1977 level of 1.2 million barrels per day. Despite these declines in sales, Iran has rejected demands for an official price discount.¹

While Saudi-Iranian relations are marked with discord over the two-tier price system and diversion of Iranian market shares to Saudi Arabia, Iran continues to consolidate its leadership over the moderate price faction of OPEC opposed to Saudi Arabia's insistence on low prices, and clearly avoiding association with radical regimes demanding very much higher prices. At the December 1976, OPEC Conference, Iran stressed moderation and responsibility in its oil policy, emphasising its desire to support the economies of the Western world but simultaneously steering a "moderate course between an increase of 0 and 25%".² By virtue of its large reserves, political and diplomatic prestige, Iran easily emerged as the

¹Wall Street Journal. January 6, 1977.

²Iranian oil minister, Jamshid Amuzegar in New York Times. December 16, 1975.

natural leader of this faction.

Conflict with Saudi Arabia and leadership of the moderate price faction will steer Iran's oil policy towards demanding as high an oil price as it believes the West can pay without suffering economic dislocation. This strategy will sustain Iranian leadership over the non-Arab members as well as permit limited unofficial pricing flexibility. During periods of slack demand, Iran will be compelled to reduce production levels while attempting to accommodate domestic commitments through barter arrangements. As Iran is uninvolved in the Arab-Israeli conflict, it will avoid all association with the Arab "oil weapon".

Iran's practice of discounting prices in exchanging oil for armaments has resulted in accusations of price cutting from the Saudi Minister of Oil and other OPEC members. At a time of weak demand, Iranian price-cutting could undermine OPEC's price structure. More widespread discounting would discredit Iranian leadership over the non-Arab faction and act as a deterrent to its more widespread practice.

Irritation felt by other OPEC members over Iran's price discounts is somewhat offset by significant Iranian production cutbacks to facilitate sustaining the higher two-tier price. Nevertheless, Iran's "intra-OPEC relations" are not unduly strained. The initial value of "IOR" is 0.6.

Relations with Major Consumers

Relations between Iran and Western consumers greatly improved with continued and increased sales of oil, albeit at significantly higher prices during the Arab embargo on oil in 1973 and 1974. As a non-Arab oil producer, Iran is valued by the West not only as a staunch anti-Communist ally but as a significantly more reliable supplier than even Saudi Arabia. Like Saudi Arabia, Iran has transformed its ties with the West from one characterised by dependence to an interdependent one. At the December 1977 OPEC Conference, Iran demonstrated its concern for the interdependence of its economy to the international economy by scaling down its demands for a price increase of 40% to 25% and eventually to 15%. The Iranian Oil Minister, Amuzegar, explained that Iran had no desire to destroy the economy of the Western world. It is hypothesized that the greater the degree of interdependence between the Iranian and international economies, the greater will be the constraints to demanding high price increases. In the event of a downturn in the international economy, both Iran's substantial investments in the West and its oil revenues on which it is heavily dependent will be adversely affected.

Therefore the "relations with major consumers" variable will tend to exert some downward pressure on oil prices when the international economy appears in a weak position to absorb high increases and have less of an impact in the event of an upswing. The variable will also influence production to meet oil requirements of the West and dissuade cooperation in an embargo on oil.

Generally good relations with major consumers is marked by an initial value of 0.8 in the "RMC" variable.

Forecast of Iranian Policy: Post-1977

The following long and short-term interaction matrixes predict Iranian oil policy. :

TABLE XVIII

LONG AND SHORT-TERM INTERACTION MATRICES FOR IRAN. POST-1977*

Long-term Interaction Matrix

	QR	AC	IOR	RMC	IEE	PHP	PNE	PR
QR	0	-.2	0	0	-.4	-.8	0	-.5
AC	0	1.	0	1.	0	.4	0	0
IOR	-.5	-.2	0	-.5	.8	1.	0	-.3
RMC	1.	-.4	-.5	0	0	-.5	1.	.1
IEE	0	0	0	0	0	0	0	0
PHP	1.	1.	.8	-.5	1.5	-.1	0	-.1
PNE	0	0	0	1.5	0	0	0	0
RP	.5	.8	.5	.2	.3	1.	0	0

Short-term Interaction Matrix

	QR	AC	IOR	RMC	IEE	PHP	PNE	PR
QR	0	0	0	0	-.2	-.8	0	-.4
AC	0	.2	0	0	0	0	0	0
IOR	-.2	.3	0	-.2	-.2	.3	0	-.5
RMC	0	.1	-1.	0	.3	-.5	.5	.1
IEE	0	0	0	0	0	0	0	0
PHP	-.1	1.6	0	-.5	1.5	0	0	-.05
PNE	0	.5	0	.5	0	0	0	0
RP	.3	.5	-.1	.2	2.	1.5	0	-.1

* For details of interaction entries, see Appendix 4.

FORECAST OF IRANIAN OIL POLICY
POST 1977

Date	BHP	PNE	RP
1977	.60	.70	.40
1977.5	.65	.72	.47
1978	.70	.74	.55
1978.5	.75	.76	.64
1979	.79	.77	.69
1979.5	.83	.79	.76
1980	.85	.80	.80
1980.5	.88	.82	.83
1981	.90	.83	.87
1981.5	.91	.84	.89
1982	.93	.85	.90

FIGURE VII

FORECAST OF IRANIAN OIL POLICY. POST 1977

The forecast indicates a gradual increase in Iran's preference for high prices. The nature of the increase suggests that future price levels advocated by Iran would be gradual, probably in the region of 4% to 8% per annum.

Iranian sentiment against the use of an oil embargo, although already high at an initial value of 0.7, increases gradually to 0.85 in 1982, indicating an extremely small likelihood of Iranian participation in an oil embargo.

Iran's production rate climbs steadily from 0.4 in 1977 to 0.8 in 1980 and tapers off thereafter. This suggests an aggressive policy of increased production and market shares.

Projections of Iranian oil policy suggest preferences for moderate price increases, abstention from any oil embargo and high levels of production.

SAUDI ARABIA. POST-1977

Developments in oil politics and international relations have projected Saudi Arabia into the leading position in OPEC. Its predominance in the Middle East and oil politics is likely to be further consolidated.

Quantity of Reserves

Saudi Arabia continues to have the largest known reserves of oil in OPEC (followed by Kuwait and Iran) and one of the lowest rates of production relative to reserves: at 1975 levels of production, Saudi Arabian reserves are anticipated to be depleted in 58 years, compared to 101 years for Kuwait and 33 years for Iran.¹

It is anticipated that Saudi Arabia's "quantity of reserves" will continue to exert an important effect on price and production decisions, especially in concert with the variable "Relations with Major Consumers".

This variable is given the starting value of 0.99

Absorptive Capacity.

Expenditures in Saudi Arabia for development and military armaments have increased steadily since the 1960s and early 1970s. Saudi Arabia's present five year development plan, which began in 1975, has been allocated a budget of US\$ 142 billion. Major areas of expenditures in the present development plan centre on construction of an industrial infrastructure, social development, the establishment of an extensive petrochemical industry and military armament and construction.

An estimated US\$ 25 billion investment in the petrochemical industry¹ and investments of US\$22 billion in military armaments and in construction of military bases, airports, hospitals and training centres will immediately absorb large sums.² Social and infrastructural developments on the other hand ensure the expansion of future absorptive capacity. Social and infrastructural developments address the primary areas of bottlenecks in the delivery and implementation of additional capital investments. In particular, the emphasis on education and the construction of roads, ports and railways is

¹The Times. Reproduced in The Mirror, November 1, 1976.

²For a report on Saudi Arabia's military investment, see U.S. News and World Report, October 18, 1976.

anticipated to remedy Saudi Arabia's deficiencies in skilled manpower and administrative talent, and an inadequate transportation system, especially where port facilities are concerned. These investments will undoubtedly ensure the opening of new avenues of investment, especially in downstream petrochemical processes including the production of fertilisers, animal feedstuffs and other petrochemicals. It is anticipated that investment in petrochemical development will continue at a healthy pace in view of the pattern of demand growth in world markets for its products.¹

Despite these heavy investments in its domestic development, Saudi Arabia's financial surplus continues to grow. It is estimated by the U.S. Department of the Treasury that Saudi Arabia's investible surplus, which reached US\$3120 million in 1973 and increased to US\$20,800 million in 1974 and dipped slightly to US\$20,055 million in 1975, will increase to US\$133.2 billion in 1980.²

Therefore despite heavy expenditures, which are expected to exceed revenues for the period 1975 to 1980 and the expansion of Saudi Arabia's limited

¹The Mirror, November 1, 1976.

²U.S. Department of the Treasury, 1975.

absorptive capacity, it will continue to enjoy financial surplus far beyond its means to employ productively within its borders. Saudi Arabia's investible surplus committed abroad is estimated to be at least US\$45 billion. Of this sum, US\$14 billion is believed to be invested in the United States, a similar amount in Europe and several billion dollars in Japan. Recently, Saudi Arabia has diversified its holdings into long term investments, largely in equity and real estate, but the bulk of Saudi investments is kept in very liquid form as corporate and government stocks and bonds.¹ In addition, a comparatively small amount is exported as aid to poorer countries. In 1974, Saudi Arabia disbursed as aid US\$861 million, compared to US\$1,021 million in 1975.² In 1977, Saudi Arabia committed US\$1 billion in aid to African countries after the Afro-Arab summit conference in Cairo.³

In view of Saudi Arabia's considerable monetary reserves, the influence that the "Absorptive Capacity" variable will have on the types of decisions relating to pricing, production and the probability of an embargo, will be similar to those in the 1973 study:

¹North Africa and Middle-East. 1976-1977.
p 602.

²Ibid.

³US News and World Report, March 21, 1977.

TABLE XIX

SAUDI ARABIA'S FIVE YEAR DEVELOPEMENT PLAN 1975-1980
(million rials. 100 rials= US\$28.41)

Water and Desalination	34,065
Agriculture	4,685
Electricity	6,240
Manufacturing and Minerals	45,058
Education	74,161
Health	17,302
Social Programs and Youth Welfare	14,640
Ports, Roads and Railways	21,283
Civil Aviation	14,845
Telecommunications and Posts	4,225
Municipalities	53,328
Housing	14,263
Holy Cities and the Hajj	5,000
Other Development	<u>9,312</u>
Total Development	<u>312,416</u>
Defence	78,157
General Administration	38,179
Funds	<u>63,478</u>
Subtotal Other	<u>179,814</u>
Total Plan	<u>498,230</u>

SOURCE: North Africa and Middle-East. 1976-1977. p 608.

low price increases or preferably price freezes, higher levels of production and market shares to maintain low prices, and the disbursement of oil revenues to front-line Arab states as an alternative to the political employment of the "oil weapon".

Saudi Arabia's "Absorptive Capacity" variable is assigned the initial value of 0.3.

Intra-OPEC Relations.

While the radical faction in Arab politics suffered a decline in influence both within the Arab world and in OPEC, the conservative faction ascended in prominence. So successful has been Saudi Arabia's use of its economic and diplomatic power that it has engineered itself into becoming a primary force in Arab and Middle-East politics.

Saudi efforts in undermining resistance from more radical Arab states to a settlement of the Arab-Israeli conflict is clearly evident. To the moderate and conservative regimes alike, the imperative of establishing a "just peace" in the Middle-East has become more pressing in 1977. The establishment of a "just peace" is interpreted as the creation of an independent Palestine or one linked in a yet undefined manner with Jordan, the return of occupied Arab territories, the guarantee of a secure Israel and the maintenance of a strong US presence in the region enabling the survival of moderate conservatism.

However, the prerequisite of such a "just peace" is the elimination or neutralizing of radical forces - Palestinian and Arab groups and countries which are still committed to "liberation" of Palestine through the destruction of the Zionist-Jewish state. Among measures executed by the "moderate conservative" faction was the expulsion of the Palestinian guerillas from Jordan in 1970 and 1971, which restored a measure of security to Israel's eastern border. Suppression of radical Palestinian groups in Lebanon and limiting the activities of other Palestinian groups by Syria had the same effect for Israel's northern border.

Through financial disbursements and diplomatic pressure, Saudi Arabia has reinforced its leadership over the front line states of Egypt, Jordan and Syria, and, to some extent, successfully imposed its own strategy for a Middle-East settlement upon them. However, the Saudi approach, which relies heavily upon the United States as initiator and guide for a peace settlement, also involves suppression of radical and left-wing Palestinian and Arab groups in order to attract American and Israeli cooperation by presenting an image of Arab moderation. This strategy places it in direct ideological conflict with the radical Arab countries, especially Libya and Iraq, and the "rejection front" of the PLO.

The prominence of the radical Arab faction has however declined considerably since the 1973-1974 period.

As time elapses, the political and economic triumphs Libya was able to achieve over the oil companies in the negotiations of 1970 and 1971 diminish in significance in OPEC and the Arab world. Furthermore, Libya's commitment to Nasserist values and indulgence in radical rhetoric continues to isolate it from an Arab political mainstream that moves steadily in a pragmatic conservative direction, and towards cooperation with the United States. The extent of Libya's ideological isolation and Colonel Gaddafi's personal isolation from conservative and moderate Arab politicians can be illustrated by the widely shared belief of him as a man of "unsteady ideas, twisted values and rash behaviour".¹ By and large, the conception of OPEC by the less conservative states as a "vanguard... against imperialism and the monopolies", a bulwark of the "forces of liberation", and as an example to the developing world of the means to dignify their terms of trade (as articulated by Iraq, Algeria and Venezuela respectively) are out of the pragmatic mainstream of members' perception of the role of the organization.² Algerian radicalism is however deflected from Middle-

¹ Egyptian note of protest to Libya over sharp political differences in handling the Arab-Israeli conflict. Globe and Mail, April 18, 1977.

² New York Times, December 19, 1976.

East developments and concentrated on the achievement of a new economic system internationally.

Further indication of Saudi Arabia's successful consolidation of its leadership role in Arab politics is found in its diversified interest in Africa and in the countries around the Red Sea. Saudi Arabian foreign policy objectives are aimed at maintaining regional stability and a strong, pro-Western outlook among these countries. It appears to have enjoyed some success in swinging Somalia away from the Soviet orbit into a more moderate and perhaps pro-Western position.¹ In Zaire, Egyptian and Moroccan troops fighting on the side of President Mobutu are financed by Saudi Arabia.² On the international financial scene, Saudi Arabia is seeking to make major contributions, estimated to be approximately US\$16 billion to the International Monetary Fund conditional upon its receiving commensurate voting power in the organization. While resistance from the U.S. and European countries to a Saudi share of the power they now dominate may result in the withdrawal of the Saudi offer,³ these actions indicate consolidated Saudi leadership in

¹Guardian, May 8, 1977

²Globe and Mail, April 16, 1977

³Business Week, May 16, 1977

the Arab Middle-East, and the employment of its oil wealth and consequent political and diplomatic prestige internationally, primarily in Africa and Third World countries through the mediums of bilateral aid and multilateral organizations like the IMF.

Saudi Arabia's ascendent position in OPEC and Arab politics suggests it will more tenaciously lobby for its own petroleum policy preferences in OPEC and it will be in a more advantageous position to sway decisions in its favour. Saudi Arabia's new status has not affected its oil policies: it continues to favour low price increases or price freezes, the avoidance of the punitive use of the "oil weapon", and increased market shares and production to sustain low prices.

However, Saudi Arabia's continued domination of Arab and OPEC politics is largely predicated upon its ability to successfully pressure the United States to persuade Israël to return occupied Arab territories and negotiate a peace settlement. Failure would undoubtedly discredit Saudi Arabia's "carrot" version of the "oil weapon" by offering concessions to secure political ends, and create the groundwork for the resurgence of the radical Arab faction and confrontational oil policies vis-a-vis the West.

Successful neutralization of the power of the radical faction, and consolidation of Saudi leadership

over moderate and conservative Arab states contribute to improving its "Intra-OPEC Relations". However, gains in this direction are offset by Iranian and non-Arab opposition to the Saudi low-price policy. This variable is given an initial value of 0.4.

Relations with Major Consumers.

Among major oil consuming countries, the United States exerts the greatest impact upon Saudi Arabian oil policies.

Saudi Arabia has successfully transformed its relations with the United States from one of dependence to interdependence in the 1970s. For Saudi Arabia, the United States is an indispensable partner in economic development, in its plans for the expansion of military capacity, and as a guarantor of security from Soviet expansion into the Middle-East and from potential enemies in Iraq and Iran. Arms purchases from the United States reached US\$8 billion since 1972. Simultaneously, the Saudis have steadily increased their economic ties with the United States as a demonstration of their confidence in American ability to rapidly transform Saudi Arabia into a developed country.¹ Of the total of US\$142 billion to be spent between 1975 and 1980, it is estimated that at

¹New York Times, December 18, 1976.

least US\$25 billion will be paid for American civilian and military goods and services.

To the United States, Saudi Arabia is an important source of oil, a staunch ally, and is instrumental to its desire to maintain friendly relations with other Arab states and influence in the Middle-East. American dependence on Saudi Arabian oil steadily increases, unabated by the embargo of 1973. Prior to the 1973 embargo, Arab oil constituted only 15% of total American oil imports, but by 1976 the US market share captured by Arab OPEC producers reached 33%.¹ Sales of Saudi oil alone doubled between 1975 and 1976 to an average of 1.1 million barrels per day, making Saudi Arabia the leading oil supplier to the United States.²

At the December 1976 OPEC Conference, Saudi Arabia, in defiance of the wishes of eleven OPEC members, raised its oil prices by only 5% as contrasted to a 10% immediate increase plus a subsequent 5% increase in July 1977 adopted by the others. Reasons given by the Saudis for their substantially lower increase was fear that the current economic upturn may relapse into another recession. It was also quietly feared that an economic

¹Globe and Mail, November 30, 1976.

²Christian Science Monitor, August 19, 1976.

recession could considerably decrease the value of substantial Saudi investments in the West. As a self-perceived member of the Western international economic and political system, it is alarmed that economic problems for the West will pave the way for Communist dictatorship, evident in the success enjoyed by Western European Communists, and which it fears could spread to the Middle-East.¹

At the same time, the Saudis publicly linked the low price increase to the willingness of the United States in persuading Israel to adopt a more flexible attitude with respect to the return of occupied Arab territories and the creation of a Palestinian state. In addition, Saudi Arabia made the low price increase conditional upon the willingness of the developed countries to concede to the demands of the developing countries for debt rescheduling and commodity price stabilization at the forthcoming conference on International Economic Cooperation.

Through successfully demonstrating its commitment to pressuring Egypt, Syria, Jordan and the PLO to be flexible, the Saudi requirement has made an American response more urgent. By risking its political prestige in the bid to secure American cooperation, the Saudis are

¹Interview with Sheikh Yamani in Swiss Press Review and News Report, December 29, 1976.

involved in a gamble in which a loss could result in discrediting its pro-Western foreign policy and the "carrot" strategy of the "oil weapon", in its isolation from the Arab world and in the potential resurgence of the radical Arab faction.

Thus the "Relations with Major Consumers" variable propels Saudi Arabia towards lower price increases, high rates of production and market shares to sustain low prices and the "carrot" strategy in the use of the oil weapon.

Shared commitment to the preservation of Western supremacy is counterbalanced by serious Saudi-US differences vis-a-vis the settlement of the Arab-Israeli conflict. This variable is given an initial value of 0.6.

International Economic Environment, Preference for High Price, Preference for No Embargo, and Production Rates

Values reflecting forecasts of hesitant economic recovery beginning in 1977 are externally imposed on the IEE variable.

Saudi Arabia's repeated call for price freezes and low increases suggests that its "preference for high price" is still low. This variable is given an initial value of 0.2.

Commitment to protecting the tenuous economic recovery and sustaining Western supremacy suggest that serious economic disruption strategies would be rejected. Consequently, "preference for no embargo" is still strong at 0.8, and the rate of production will be maintained at levels to meet demand, and perhaps to undermine higher prices as well.

The forecast of Saudi Arabian oil policy flow from the variable interactions in the following matrices.

TABLE XX

LONG AND SHORT-TERM INTERACTION MATRICES FOR SAUDI ARABIA,
POST-1977*

Long-term Interaction Matrix

	QR	AC	IOR	RMC	IEE	PHP	PNE	RP
QR	0	0	0	0	-.8	0	0	-1.
AC	0	.8	0	.5	0	0	0	0
IOR	-.2	.2	0	-.5	1.	.5	0	-.8
RMC	.5	1.	-.2	0	0	-1.5	2.	.5
IEE	0	0	0	0	0	0	0	0
PHP	-1.5	.1	.5	-1.	1.	0	0	-1.
PNE	1.	0	-.1	1.5	-.2	0	0	0
RP	1.5	.1	-.2	.3	.5	1.5	0	0

Short-term Interaction Matrix

	QR	AC	IOR	RMC	IEE	PHP	PNE	RP
QR	0	0	0	0	0	0	0	-1.
AC	0	0	0	.5	0	0	0	0
IOR	0	.2	0	-1.	.2	1.5	-.5	-1.
RMC	.5	.3	-.4	0	.2	-1.5	1.	.3
IEE	0	0	0	0	0	0	0	0
PHP	-1.5	0	1.	-1.	2.	-1.	0	-1.
PNE	0	0	-.5	1.5	-.4	0	0	-.1
RP	1.	0	2.	.2	.2	-.2	0	0

*For details of the interaction entries, see Appendix 5.

TABLE XXI

FORECAST OF SAUDI ARABIAN OIL POLICY, POST-1977

Date	PHP	PNE	RP
1977	.20	.80	.80
1977.5	.14	.83	.82
1978	.09	.87	.83
1978.5	.06	.89	.84
1979	.03	.91	.85
1979.5	.02	.92	.87
1980	.01	.94	.88
1980.5	0	.95	.89
1981	0	.95	.90
1981.5	0	.96	.91
1982	0	.97	.92

FIGURE VIII

FORECAST FOR SAUDI ARABIA'S OIL POLICY, POST-1977

Saudi Arabia's "preference for high price" decreases in value from 0.2 in 1977 to 0 in 1980.5. The implication of the decline is ~~that~~ high prices will continue to be an unattractive policy option for Saudi Arabia. The very gradual nature of the decline suggests that Saudi Arabia's pricing policy will not differ markedly from its present opposition to high price increases. In terms of concrete policy, the low values of the forecast suggest the advocating of price freezes or very low price increases.

Saudi Arabia's opposition to the use of oil embargoes increases from 0.8 in 1977 to an almost absolute level of 1 in 1982. This represents no change in Saudi policy preferences since 1974.

Saudi Arabia's "rate of production" increases gradually. This implies that production will keep pace with demand, and that coupled with no preference for high prices may be used to undermine price levels which it deems unwarranted.

The projections suggest a continued Saudi policy of opposition to high price increases, and the use of the "oil weapon" either in the form of an embargo or as cutbacks in production,

OPEC, POST-1977

Developments in the post-1977 period makes necessary the addition of a new variable to the existing model for forecasting OPEC policy. With the anticipated entry of Alaskan and North Sea oil to the international market, and the increasing urgency of developing alternative fuels to oil, the variable "competition from non-OPEC sources of oil and oil substitutes" is added.

The Model

The factors which decide OPEC oil policies are the policy preferences of (1) the moderate price faction consisting of Gabon, Nigeria, Indonesia, Venezuela and Kuwait, headed by Iran; (2) the low price group consisting of Saudi Arabia and its conservative allies, the United Arab Emirates and Qatar; and (3) the radical regimes of Libya, Algeria and Iraq. Additional factors are (4) "Relations with Major Consumers"; (5) "Competition from non-OPEC sources of oil and oil substitutes"; (6) Middle-eastern political developments contained in the variable "Breakup of the Middle-East Stalemate" and (7) the "International Economic Environment". The forecast is concerned with three areas of OPEC policy: (1) price; (2) the probability of an embargo on oil;

(3) the rate of production. Thus far only the policy preferences of Iran and Saudi Arabia have been analysed.

Large reserves and flexibility in production levels have greatly reinforced Saudi Arabia's predominance in determining OPEC policy. The starting value of the strength of the Saudi faction is 0.55.

Although clearly a subordinate power to Saudi Arabia, Iran's leadership over the majority of OPEC members confers upon it significant potential for influencing OPEC policy. The Iranian-led faction is given an initial value of 0.35.

The Other Arab Faction

The third most influential faction in oil politics is the radical regimes of Libya, Iraq and Algeria. However, the influence of this group over Arab and OPEC politics has declined considerably since 1973 relative to the Saudi and Iranian factions.

Commitment to Nasserist Arab socialism has resulted in ideological isolation. Opposition to the continuation of Israel as a Zionist Jewish state conflicts with the general Arab willingness to recognise its existence.¹ In addition, support given to the "rejection front" of the PLO places Iraq and Libya in opposition to the conservative and

¹See interview with Saddam Husayn in US News and World Report. May 16, 1977.

moderate regimes seeking a settlement with American assistance. Continued criticism of moderate and conservative regimes in Egypt, Jordan, Syria and Saudi Arabia as traitors to the Arab cause, further lodge the perception of the radical regimes in the lunatic fringe of Arab politics.¹

While the political attentions of Libya and Iraq concentrate upon developments in the Middle-East, Algeria champions the solidarity of Third World countries in forcing trade and assistance concessions from the developed countries.²

Although political priorities of members in the radical faction vary, they nevertheless share similarities in their oil policies. The radical faction can generally be relied upon to be price hawks. At the December 1976 Conference, Iraq, which demanded a minimum increase of 25%, led the high price faction of Libya and Algeria. In terms of production and sales, the radical regimes, in particular Iraq, frequently resort to aggressive price cutting. Although a great deal of unanimity is expected among the three countries with respect to the "oil weapon", this is not always the case. Nevertheless, the radical regimes can be relied upon to adopt a more confrontational version of the "oil weapon" than the conservative faction

¹New York Times, January 5, 1977.

²Keesing's Contemporary Archives, March 10-16, 1975, p 27010.

and the relatively uninvolved Iranian faction.

Due to the ideological and political isolation of the radical faction from Arab and OPEC politics, it can be expected to have little impact upon the course of events in the Middle-East and OPEC in the immediate future, but a shift in regional politics, in particular, the failure of the West to pressure Israel to negotiate a peace settlement, could propel this faction on to political prominence.

The initial value of the power of the radical faction is fixed at 0.1.

Relations with Major Consumers.

The "Relations with Major Consumers" which have the greatest bearing upon OPEC oil policy are those between Saudi Arabia and the United States. By publicly linking a low price increase for Saudi oil to American willingness to pressure Israel into adopting a flexible stand vis-a-vis the return of Arab territory and the creation of a Palestinian state, the failure of the United States to effect a peace settlement will undoubtedly discredit Saudi Arabia's conservative oil policy and potentially lay the groundwork for the ascendance of the radical faction and the return to a radical oil policy of high prices, low levels of production and perhaps the punitive "oil weapon".

Despite obvious differences over the settlement of the Arab-Israeli conflict and price increases, relations between OPEC's two dominant members and the West are stable. This variable has a starting value of 0.6.

The International Economic Environment.

Economic forecasts for 1977 and the immediate future indicate slow but continued recovery. The strongest upswing is evident in the American economy which is expected to register a growth rate of 5% compared to an estimated 3% for Western Europe in 1977.¹ Although there is hope that a strong American recovery will generate positive spillover effects for Europe, it is thought unlikely that this would take place before 1978.

Until the international economic recovery strengthens considerably, it is likely to continue to exert a dampening effect upon the policies of the low and moderate price factions in OPEC. Asked if the 5% price rise imposed by Saudi Arabia would be applied throughout 1977, the Saudi Minister of Petroleum replied, "Yes, we don't see a reason to increase unless there is something very strong during 1977 such as a strong recovery in the West".²

¹US News and World Report, May 9, 1977.

²Interview in New York Times, December 18, 1976.

Stagnation or slow recovery in the West would have a limited effect upon price policies of the radical regimes which justify a price increase upon the substantial increases in their costs of imports. On the other hand, a strong recovery would provide impetus, especially to the moderate price faction, to demand higher prices.

While holding down price increases, it is also probable that stagnant or slow demand for oil in the immediate future would spur competition from producers for increased market shares. There is already evidence in this direction: while lower priced Saudi oil has captured larger market shares, smaller producers, especially those heavily dependent on oil revenues will become most vulnerable to competitive pricing. Indonesia, which voted with the majority of OPEC members to increase oil prices by 10% from January 1977, implemented an increase of only 6%.¹ To what extent the Indonesian action is a forerunner of things to come is uncertain. It is likely that the longer the persistence of low demand, the greater the probability of competitive pricing among OPEC producers. Iran's discounted barter arrangement is evidence of this. The additional 5% increase scheduled for July 1, 1977 has not been implemented.

While the international economy remains precarious,

¹Charleston Gazette, January 2, 1977.

use of the disruptive and punitive "oil weapon" would be an extremely unlikely policy option for the moderate and low price factions. However, it cannot be decisively ruled out for the radical regimes for whom political motivations may outweigh economic considerations.

For the immediate future, the "International Economic Environment" variable suggests low and moderate price increases, with some possibility of competitive pricing among the small producers, and extreme unlikelihood of a punitive version of the "oil weapon".

The initial value of this variable is 0.55.

Competing Substitutes and Alternative Sources of Oil. (S)

This variable has been insignificant in the time span studied previous to 1977, as alternative energy sources were yet to be viable competitors and lead-times for non-OPEC oil to enter the market were projected into the 1980s. This variable assumes growing significance from 1977, and will undoubtedly be a major variable in the late 1980s.

The major sources of potentially competitive non-OPEC oil are located in the North Sea, Alaska, Mexico, the People's Republic of China and the tar sands in Canada.

New estimates of oil reserves in Mexico, released by the Mexican state oil company, Pemex, indicate it

possesses at least 60 billion barrels. However, the figure is feared to be exaggerated so as to strengthen Mexico's bargaining position in borrowing large volumes of capital from foreign sources. By 1982, the Mexican government hopes to be able to export one million barrels of oil per day. As the international market then is expected to exceed 50 million barrels per day, the projected Mexican exports do not appear to provide undue competition for OPEC.¹

Hopes for the People's Republic of China as the new major exporter of the 1970s and 1980s have not materialized. The growth rate of oil production in 1976 decreased to 10%, or half the annual average for the 1960s. Indication of the slowdown is found in the reductions of oil exports to Japan by 25% in 1976. It is now believed very unlikely that the PRC will emerge as a major exporter.²

Norway, another potential major exporter, is however greatly concerned with oil conservation and is anxious to avoid political pressures to produce more oil than it deems feasible and the consequent economic dislocation arising from excessive oil revenues. Hence, regulated production in Norway is unlikely to flood the

¹Globe and Mail, March 23, 1977.

²Ibid., December 17, 1976.

international oil market. Given current technology and prevailing oil prices, the extensive tar sand deposits in Canada, Venezuela and possibly Columbia are not yet price competitive. Should additional technological advances be made, it is still unlikely that oil from the Canadian and Venezuelan tar sands will make a significant contribution to meet expanding levels of international energy consumption.¹

Thus far, Canada, Norway, China and Mexico adhere to OPEC pricing policies. There is little reason to expect deviation from OPEC prices if the market sustains both higher prices and new entrants.

OPEC's market shares are expected to be unchallenged until the early 1980s by new entrants from Mexico, Norway and Great Britain. For the immediate future, competition from new producers contributes little to determining OPEC price and production policies. When non-OPEC producers do significantly enter the oil market, it is likely that sufficiently high demand levels will not lead to competitive price cutting.

Another source of competition for OPEC oil is from non-oil energy substitutes. The most frequently mentioned are coal, nuclear and solar energy.

Of these three energy sources, coal appears to be

¹Choucri, International Politics of Energy Interdependence, pp 209-210.

the most promising. As large reserves are located in the United States, the USSR, Europe and China, coal poses no problems of strategic supply shortage. Simultaneously, it is the cheapest available industrial fuel: at prevailing prices, oil costs \$2.09 per million British Thermal Units, compared to \$1.11 for natural gas and 86 cents for coal.¹ However, coal poses serious environmental and safety hazards. In addition, the costs of transforming electricity plants so that they may burn coal rather than oil or gas are substantial. Coal does not provide a satisfactory substitute for all the uses that oil caters to. With prevailing technology, coal is believed unable to live up to its potential until gasification, liquefaction and non-polluting techniques to burn it directly are developed. The use of scrubbers and other devices to remove sulphur and ash from coal smoke is considered an interim solution. The US Federal Energy Administration estimated the "take-off" date for the commercial use of these techniques to be 1980.²

Nuclear energy offers another viable substitute to oil. Like coal, nuclear energy generation presents potentially severe environmental and safety hazards. In

¹Based on US prices. US News and World Report. April 25, 1977.

²Federal Energy Administration: Project Independence Report, (November 1974. US Government Printing Office, Washington D.C.)

addition, it poses international political problems, in particular the proliferation of nuclear nations, and potential terrorist deployment of nuclear weapons or sabotage of nuclear energy generating facilities. The uncertainty of uranium supply and guarded dissemination of nuclear technology will not eliminate reliance upon oil as a major source of energy in the near future. The leadtime of 9 to 14 years for the construction of nuclear power plants place the widespread use of nuclear energy in at least 1985.¹

Solar energy, which promises unlimited availability and relatively few environmental problems, is still far from being a practical oil substitute. Availability of large volumes of cooling water required in solar energy generation will act as a restraint to extensive use. Furthermore, it is estimated that the maximum contribution of solar energy to total energy requirements will not exceed 20% of expected consumption.²

Non-oil sources of energy are not yet serious competitive substitutes for oil but may begin to exert some impact on OPEC policies by 1985.

A set of arbitrarily imposed values reflecting projections of the significance of "Competing Substitutes and Alternative Sources of Oil" is used in the

¹Ibid., p 69.

²Ibid., p 72.

model. It has a starting value of 0.2.

Breakup of the Middle-East Stalemate.

Like the October 1973 Arab-Israeli war which resulted in a four-fold oil price increase and embargo, political developments of the future will be the most significant factor influencing OPEC prices, production and the probability of employing the punitive "oil weapon" in the immediate post-1977 period.

As Saudi Arabia's moderate oil policy is predicated upon U.S. cooperation in pressuring Israel to negotiate with the conservative and moderate Arab regimes, it is extremely likely that the failure of the U.S. to respond satisfactorily will discredit the moderate Saudi approach and give credence to more radical strategies, involving steep price increases and production cutbacks. Israeli and/or American intransigence may give rise to the often predicted outbreak of yet another Arab-Israeli war. Under those circumstances, it would be reasonable to expect a replay of the 1973-1974 Arab oil strategy. The strengthened economic, diplomatic and military positions of the Arab states vis-a-vis Israel and the United States may suggest the deployment of the "oil weapon" in a prolonged and more tenacious manner than was the case in 1973-1974.

The study of post-1977 OPEC policy will therefore be based on two projections of the two most likely outcomes of Middle-East political developments: (1) Arab perceptions of the willingness of Israel and the United States to negotiate a peace settlement; (2) perceptions of Israeli and/or U.S. intransigence and events culminating in war. Consequently, ~~two~~ separate studies of OPEC policies are based upon these sets of values reflecting the two probable developments. Both sets of values start at 0.2. The first set of values is designed to simulate a Middle-East peace settlement, and the second simulates an outbreak of another Arab-Israeli war in the first half of 1978. As it is thought unlikely that a Middle-East peace conference can realistically be convened in 1977 by the Israeli, Arab and American parties involved, 1978 will be a crucial year in which Arab regimes, both radical and conservative, will assess the efficacy of the Saudi's "carrot" version of the "oil weapon".

Price, Probability of an Embargo and Rate of Production.

The initial value given to Price is 0.66. It is calculated from the existing price relative to a maximum price of US\$20.

Neutralization of the power of the radical regimes and conservative predominance over developments in the Arab-Israeli conflict, minimize the probability

of an oil embargo. This variable is given a starting value of 0.2.

The initial value of the rate of production is calculated as previously from the 1977 production rates. Its initial value is 0.7.

The first forecast is based on the assumption of a Middle-East peace settlement. Projections evolve from the variable interactions presented in Table XXII.

TABLE XXII

LONG TERM AND SHORT TERM INTERACTION MATRICES FOR OPEC
POST-1977*

Long-term Interaction Matrix.

	I	SA	OA	RMC	BMES	IEE	S	P	PE	PR
I	0	-0.5	0.1	1.	0.5	1.5	-0.3	-0.3	0	-0.2
SA	-0.3	0	0	1.3	-2.	-0.3	0.8	0.3	0.3	0.5
OA	0.3	-0.8	0	-0.3	1.	0.5	-0.5	-0.5	-0.3	-0.2
RMC	-0.5	1.	-0.5	0	-2.5	0.1	-0.1	-0.2	-2.	0.2
BMES	0	0	0	0	0	0	0	0	0	0
IEE	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0	0
P	1.2	0	2.5	-0.5	1.5	1.	-1.2	0	0.5	-0.3
PE	-1.5	-2.	1.5	-1.5	2.	0.	-2.	0	0	0
PR	0.3	0.5	0.2	0.3	-0.2	0.2	-0.2	-0.8	0	0

Short-term Interaction Matrix.

	I	SA	OA	RMC	BMES	IEE	S	P	PE	PR
I	0	-0.7	0.2	-0.5	1.5	0.5	-0.2	-0.2	0.5	-0.5
SA	-0.1	0	-0.2	1.	-2.	-1.	1.	0.8	-1.5	1.
OA	0.1	-1.5	0	-1.	3.	0.5	-0.2	-0.1	1.	-0.5
RMC	-0.5	1.5	-0.4	0	-2.5	0	0	-0.5	-1.5	0.8
BMES	0	0	0	0	0	0	0	0	0	0
IEE	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0	0
P	0.5	0	1.	-1.	1.5	0.3	-0.1	-0.5	1.	-0.4
PE	-1.5	-2.	0.5	-1.	2.5	0	0	0	0.1	0
PR	0.1	1.	0.2	0.5	-0.8	0.2	0.1	0.4	-1.6	-1.

* For details of interaction matrices, see Appendix 6.

TABLE XXIII

FORECASTS OF OPEC POLICY 1977-1982.

The computed forecast values are as follows:

I	SA'	OA	RMC	BMES	IEE	S	P	PE	PR	Year
0.35	0.55	0.1	0.6	0.2	0.55	0.2	0.66	0.2	0.7	1977
0.45	0.48	0.2	0.46	0.3	0.55	0.2	0.75	0.25	0.67	1977.5
0.49	0.48	0.24	0.38	0.3	0.55	0.3	0.8	0.24	0.66	1978
0.39	0.64	0.06	0.57	0.2	0.6	0.3	0.8	0.02	0.78	1978.5
0.34	0.72	0.02	0.66	0.2	0.6	0.3	0.8	0.02	0.78	1979
0.35	0.75	0.01	0.68	0.2	0.65	0.35	0.8	0	0.79	1979.5
0.34	0.79	0	0.72	0.15	0.65	0.35	0.8	0	0.8	1980
0.32	0.83	0	0.76	0.1	0.65	0.35	0.8	0	0.81	1980.5
0.34	0.84	0	0.77	0.1	0.7	0.35	0.8	0	0.82	1981.
0.36	0.85	0	0.78	0.1	0.7	0.35	0.8	0	0.82	1981.5
0.38	0.87	0	0.79	0.1	0.7	0.35	0.81	0	0.83	1982

FIGURE IX

PREDICTED CHANGES IN THE VALUES OF RATE OF PRODUCTION,
PRICE, PROBABILITY OF EMBARGO IN A MIDDLE-EAST PEACE
SETTLEMENT

The projections show a very gradual increase in price, significantly below those achieved in a situation of war. Similarly, the probability of an embargo declines from a low level of 0.2 in 1977 to one approaching 0 in two years. Production rates register a slight decrease from 1977 to 1978.5 in response to low values of IEE in that period. Thereafter, when the International Economic Environment (IEE) improves, production rates increase gradually.

In the event of a settlement of the Arab-Israeli conflict, the regional political variable "Breakup of the Middle-East Stalemate" assumes only minor significance. The types of oil policies adopted by OPEC are determined to a large extent by the power relations between the three factions. The ascendance of the Saudi faction in the event of a peace settlement guarantees the adoption of conservative OPEC policies, characterized by lower prices, high levels of oil production to meet demand, and extremely low probabilities of using the "oil weapon" in the form of oil embargoes or output restrictions.

FIGURE X

PROJECTIONS OF THE RELATIVE POWER POSITIONS OF THE SAUDI,
IRANIAN AND OTHER ARAB FACTIONS IN THE EVENT OF A MIDDLE-
EAST PEACESETTLEMENT

The second forecast is based on the assumption of an outbreak of another Arab-Israeli war.

TABLE XXIV

FORECASTS OF ~~OEES~~ POLICY 1977-1982 IN THE EVENT OF
ANOTHER ARAB-ISRAELI WAR

The computed forecast values are as follows:

I	SA	OA	RMC	BMES	IEE	S	P	PE	PR	Year
0.35	0.55	0.1	0.6	0.2	0.55	0.2	0.66	0.2	0.7	1977
0.45	0.48	0.2	0.46	0.3	0.55	0.2	0.75	0.25	0.67	1977.5
0.49	0.48	0.24	0.38	0.3	0.55	0.3	0.8	0.24	0.66	1978
0.84	0.01	0.86	0	1.	0.6	0.3	0.96	0.77	0.34	1978.5
0.86	0	0.89	0	1.	0.6	0.3	0.98	0.79	0.31	1979
0.83	0.01	0.83	0	0.8	0.65	0.35	0.98	0.73	0.36	1979.5
0.72	0.17	0.55	0	0.4	0.65	0.35	0.98	0.48	0.5	1980
0.68	0.26	0.43	0.01	0.4	0.65	0.35	0.98	0.38	0.56	1980.5
0.62	0.39	0.26	0.06	0.3	0.7	0.35	0.98	0.22	0.63	1981
0.57	0.49	0.18	0.12	0.3	0.7	0.35	0.98	0.12	0.68	1981.5
0.56	0.53	0.1	0.15	0.3	0.7	0.35	0.98	0.06	0.7	1982

FIGURE XI

FORECASTED CHANGES IN THE VALUES OF PRICE, RATE OF PRODUCTION, AND PROBABILITY OF EMBARGO IN THE EVENT OF A BREAKUP OF THE MIDDLE-EAST STALEMATE.

FIGURE XII

PROJECTIONS OF THE RELATIVE POWER POSITIONS OF THE SAUDI,
IRANIAN AND OTHER ARAB FACTIONS IN THE EVENT OF A MIDDLE-
EAST WAR

Forecasted Changes in the Power Relations of the Iranian,
Saudi and Other Arab Factions in the Event of a Breakup
of the Middle-East Stalemate.

The values in the "Breakup of the Middle-East Stalemate" variable have been adjusted to show another Arab-Israeli war in 1978-1979.

The projections show a significant but gradual increase in prices until 1978.5 when war is imposed. A sudden large increase of 20% in oil prices coincides with the outbreak of war. Thereafter the price stabilizes over an extended period of three years. The increase in oil prices is more accurately attributed to the types of oil policies that become attractive options in the event of war.

The probability of an embargo, although slight in 1977, increases markedly to coincide with the outbreak of war in the second half of 1978. The probability of an embargo remains high until 1979.5. Thereafter, it diminishes rapidly when Middle-East tensions are defined to subside and becomes almost negligible by 1982.

The rate of oil production is also closely determined by the political situation in the Middle-East. The decrease in the rate of oil production between 1977 and 1978 is in large measure due to the dampening effect of a weak international economy. The sudden and precipitous decline from 0.66 in 1978 to 0.34 in 1978.5 is in direct response to the Middle-East

war imposed in 1978.5. While military tensions remain high between 1978.5 and 1979.5, production rates continue to be significantly below the normal level of 0.7 in 1977. As military and political instability diminishes, as defined to begin from 1980 onwards, production rates climb gradually from 0.5 to 0.7 in 1982.

In terms of predictions of the relative power positions of the three factions in OPEC, we note that Iran steadily maintains the second place in OPEC's power hierarchy. Its position is temporarily facilitated by an outbreak of war but declines when tension eases. The position of the radical Arab faction in OPEC is negligible from 1977 to 1978 but climbs suddenly when war breaks out. The implications of the ascent of the Iranian and radical factions in a war situation are clear: panic over supply and war promote the ascendance of radical oil policies: high prices, restrictions of output and the use of an oil embargo by the Arab states.

The rapid decline of Saudi power in OPEC, which coincides with the outbreak of war, suggests the untenability of conservative oil policies characterized by low prices and rejection of the use of output restrictions and oil embargoes in situations of high political and military tensions. However, it is hypothesized that the return to normal conditions and the subsidence of perceptions of threat will revise the temporary hierarchy.

Structural characteristics of reserves and output will be reasserted as the criteria for decision making power.

Western preference for reascendence of conservative predominance and diplomatic and economic prestige accumulated through aid and investment programmes will facilitate Saudi Arabia's return to power.

CONCLUSION

In my thesis, an effort was made to follow through the logical consequences of a series of hypotheses. The results are verified against actual developments and have also been used as forecasts. In the first case, post-facto analysis presents the student with both drawbacks as well as support. The principal drawback is the tendency to tailor relationships to reflect known outcomes. While this is a barrier to greater objectivity, it nevertheless permits the student to sharpen her sensitivity to the relationships of variables. The sensitivity to variable interactions gained in the post-facto exercise is considered vital to accurate forecasting.

A survey of OPEC history prepared the groundwork for modelling oil policy. The determinants thought to be essential to modelling oil policy in Saudi Arabia, Iran and OPEC reflect the interplay of domestic and international political and economic factors. KSIM was selected as the appropriate methodology for computing the complex and numerous variable interactions. While applying logic and rigour to the analysis of interactions, KSIM also allows the inclusion of variables representing

precise quantities as well as subjective estimates. By addressing the futility of a strictly quantitative approach to the study of decision-making, KSIM represents an invaluable tool in the study of social phenomena. The degree of success achieved in forecasting the 1973-1978 period testifies to the validity of the model.

The nature of the subject matter of political science inhibits the production of grand theory. Consequently the emergence of mini-theories have meaning only when applied to highly specific conditions and narrow boundaries. The choice of the methodology, KSIM, reflects my belief in the complexity and variety of political variables whose assessment can only be approached in a manner simultaneously logical and intuitive. This mirrors my own view of the unfortunate development in the social sciences away from a belief in the value of considered intuitive and impressionistic judgements to one giving too much weight to numbers. The inferiority complex from which we as social scientists suffer vis-a-vis natural sciences does not enable us to accept the immense gulf between the subject matters of science and social phenomena, and consequently the imperative of formulating a relevant and appropriate methodology for our own studies. At a time of great progress made by science and technology, the differentiation of the values and functions of scientists and

students of social phenomena must be made more explicit. As the nature of science and technology is activity and the avoidance of ~~contemplation~~ of its activities, the social scientists must assume their long-neglected responsibility of guiding or influencing the course of human progress. To this end we must discard the pretense of "value-free judgement" and attempt an earnest search for a methodology that is appropriate to our concerns. I hope that this exercise represents a small step forward in this direction.

APPENDIX A

MATHEMATICAL DETAILS OF KSIM

The following formulations and derivations were presented by Kane et al.¹

Suppose we wish to project the behaviour of the variables $x_i(t)$, $i=1,2,\dots,N$.

We assume the variables are bounded

$$0 < x_i(t) < 1, \quad i=1,2,\dots,N; \quad t \geq 0 \quad (1)$$

and furthermore, we assume that several variables act upon the system but are themselves not acted upon. These latter variables are $x_i(t)$, $i=N+1,\dots,M$. Then the values of the variables are updated by the equations:

$$x_i(t + \Delta t) = x_i P_i(t), \quad i=1,\dots,N \quad (2)$$

where

$$P_i(t) = \frac{1 + \frac{1}{2}\Delta t \sum_j |a_{ij}x_j + b_{ij}\frac{dx_j}{dt}| - (a_{ij}x_j + b_{ij}\frac{dx_j}{dt})}{1 + \frac{1}{2}\Delta t \sum_M |a_{ij}x_j + b_{ij}\frac{dx_j}{dt}| + (a_{ij}x_j + b_{ij}\frac{dx_j}{dt})} \quad (3)$$

a_{ij} is the matrix element giving the impact of x_j on x_i and b_{ij} is the matrix element giving the impact of the change $\frac{dx_j}{dt}$ on x_i . Δt is the time

Julius Kane, Ilan Vertinsky and William Thomson, "KSIM: A Methodology for Interactive Resource Policy Simulation", Water Resources Research 9 (February 1973) 65-79.

period of one iteration. a_{ij} and b_{ij} can be functions of the variables x_i and time.

Now $P_i(t) > 0$, and hence the transformation in equation (2) maps the open interval $(0,1)$ onto itself - the boundedness of $x_i(t)$ is preserved.

Equation (3) can be written in the form

$$P_i(t) = \frac{1 + \Delta t |\text{sum of negative impacts on } x_i|}{1 + \Delta t |\text{sum of positive impacts on } x_i|}$$

When the negative impacts exceed the positive impacts, $P_i(t) > 1$ and x_i decreases. Conversely, when the positive impacts outweigh the negative, $P_i(t) < 1$ and x_i increases. When the negative and positive impacts balance, $P_i(t) = 1$ and x_i is unchanged.

The remaining properties of this formulation are evident if the limiting system of differential equations implied by (2) and (3) are examined. This system of equations can be written as

$$\frac{dx_i}{dt} = - \sum_{j=1}^M (a_{ij}x_j + b_{ij}\frac{dx_j}{dt}) \cdot x_i \ln(x_i), \quad i=1, \dots, N$$

An inspection of this equation shows that as $x_i \rightarrow 0$ or 1 , $\frac{dx_i}{dt} \rightarrow 0$, i.e. the response of a variable to a given impact goes to zero as the variable approaches either bound. The other characteristics of the simulation model are equally evident from the equation: a variable produces greater effects upon the system when it is larger, all else being equal; and complex interactions are described by an array of binary interactions.

The scaling of the matrices is achieved by the multiplication of matrix elements by constants, the a_{ij} matrix by c_a and the b_{ij} matrix by c_b . To

calibrate these constants, one need consider only one influence pair: to determine c_a , the influence variable j has upon variable i in the short time interval T , given an interaction of strength a_{ij} needs be estimated. Suppose this influence results in a percentage change p in i , then, from equation (1),

$$(1+p)x_i(t) = x_i(t)(1 - Tc_a a_{ij} x_j)$$

From this equation, c_a can be calculated. It will be noted that although c_a depends on the x_j chosen, it does not vary by more than a factor of 2 over a range in x_j from 0.2 to 0.8.

Similarly, c_b can be determined by estimating what a given percentage change in x_j can cause in x_i . Suppose a p_1 percentage change in x_j would be reflected in a p_2 percentage change in x_i for a strength of interaction b_{ij} . Then, c_b can be determined from the equation

$$(1+p_2)x_i = x_i(1 - c_b b_{ij} p_1 x_j)$$

APPENDIX B

Appendix 1. Iran: 1973-1978

Entries represent the impact of row variables upon column variables. Entries of 0 indicate the independence of row variables from column variables. The values of the variable IEE are externally imposed and therefore omitted.

QR on QR=0.

QR on AC=0.

QR on IOR=0.

QR on RMC=0.

QR on PIOC=0.

QR on PHP=-.3. Large reserves prompt lower PHP to discourage substitution.

QR on PNE=0.

QR on RP=0.2. Large reserves encourage higher RP.

AC on QR=0.

AC on AC=0.5. Large immediate investments improve future AC.

AC on IOR=0.

AC on RMC=2. Massive military and civilian imports improve RMC through financial compensatory flows.

AC on PIOC=-1.5. Large AC for additional revenues prompt government to curb profits of international oil companies.

AC on PHP=2. Large AC prompt PHP to accomodate needs.

AC on PNE=0.

AC on RP=0.5. High AC is accomodated by higher RP.

IOR on QR=0.

IOR on AC=0.

IOR on IOR=0.

IOR on RMC=0.5. As an important non-Arab OPEC producer, Iran acts as a link between the Arab faction and Western consumers.

IOR on PIOC=-1. Closer IOR prompt cooperation at the expense of PIOC.

IOR on PHP=1. Harmony between the higher price-advocating majority and the conservative minority will increase prices.

IOR on PNE=0.

IOR on RP=-.2. Closer IOR will eliminate price and market sharing competition.

RMC on QR=0.

RMC on AC=.5. Closer RMC will make available to Iran additional sophisticated and expensive military hardware.

RMC on IOR=.3. As the bridge between the West and Arab OPEC members, closer RMC will improve IOR.

RMC on RMC=0.

RMC on PIOC=.5. Closer RMC will be used to facilitate the interests of PIOC.

RMC on PHP=-.5. Closer identity of interests between Iran and the West will result in lower PHP to protect the international economy.

RMC on PNE=2. Closer RMC will cause Iran to reject the embargo.

RMC on RP=.5. Closer RMC will prompt Iran to make available adequate oil supplies.

PIOC on QR=0.

PIOC on AC=0.

PIOC on IOR=0.

PIOC on RMC=.3. Higher PIOC will be exerted towards protecting supplies to Western consumers, hence behaving as a buffer during supply shortages.

PIOC on PIOC=0.

PIOC on PHP=.5. Higher prices improve profits of oil companies.

PIOC on PNE=-1. Rejection of the embargo will eliminate potential antagonisms between companies and suppliers and consumers.

PIOC on RP=0.

IEE on QR=0.

IEE on AC=.2. Improved IEE extends new areas of commercial investments, especially in downstream petroleum industries.

IEE on IOR=1. Improved demand and ability to pay higher prices will eliminate some market and pricing competition.

IEE on RMC=-.2. Better ability to pay higher prices will encourage higher PHP causing deterioration of RMC.

IEE on PIOC=-1.5. Increased demand will curtail the maneuverability of companies.

IEE on PHP=1.5. Better IEE will encourage PHP.

IEE on PNE=1. Desire to avoid jeopardising the international economy will lead to rejection of the embargo.

IEE on RP=.5. Increased demand will encourage higher RP.

PHP on QR=0.

PHP on AC=0.

PHP on IOR=1. Iran's PHP will cement ties with the OPEC majority.

PHP on RMC=-1. Higher PHP will damage RMC.

PHP on PIOC=.1. Higher profits will improve PIOC.

PHP on PHP=-.4. High price will discourage still higher prices.

PHP on PNE=0.

PHP on RP=.3. Higher price will encourage higher RP.

PNE on QR=0.

PNE on AC=0.

PNE on IOR=0.

PNE on RMC=3. Rejection of embargo reassures Iran's ties with the West.

PNE on PIOC=-.4. In an embargo on oil, PIOC is greatly curtailed as companies' dependence on fewer producers is increased.

PNE on PHP=0.

PNE on PNE=0.

PNE on RP=0.

RP on QR=-1.5. High RP will deplete QR.

RP on AC=0.

RP on IOR=-.2. Higher RP implies competition for market shares, depressing IOR.

RP on RMC=1. Higher RP from a non-Arab producer reassures RMC.

RP on PIOC=-.5. Fluctuations in RP curb companies' ability to deal with other suppliers.

RP on PHP=-.1. High RP may depress prices.

RP on PNE=2. Higher RP thwart successful embargoes.

RP on RP=0.

Short-term Interaction Matrix

QR on QR=0.

QR on AC=0.

QR on IOR=0.

QR on RMC=1. High QR and high dependence on Iranian oil cause consumers to address relationship with Iran with greater care.

QR on PIOC=-.2. As Iran is a major supplier, international oil companies are more dependent upon it.

QR on PHP=-.05. High QR has a moderating effect on PHP.

QR on PNE=0.

QR on RP=.5. High QR suggests higher RP.

AC on QR=0.

AC on AC=0.

AC on IOR=0.

AC on RMC=.5. Mutual reliance upon reliable supplies of oil and military and development goods improve RMC.

AC on PIOC=-1.2. High domestic financial requirements reduces PIOC by placing the oil industry under more responsive national control.

AC on PHP=2.5. High AC prompts higher PHP.

AC on PNE=0.

AC on RP=.5. High AC prompts higher RP.

IOR on QR=0.

IOR on AC=0.

IOR on IOR=0.

IOR on RMC=-2. Mutual interests in attaining higher prices, controlling RP diminishes RMC.

IOR on PIOC=-1. As international oil companies are identified as barriers to host-governments attaining control over their oil industries, OPEC cooperation is aimed at decreasing PIOC.

IOR on PHP=1. Mutual interests in higher prices ensures high PHP.

IOR on PNE=0.

IOR on RP=-1. Pressure will be exerted upon Iran to lower production and decrease its market shares.

RMC on QR=0.

RMC on AC=0.

RMC on IOR=-1. Close RMC introduce a measure of disharmony into relations with Arab states.

RMC on RMC=0.

RMC on PIOC=.3. As international oil companies are seen as instruments to protect the interests of consumer countries, efforts will be made to increase PIOC.

RMC on PHP=-.5. Desire for lower prices prompt consumer countries to pressure Iran to moderate price demands.

RMC on PNE=2. Anxiety for security of oil supplies prompt consumer countries to pressure Iran to resist participation in an embargo.

RMC on RP=.3. Iran will be pressured to produce enough to meet new demand.

IEE on QR=0.

IEE on AC=0.

IEE on IOR=1. High IEE characterised by higher demand, better ability to sustain higher prices will ensure greater harmony in IOR.

IEE on RMC=0.

IEE on PIOC=-.2. Higher demand for oil place international oil companies in a position of greater dependence upon host governments.

IEE on PHP=.8. Better ability to afford higher prices and stronger demand strengthen PHP.

IEE on PNE=0.

IEE on RP=.2. Higher demand is met by higher RP.

PIOC on QR=0.

PIOC on AC=0.

PIOC on IOR=-.5. Decreased PIOC characterised by less ability to "play off" members result in better IOR.

PIOC on RMC=.3. As international oil companies still retain control over distribution networks, they can ameliorate the effects on major consumers in a supply crisis.

PIOC on PPOC=0.

PIOC on PHP=0.

PIOC on PNE=0.

PIOC on RP=0.

PHP on QR=0.

PHP on AC=0.

PHP on IOR=1. Iran shares an interests in higher prices with other OPEC members.

PHP on RMC=-2. Higher price demands are strongly resisted by consumers.

PHP on PIOC=0.

PHP on PHP=0.

PHP on PNE=0.

PHP on RP=-1. RP must be reduced to maintain high PHP.

PNE on QR=0.

PNE on AC=0.

PNE on IOR=-1. High PNE potentially thwarts the success of an embargo and hence reduce IOR.

PNE on RMC=2. Strong PNE ensures security of oil supplies thus strengthening RMC.

PNE on PIOC=.2. Continued Iranian exports during a supply crisis place international companies in a more dependent position.

PNE on PHP=0.

PNE on PNE=0.

PNE on RP=0.

RP on QR=0.

RP on AC=0.

RP on IOR=0.

RP on RMC=2. Iran's high RP strengthens RMC.

RP on PIOC=0.

RP on PHP=1.5. RP will be tailored to sustain high PHP.

RP on PNE=3. High RP precludes participation in an embargo.

RP on RP=0.

Appendix 2: Saudi Arabia: 1973-1978

Failure to note entries indicate the absence of effect of one variable upon the other.

Long-term Interaction Matrix.

QR on IOR=-.2. As owners of the largest reserves in OPEC, Saudi Arabia's policy of high RP and cautious pricing negatively affects IOR.

QR on PHP=-.5. Large reserves and the fear of provoking lower priced substitutes through aggressive pricing forces down PHP.

QR on PR=.5. Large reserves suggest an increase in RP.

AC on QR=-.1. Increasing AC will deplete QR.

AC on IOR=2.5. Increasing AC and PHP to secure additional revenues will improve IOR.

AC on RMC=.5. Although AC is small relative to revenues, Saudi willingness to generate domestic growth through extensive infrastructural construction and its traditional reliance upon the West for the provision of goods and services and compensatory financial flows to the West suggest improving RMC.

AC on PIOC=-.5. Controlling PIOC will secure a larger share of oil profits.

AC on PHP=.5. Large scale construction of infrastructure will increase AC, thus slightly increasing PHP.

AC on PNE=.5. High AC will constrain the ability to curb supplies.

AC on RP=.2. Increased AC will suggest slight increase in RP.

IOR on RMC=-.8. Disharmony in IOR, caused by conflicting price policies, will improve Saudi Arabia's RMC as it demonstrates support for steady or slowly increasing price changes.

IOR on PHP=.8. Disharmony in pricing policy will force Saudi Arabia to moderate its opposition to higher prices.

IOR on PNE=-2. Pressure may be exerted by radical Arab members for Saudi participation in an embargo. However, the strength of this impact is moderated by staunch Saudi opposition to an embargo.

IOR on RP=-.4. Pressure may be exerted by OPEC members with larger ACs for Saudi Arabia to restrict its RP.

RMC on QR=-.2. RMC pressures to increase RP will deplete QR.

RMC on AC=.5. Stronger RMC and increasing mutual trust expand Saudi expenditures upon sophisticated weapons systems and development goods from the West.

RMC on IOR=-.4. Stronger RMC, manifested in the perceived need to maintain dominance of the West through steady or slowly increasing oil prices, introduces disharmony in IOR.

RMC on PIOC=.05. As international oil companies are still perceived by Western governments as guardians of their energy supplies through manipulation of company-owned distribution networks, pressure will be applied to restrain government efforts at reducing PIOC.

RMC on PHP=-.5. Identification of Saudi interests with that of the West will tend towards low PHP.

RMC on PNE=.3. Embargoes on energy shipments to the West are seen as producing detrimental effects on the balance of power between the former and the Communist bloc, and hence high PNE.

RMC on RP=.6. Commitment to protecting Western interests involves making available adequate quantities of oil.

IEE on IOR=.8. Better IEE, characterised by higher demands for oil, ability to sustain higher prices improve IOR.

IEE on RMC=.2. Better IEE removes some disharmony over pricing and thus improves RMC.

IEE on PIOC=-.05. High demands and greater reliance upon suppliers constrain the bargaining power of companies vis-a-vis host-governments.

IEE on PHP=.6. Better IEE will diminish the force of Saudi arguments against high prices in conditions of economic recession,

IEE on PNE=-1. Fear of jeopardising IEE will deter participation in an embargo.

IEE on RP=.8. Better IEE, marked by higher demands for oil will tend to increase Saudi production.

PIOC on RMC=.2. The control over distribution networks by oil companies moderate the severity of OPEC decisions on supply curtailments thus improving RMC.

PHP on AC=.5. PHP will encourage immediate investments in social and economic infrastructural developments, thus expanding AC.

PHP on IOR=.8. High Saudi PHP will improve its IOR with the majority high price group.

PHP on RMC=-.4. High PHP will damage RMC.

PHP on PHP=-.1. High prices will reinforce Saudi arguments against future rounds of price increases.

PHP on PNE=-2. As PNE may increase prices, low PHP is incompatible with an embargo.

PHP on PR=.2. Higher prices, if instituted without Saudi consent, may incite it to increase RP to undermine the higher price.

PNE on IOR=-.1. Overall Saudi impact on IOR is slight.

PNE on RMC=2. Higher PNE induces higher RMC.

RP on QR=-1.5. Long-term increases in RP will reduce QR.

RP on IOR=-.4. Higher Saudi RP threaten the maintenance of higher prices and competes for a larger share of the market, thus aggravating IOR.

RP on RMC=.2. High RP which meet Western demands and undermines the maintenance of high prices will stimulate RMC.

RP on PHP=-.4. Higher RP lowers actual prices and threatens official OPEC price levels.

RP on PNE=-.4. A general production curtailment may be used as a substitute for an embargo to specific consumers.

Short-term Interaction Matrix

AC on IOR=1. Higher AC and the need for additional oil revenues and hence higher PHP will improve Saudi relations with the higher price advocating OPEC majority.

AC on PHP=.2. Higher AC will slightly increase PHP.

IOR on RMC=-1.5. Disillusionment with Israeli-U.S. intransigence among Arab members and pressures exerted by them upon Saudi Arabia to adopt more radical strategies mar its RMC.

IOR on PIOC=-.5. The necessity of enforcing cooperation in carrying out the oil strategies of the Arab states further restrict PIOC.

IOR on PHP=1.5. Price is a complementary strategy of the Arab "oil weapon".

IOR on PNE=-1. IOR moderates Saudi Arabia's commitment to reject the embargo on oil sales.

IOR on RP=-1.5. Curtailment of RP becomes Saudi Arabia's best alternative to the embargo on oil.

RMC on IOR=-1.2. Stronger RMC and commitment to low prices and rejection of the more radical oil policies exacerbate IOR.

RMC on PIOC=.2. In view of the impending problems of supply and pricing, RMC serves to strengthen PIOC.

RMC on PHP=-1.5. Pressure is exerted to restrain prices.

RMC on PNE=1. Pressure is exerted to reject the embargo option.

RMC on RP=1.5. RMC is used to influence Saudi Arabia to increase RP.

IEE on IOR=.5. Economic recovery and consequent strong demand for oil improve IOR by removing areas of friction over market shares and price-cutting.

IEE on PHP=.3. Improving IEE and ability of consumers to pay higher prices strengthen PHP.

IEE on RP=1.5. Higher IEE will stimulate demand and RP.

PIOC on RMC=.2. PIOC, manifested largely in the control of distribution networks, operates to ensure some supplies to all customers, thereby ameliorating the effects of Arab oil strategies on RMC.

PIOC on PNE=-.2. Problems from consumers and suppliers confronting oil companies in an embargo on oil, suggest the latter would persuade the Saudi government against participation.

PHP on AC=1.5. Higher PHP will force additional investments.

PHP on IOR=.8. Higher PHP will unite members.

PHP on RMC=-.8. High PHP will damage RMC.

PHP on PHP=-.4. High PHP will deter immediate future increases.

PHP on RP=.5. High PHP will increase RP.

PNE on IOR=-.3. PNE damages IOR when the majority of OPEC members favour an embargo.

PNE on RMC=.5. PNE reassure RMC.

PNE on PR=-.5. PNE leaves curtailment of RP as the only alternative strategy to appease majority OPEC demands.

PR on IOR=-1. High RP thwart the Arab "oil weapon", compete for a larger share of the market and threaten higher price levels.

RP on RMC=1. Higher RP reassures consumers of oil supplies.

RP on PHP=-1. Production curtailment results in higher oil prices.

RP on PNE=-1. Curtailment of RP strengthens PNE.

Appendix 3: OPEC 1973-1978

Long-term Interaction Matrix

I on SA=-1. As a major producer and leader of the majority faction desiring higher prices, the impact of an increase in the value of I diminishes the value of SA.

I on OA=.5. Demands for higher prices support the demands of the OA faction for still higher prices.

I on RMC=1. Moderate price increases and assurances of continued reliable oil supplies strengthen RMC.

I on P=.5. I favours a moderate price increase.

I on PE=-.8. While association with members preferring an embargo on oil presents I with diplomatic and "image" problems, it nevertheless stands to gain from curtailed supplies and higher prices.

I on RP=.3. The I faction is characterised by high demands for additional revenues, and hence RP will accomodate financial requirements and will be moderated by some conservation.

SA on I=-.5. As the largest producer, SA diminishes the impact of I.

SA on OA=-1. Ideological and political isolation make the OA faction more vulnerable to SA's impact.

SA on RMC=2. SA's commitment to protecting the dominance of the West improve RMC.

SA on PE=-2.5. Embargoes on oil are considered highly damaging to the interests of the West and SA itself. Hence the strong opposition.

SA on RP=.6. Higher RP undermine high prices, provide adequate supplies to meet international requirements and relieve its large reserves.

OA on I=.5. In contrast to radical OA proposals, the I demands appear more reasonable.

OA on SA=-.3. Perceived legitimacy of demands and sympathy from $\bar{I}$ members force SA to moderate its conservative position.

OA on RMC=-2. Radical demands damage RMC.

OA on P=1.1. OA favours high prices.

OA on PE=1. Embargoes on oil remain a viable radical strategy.

OA on RP=.5. Iraq and Algeria are confronted by high financial requirements while past behaviour of all members indicate interests in increasing production.

RMC on I=-.2. Stronger RMC slightly moderates I's demands.

RMC on SA=1.5. Stronger RMC engenders greater Saudi commitment to protecting its interests.

RMC on OA=-.3. Better RMC will slightly moderate the OA position.

RMC on PE=-3. Fear of potentially severe economic crisis arising from embargoes on oil ensures strong opposition.

BMES on I=1. Uncertainty in BMES will strengthen demands for higher prices, higher production and market shares and rejection of embargoes.

BMES on SA=-2. BMES will discredit Saudi policy of protecting Western interests and reliance upon the U.S. to moderate Israeli intransigence.

BMES on OA=2. BMES will strengthen appeal of OA strategies and promote embargoes on oil and high prices.

BMES on RMC=-1.2. U.S. partiality to Israel in a BMES will damage RMC.

BMES on P=.6. A BMES will cause prices to rise but not significantly from already high levels.

BMES on PE=1.5. BMES legitimises the extraordinary embargo strategy.

BMES on RP=-.6. RP curtailment or in conjunction with an embargo becomes likely.

IEE on I=.5. Strong IEE suggests ability to pay higher prices and stronger demand thus improving I's arguments for higher prices.

IEE on SA=-.1. Stronger IEE reduces the validity of the Saudi argument of price restraint to sustain a weak international economy.

IEE on OA=.3. Stronger IEE has the same impact for OA as well as I.

IEE on RMC=.2. Stronger IEE eases RMC.

IEE on P=.4. Higher IEE will increase demands for higher P.

IEE on PR=.5. RP will be increased to meet stronger demand from improved IEE.

P on I=-.2. Higher existing prices will moderate I's demand for further increases.

P on SA=1. High existing prices will strengthen SA's demands for price reduction or maintenance.

P on RMC=-.5. Higher prices will damage RMC.

P on P=.4. Price increases will still be regarded by the majority as being inadequate.

P on RP=.3. Higher P will encourage higher RP as a means of increasing revenues for some and to depress prices for SA.

PE on I=1.2. The higher the PE, the stronger becomes I's demands for higher prices.

PE on RMC=-2. High PE will damage RMC.

PE on P=.3. Fear of PE will increase P.

PE on RP=-1.2. PE will result in reduction of RP.

RP on I=-.3. Higher RP reduces the possibilities of achieving I's demands.

RP on SA=.8. Higher RP strengthens SA's position on maintaining existing price levels.

RP on OA=-.5. Higher RP undermines OA's demands for higher prices and embargo on oil sales.

RP on RMC=.3. Higher RP will reassure RMC.

RP on P=-.1. High RP undermines P.

Short-term Interaction Matrix

I on SA=-2. Isolation of SA and relative strength of I faction reduces SA's influence.

I on OA=2. I's position on pricing reinforces the OA faction.

I on RMC=-1.5. Demands for high prices damage RMC but is moderated by the I faction being reliable major suppliers.

I on P=2.5. I's demands will significantly increase P.

I on PE=-.3. I is moderately opposed to PE.

I on RP=1. I is in favour of increasing production.

SA on I=-.2. Being isolated SA is not able to strongly undermine I.

SA on OA=-.5. In a crisis, SA is discredited and barely manages to undermine OA.

SA on RMC=-2. As a Arab state and susceptible to radical Arab influence, SA's RMC is damaged despite its opposition to an embargo on oil.

SA on P=1. Increased prices must complement production curtailment which SA favours.

SA on PE=-1. SA is opposed to an embargo.

SA on RP=-1.5. SA favours a general curtailment of RP.

OA on I=2. In contrast to the radical demands of the OA faction, I's preference appear more moderate and hence more legitimate.

OA on SA=-3. The crisis nature of BMES legitimises the use of radical strategy and demonstrates the inadequacy of the Saudi approach.

OA on RMC=.3. The threat of major economic disruptions damages RMC severely.

OA on P=3. Panic created by an embargo on oil will increase prices substantially.

OA on PE=3. Extraordinary ~~BMES~~ crisis conditions legitimises the embargo on oil.

OA on RP=-3. Reduction in RP must accompany an embargo.

RMC on SA=1. Close ties between SA and the West provide the latter with greater leverage to persuade Saudi rejection of the radical proposals.

RMC on OA=-.3. Articulated Western threats of military and economic sanctions slightly undermines the OA position.

RMC on P=-.1. Under conditions of BMES, RMC's effect on P will be slight.

RMC on PE=-1. Leverage through RMC to restrain the embargo is not large under the circumstances.

RMC on RP=.5. RMC will be used to urge increases in RP.

BMES on I=2. BMES provides the conditions for increased I production and prices.

BMES on SA=-3. BMES discredits the continued use of a strategy supportive of Israel's Western allies and is incapable of response to the political and military situation.

BMES on OA=3. War supports the use of drastic approaches.

BMES on RMC=-3. In the BMES the West is pinpointed as the enemy and the target of Arab strategy.

BMES on $P=3$. Strategies responding to BMES provide for increase in P .

BMES on $PE=3$. The use of an embargo on oil becomes an appropriate strategy in BMES.

BMES on $RP=-3$. Reduction in RP complements an embargo.

IEE on $I=1$. Strong demand supports higher prices and production.

IEE on $SA=-1$. Stronger demand and better ability to pay higher prices reduces the force of Saudi arguments against jeopardising economic recovery.

IEE on $OA=1$. OA demands for higher prices and curtailed RP is supported by higher oil demands and greater economic susceptibility of the West.

IEE on $P=.5$. Increased demand supports P increase.

IEE on $PE=1$. Higher demand increases Western susceptibility to an embargo.

IEE on $PR=.5$. Increased production responds to new demand.

P on $I=.4$. Existing price levels are generally considered inadequate and strengthen demands for higher levels.

P on $OA=.4$. OA demands higher prices as existing levels are considered low.

P on $RMC=-1.5$. Any increase in P will damage RMC .

P on $P=1:6$. Existing price levels are considered low and will encourage increases.

P on $PE=.5$. Price is a complementary strategy of the "oil weapon".

P on $PR=.4$. Higher P will increase PR .

PE on $I=.5$. Higher PE provides conditions for increased prices and production.

PE on $SA=-2$. PE will force prices up and SA 's production down.

PE on OA=.2. Due to the severe political and economic consequences of an embargo, its temporary nature does not significantly increase OA.

PE on RMC=-3. An increase in PE, severely affects RMC.

PE on P=2.5. Curtailment of supplies will lead to high prices.

PE on PR=-3. Curtailment of RP must accompany an embargo.

RP on I=-.1. An increase in RP will only slightly damage the strength of the I faction under conditions of strong demand.

RP on SA=-1. An increase in RP jeopardises SA's alternative strategy of a general RP curtailment.

RP on OA=-.5. An increase in RP will jeopardise an embargo on oil as well as higher prices.

RP on RMC=1. An increase in RP will improve RMC.

RP on P=-.5. An increase in RP will undermine P increase.

Appendix 4: Iran: 1977-1982

The failure to note an interaction denotes the absence of variable impact except where IEE has been externally imposed.

Long-term Interaction Matrix

QR on IOR=-.5. High QR and its tendency towards higher production and market shares damage IOR.

QR on RMC=1. High QR, high production and moderate prices improve RMC.

QR on PHP=1. Although QR is substantial, Iran's rapidly diminishing reserves tends towards high PHP.

QR on RP=.5. High QR tends towards high RP.

AC on QR=-.2. Larger AC will result in higher production.

AC on AC=1. Investments in economic growth will increase future AC.

AC on IOR=-.2. The positive effects of higher AC on IOR, high PHP, is offset by higher production and market shares at the expense of other producers.

AC on RMC=-.4. Higher oil prices to accomodate increased AC damage RMC.

AC on PHP=1. Higher AC will increase PHP.

AC on RP=.8. Higher AC will be accomodated by increased RP.

IOR on RMC=-.5. Closer ties with OPEC members, resulting in a higher price consensus, are likely to upset RMC.

IOR on PHP=.8. Higher IOR is likely to result in a higher price consensus.

IOR on RP=.5. Better IOR eliminates the possibility of Saudi Arabia capturing Iranian markets thus enabling the latter to increase production.

RMC on AC=1. Closer RMC will enable heavy Iranian expenditures on military hardware and development goods.

RMC on IOR=-.5. Closer RMC, characterised by sympathy to Western economic problems, will alienate Iran from the high price majority faction.

RMC on PHP=-.5. Closer RMC will persuade Iran of the danger to the international economy from PHP.

RMC on PNE=1.5. Closer RMC will reinforce Iran's PNE.

RMC on RP=.2. Closer RMC will ensure Iranian oil supplies meet international demand.

IEE on QR=-.4. Better IEE, characterised by strong demand for oil will slightly deplete QR.

IEE on IOR=.8. Better IEE, strong demand and ability to pay higher prices, will remove sore points over prices and market shares in IOR.

IEE on PHP=1.5. Better IEE will encourage higher PHP.

IEE on RP=.3. Better IEE will result in higher RP to meet demand.

PHP on QR=-.8. Higher PHP will encourage greater extraction.

PHP on AC=.4. Higher revenues from increased prices will encourage greater expenditures as well as concerns for increasing avenues of expenditures.

PHP on IOR=1. Higher PHP will bind Iran closer with the moderate as well as radical price factions, but positive gains will be offset by strains with Saudi Arabia.

PHP on RMC=-.5. High PHP will upset RMC.

PHP on PHP=-.1. High price, exert a barrier to future increases.

PHP on RP=1. High PHP will encourage larger RP.

PNE on IOR=0. Alienation from the radical faction arising from high PNE is offset by support given to the anti-embargo conservative faction as well as the high price-advocating radical faction.

PNE on RMC=1. Iranian PNE strengthens RMC.

RP on QR=-.5. Increased RP will diminish QR.

RP on IOR=-.3. Higher Iranian RP and attempts to enlarge market shares will damage IOR.

RP on RMC=.1. Larger RP will assure West of supplies to meet increasing demand.

RP on PHP=-.1. Increased production is compromised by lower PHP.

Short-term Interaction Matrix

QR on IOR=-.2. Large Iranian QR poses potential strain with other members over market shares.

QR on PHP=-.1. Large QR prevents Iran from charging very high prices.

QR on RP=.3. Large QR encourages increased RP.

AC on AC=.2. Through investment for growth, AC for new investments is expanded.

AC on IOR=.3. Expanded Iranian AC and consequent financial requirements align it with the majority high-price faction, but damages relations with low price advocating Saudi Arabia.

AC on RMC=.1. Expanded demand for Western goods and services is offset by high requirements for oil revenues.

AC on PHP=1.6. High AC encourages higher PHP.

AC on PNE=.5. High AC and financial requirements militates against issuing an embargo on oil.

AC on RP=.5. High AC encourages larger RP.

IOR on RMC=-1. Closer IOR, accompanied by stronger consensus on oil pricing will unsettle RMC.

IOR on RP=-.1. Closer cooperation will result in slight reductions in Iran's RP to bolster prices.

RMC on IOR=-.2. Closer RMC and Iranian sympathy with Western demands for maintaining existing price levels will alienate it from the majority high price faction but cement its ties with Saudi Arabia.

RMC on PHP=-.5. Closer RMC will increase Iranian sympathies with maintaining existing price levels.

RMC on PNE=.5. Closer RMC will militate against an Iranian embargo on oil to the West.

RMC on RP=.2. Closer RMC will persuade Iran to increase RP to match demand as well as steady prices.

IEE on QR=-.2. Improved IEE will encourage higher production thus decreasing QR.

IEE on IOR=-.2. Deteriorating IEE, marked by sluggish demand and inability to pay higher oil prices will increase probabilities of price-cutting and competition for increased market shares or for maintaining existing export levels.

IEE on RMC=.3. Better IEE will reduce friction from price cutting.

IEE on PHP=1.5. Improved IEE, marked by increased demand and ability to pay higher prices will increase PHP.

IEE on RP=2. Improved IEE will encourage higher production to meet demand.

PHP on QR=-.8. High PHP will result in decreasing QR in order to maximise oil earnings.

PHP on IOR=.3. High PHP will cement ties with the majority but damage IOR with Saudi Arabia.

PHP on RMC=-.5. PHP will damage RMC.

PHP on RP=1.5. PHP will increase RP.

PNE on RMC=.5. PNE will ensure the confidence of the West.

RP on QR=-.4. Increased RP will help deplete QR.

RP on IOR=-.5. Increased Iranian RP resulting in a larger market share will damage IOR.

RP on RMC=.1. Increased RP will reassure Western consumer countries.

RP on PHP=-.05. Expanded RP will dampen PHP.

RP on RP=-.1. Increased RP will inhibit further increases in the short-run.

Appendix 5. Saudi Arabia: 1977-1982

Failure to note an interaction denotes the absence of variable impact except where the IEE variable has been externally imposed.

Long-term Interaction Matrix

QR on IOR=-.2. Large QR and high production rates compete for market shares with other members.

QR on RMC=.5. Large QR and high RP reassure Western consumers.

QR on PHP=-1.5. The fear of provoking oil substitutes through demands for high price inhibits PHP increases.

QR on PNE=1. Uncertainty of supply may result in the shift to oil substitutes, hence increasing Saudi PNE.

QR on RP=1.5. High QR requires high RP before demand for oil diminishes.

AC on AC=.8. Investments in infrastructural developments increase future AC.

AC on IOR=.2. Higher AC, with increasing requirements for oil revenues will improve Saudi Arabia's relations with the high price advocating majority faction.

AC on RMC=1. Higher AC promises the expenditure of large sums on Western goods and services.

AC on PHP=.1. Increased AC will slightly increase PHP.

AC on PR=.1. High AC will encourage increased production.

IOR on RMC=-.2. Closer ties with the Iranian faction preferring higher prices or with the radical faction will unsettle RMC.

IOR on PHP=.5. Closer ties with other members will increase Saudi PHP.

IOR on PNE=-.1. Closer IOR will only have a small negative effect upon Saudi PNE.

IOR on RP=-.2. Closer IOR will restrain Saudi RP to enlarge its market shares and maintain lower prices.

RMC on AC=.5. Closer RMC will enlarge AC through sales of expensive military hardware.

RMC on IOR=-.5. Deeper sympathy for Western arguments against price increases will damage IOR.

RMC on PHP=-1. Closer RMC will reinforce already low PHP.

RMC on PNE=1.5. Influence will be exerted through closer RMC to steer away from launching an embargo on oil.

RMC on RP=.3. Western influence will persuade Saudi Arabia to make available oil supplies to meet demand.

IEE on QR=.8. Improved IEE will encourage an increase in production to meet expanded demand.

IEE on IOR=1. Improved IEE, marked by stronger demand, will eliminate some friction over pricing and market shares.

IEE on PHP=1. Strong IEE will reduce the Saudi argument against price increases to protect the unsteady international economy.

IEE on PNE=-.2. Fear of damage to a weak IEE will reinforce the Saudi aversion to an embargo on oil to the West.

IEE on RP=.5. Stronger IEE will encourage production to meet higher demand.

PHP on IOR=.5. Higher PHP will improve relations with the majority of members.

PHP on RMC=-1.5. Higher PHP, with severe consequences for the international economy, will severely damage RMC.

PHP on RP=-1.5. Opposition to high prices will induce Saudi Arabia to substantially increase RP to undermine high prices.

PNE on RMC=2. High PNE will greatly reassure RMC.

RP on QR=-1. High RP will more quickly deplete QR.

RP on IOR=-.8. High RP, especially with the purpose of restraining price and increasing Saudi market shares will damage IOR.

RP on RMC=.5. High RP will restrain prices and ensure supply thus improving RMC.

RP on PHP=-1. High RP will decrease PHP by restraining price through increased supply.

Short-term Interaction Matrix

QR on RMC=.5. Large reserves and conservative Saudi oil policies reassure RMC.

QR on PHP=-1.5. Fear of substitution for oil arising from high prices will dampen PHP.

QR on RP=1. High QR encourages higher RP.

AC on IOR=.2. Higher AC and increased requirements for oil revenues will reconcile Saudi Arabia to the majority of members preferring higher prices.

AC on RMC=.3. Increased AC will increase compensatory flows to the West through purchases of goods.

IOR on RMC=-.4. Closer IOR will unsettle RMC.

IOR on PHP=1. Tension in IOR will moderately dampen PHP.

IOR on PNE=-.5. Closer IOR will ensure closer cooperation.

IOR on RP=-2. High RP will be used to deny increased oil revenues to rivals if IOR is strained.

RMC on AC=.5. Closer RMC will allow expenditures on costly Western weapons systems.

RMC on IOR=-1. Closer RMC will alienate the high price majority from Saudi Arabia.

RMC on PHP=-1. Closer RMC will restrain PHP in order to prevent damage to the Western dominated international economy.

RMC on PNE=1.5. Close RMC will be used to reinforce PNE.

RMC on RP=.2. Close RMC will encourage RP to sustain Western demands.

IEE on IOR=.2. An unstable IEE, marked by sluggish demand will introduce friction into pricing and market sharing agreements.

IEE on RMC=.2. Strong IEE will reduce some friction over pricing.

IEE on PHP=2. An unsteady IEE will greatly reinforce Saudi Arabia's aversion to high prices.

IEE on PNE=-.4. Unsteady IEE will restrain Saudi Arabia's employment of the oil embargo for fear of further deterioration in IEE and East-West balance of power.

IEE on RP=.2. Improved IEE will encourage RP to meet high demand.

PHP on IOR=1.5. High PHP will greatly improve relations with the majority of members.

PHP on RMC=-1.5. PHP will severely damage RMC.

PHP on PHP=-1. High price will inhibit high PHP in the short run.

PHP on RP=-.2. High PHP will tend to restrain RP to maintain higher price levels.

PNE on IOR=-.5. PNE will alienate the radical faction but will reassure non-Arab members.

PNE on RMC=1. PNE will reassure the West.

RP on QR=-1. High RP will reduce QR.

RP on IOR=-1. High RP, especially in order to undermine higher prices will greatly damage IOR.

RP on RMC=.3. Higher RP will reassure RMC.

RP on PHP=-1. Higher RP will undermine prices.

Appendix 6: OPEC: 1977-1982

Failure to note interaction entries denotes the absence of variable impact except in IEE, BMES and S where values have been externally imposed to reflect projected trends.

Long-term Interaction Matrix

I on SA=-.3. The conflict over policy preferences reduces SA's influence.

I on OA=.3. The coincidence of interests moderately reinforces OA's influence.

I on RMC=-.5. Iranian insistence on higher price levels damages RMC.

I on P=1.2. Strong Iranian insistence on price increases will result in moderate increases.

I on PE=-1.5. As a non-Arab member, Iranian aversion to an embargo on oil is significant.

I on PR=.3. Iran faces financial pressures to increase oil revenues through higher PR.

SA on I=-.5. Saudi-Iranian conflict over policy preferences reduces Iranian influence.

SA on OA=-.8. In the conflict over the adoption of conservative and radical oil policies, SA's stronger position reduces OA's influence.

SA on RMC=1.. Preference for low or steady prices and higher PR to undermine price increases and rejection of the embargo assures good RMC.

SA on PE=-2. Saudi opposition to the embargo remains strong.

SA on PR=.5. Saudi PR is expected to increase quite significantly from pressure of large reserves and to undermine higher price levels.

OA on I=.1. Being in a weak position, OA only marginally reinforces I's position.

OA on RMC=-.5. Insistence on much higher prices and known tendencies to use production curtailment or embargoes upset RMC.

OA on P=2.5. OA favours significant price increases.

OA on PE=1.5. OA's preference for the embargo strategy is also higher.

OA on PR=.2. Having smaller reserves, OA's increase in PR is smaller.

RMC on I=1. Despite Iran's preference for higher prices, as the major non-Arab exporter, Iran enjoys some support from RMC.

RMC on SA=-.3. Pressure is likely exerted through SA to dampen OA's influence.

RMC on P=-.5. RMC influence will be exerted to restrain prices.

RMC on PE=-1.5. Western influence will be used to avert an oil embargo.

RMC on PR=.3. Anxiety over supplies leads the West to lobby for higher PR.

BMES on I=.5. Panic and confusion over supply will reinforce Iran's preference for higher prices and production.

BMES on SA=-2. BMES, arising from failure of Saudi cooperation with the West, will greatly diminish its influence.

BMES on OA=1. Failure of the conservative Saudi strategy will temporarily legitimize OA's alternative radical approach.

BMES on RMC=-2.5. Confrontation between Arab states and Israel and its American ally will severely damage RMC.

BMES on P=1.5. Anxiety over supply will raise price considerably.

BMES on PE=2. The need for an alternative strategy vis-a-vis Israel and the U.S. will increase PE.

BMES on PR=-.2. In the long run, production would have declined slightly.

IEE on I=1.5. Stronger IEE will strengthen Iran's preferences for higher prices and production.

IEE on SA=-.3. Strong demand and a sturdy economy diminish justification for not increasing prices.

IEE on OA=.5. Strong demand will reinforce OA's call for higher prices.

IEE on RMC=.1. Stronger IEE is likely to remove some friction over pricing.

IEE on P=1. Stronger demand will increase prices.

IEE on PR=.2. Stronger demand will increase PR.

S on I=-.3. The introduction of potential substitutes will dampen Iranian preference for higher prices but may encourage slightly higher production.

S on SA=.8. Competition from non-OPEC oil as well as substitutes will reinforce the Saudi argument against excessive price increases.

S on SA=-.5. The threat of substitutes will do more to damage the appeal of the most price aggressive faction.

S on RMC=-.1. The introduction of substitutes is likely to slightly diminish RMC.

S on P=-1.2. The effect of S would be to greatly restrain price increases or result in actual reductions.

S on PE=-2. The use of substitutes will greatly diminish the success and employment of an embargo.

S on PR=-.2. Substitutes reduce demand for oil.

P on I=-.3. One increase in price will dampen prospects for future increases.

P on SA=.3. One price increase will reinforce arguments against future increases.

P on OA=-.5. The effect on OA is stronger than that on I because of the relative isolation of OA.

P on RMC=-.2. Because of heavy reliance upon oil, moderate price increases will be absorbed with little damage to RMC.

P on PR=-.8. An increase in P will bring a long term decrease in PR through fall in demand.

PE on SA=.3. With the return of normal conditions, the long term effect of PE is to reinforce non-confrontational strategies.

PE on OA=-.3. With subsiding of tensions, the long-term impact of PE is to isolate the radical faction.

PE on RMC=-.2. PE will greatly damage RMC.

PE on P=.5. The long-term effect is to sustain a slight increase in P.

PR on I=-.2. Higher PR will dampen price.

PR on SA=.5. Higher PR will undermine higher prices.

PR on OA=-.2. Higher PR will undermine higher prices.

PR on RMC=.2. Higher PR will slightly reassure RMC.

PR on P=-.3. PR will dampen P.

Short-term Interaction Matrix.

I on SA=-.1. As SA remains the strongest faction, the effect of moderate price I on SA is small.

I on OA=.1. I's support of price increases reinforce OA's position but is offset by I's dissociation from OA's radical rhetoric.

I on RMC=-.5. I's preference for higher prices alarms RMC.

I on P=.5. I prefers a moderate increase in price.

I on PE=-1.5. As non-Arab members, the I faction avoids the "oil weapon".

I on PR=.1. I's policies will result in slightly higher PR in response to P.

SA on I=-.7. As the strongest faction, SA's opposition to new price increases reduces I's influence.

SA on OA=-1.5. Opposition to radical policies and the isolation of OA reduce OA's impact.

SA on RMC=1.5. Aversion to the embargo and high prices reassure RMC.

SA on P=0. SA advocates maintaining existing prices.

SA on PE=-2. SA strongly opposes embargoes on oil.

SA on PR=1. In order to undermine new prices and reassure consumers, SA increases its PR.

OA on I=.2. OA's insistence upon higher prices slightly reinforces I's position.

OA on SA=-.2. By offering an alternative strategy, OA slightly diminishes SA's impact.

OA on RMC=-.4. Radical rhetoric and oil policies unsettle RMC.

OA on P=1. Adoption of OA's policies will increase P.

OA on PE=.5. Although reserved as a strategy of last resort, the embargo remains a viable alternative.

OA on PR=.2. An increase in P will bring about higher PR.

44
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RMC on I=-.5. RMC will be used to dissuade Iran from higher price demands.

RMC on SA=1. Support for SA reinforces its impact.

RMC on OA=-1. The threat of military or diplomatic intervention restrains OA.

RMC on P=-1. Influence is exerted to reduce prices.

RMC on PE=-1. Influence is exerted to reject the embargo.

RMC on PR=.5. Concerned over supply, Western nations lobby for increase in PR.

BMES on I=1.5. Tensions and uncertainty resulting from BMES would increase prices and increase demand for Iranian oil.

BMES on SA=-2. A BMES would discredit the conciliatory strategy of Saudi Arabia and temporarily curtail its influence.

BMES on OA=3. The discredited Saudi strategy and crisis situation pave the way for the radical approach.

BMES on RMC=-2.5. Polarization of Arab states and Israel and its American allies greatly damage RMC.

BMES on P=1.5. The uncertainty of supply in BMES will increase P significantly.

BMES on PE=2.5. BMES legitimises the embargo as the strategy of last resort.

BMES on PR=-.8. BMES will temporarily reduce PR especially in association with an embargo.

IEE on I=.5. Stronger demand will reinforce I's call for higher prices and production.

IEE on SA=-1. Stronger demand and better ability to respond to higher prices will undermine the Saudi argument for restraint to avoid endangering IEE.

IEE on OA=.5. The effect is similar to that for I.

IEE on P=.3. Stronger demand will encourage an increase in P.

IEE on PR=.2. Stronger IEE will encourage production.

S on I=-.2. The short-term impact of S on I is to dampen higher price demands and delay the switch to S.

S on SA=1. S prompts fears of an accelerated switch to S., reinforcing the SA call for price restraint.

S on OA=-.2. The effect is similar to that for I.

S on P=-.1. In the short-run, S will slightly dampen P.

S on RP=.1. The short-term impact on RP is adequate production meet consumer demands to avert anxiety over supply shortage.

P on I=-.2. The short-term impact of one price increase is to dampen I's call for new increases.

P on SA=.8. One price increase temporarily halts the next.

P on OA=-.1. The effect is similar to that on I.

P on RMC=-.5. Price increases damage RMC.

P on P=-.5. One increase dampen prospects for the next.

P on RP=.4. Higher P will increase supply.

PE on I=.5. PE will increase P and demand for I's supply.

PE on SA=-1.5. PE weakens SA's preference for low prices, higher production and no embargo.

PE on OA=1. PE strengthens OA demands for higher price and the use of the "oil weapon".

PE on RMC=-1.5. The threat of supply curtailment and substantially higher prices damage RMC.

PE on P=1. Supply uncertainties created by PE strengthen P.

PE on PE=.1. The momentum created by PE marginally strengthens it.

PE on RP=-1.6. PE will temporarily restrain PR.

RP on I=-.5. Higher RP will dampen price increases and constrain higher production.

RP on SA=1. Higher RP undermines new prices, reinforcing SA's position.

RP on OA=-.5. The effect is similar to that on I.

RP on RMC=.8. Higher RP will remove some anxiety over prices and supply.

RP on P=-.4. Higher RP will push down actual prices charged.

RP on RP=-1. Market forces will adjust RP.

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