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NEW CONSTRAINTS IN ABSORPTIVE CAPACITY AND THE OPTIMUM RATE OF PETROLEUM OUTPUT

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New Constraints on Absorptive Capacity and the ~~Optimum Rate of Petroleum~~

Optimum Rate of Petroleum Output

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I. Introduction

Rigorous analysis of economic policy in the oil-producing countries has been lacking for a number of reasons. First, there has been a lack of basic information regarding the policy-making processes in these countries which would serve as a basis for analysis. Secondly, the basic data necessary to examine the impact of economic policy on the economies of these countries has been sparse. Thirdly, the complex relationship between economic changes in the oil-producing countries and in the world economy has created problems for investigators in separating out the impact of domestic policy decisions from exogenous shocks and changes in world market conditions on the development of these countries. We analyze economic policy in oil-producing countries within a framework that combines a qualitative assessment of the policy-making process with an empirical formulation based upon historical and current trends in these countries.

In this study we employ the concept of absorptive capacity to analyze the optimum rates of petroleum production in Iran, Iraq, Saudi Arabia and Kuwait. The analysis offers a basis for a comparative analysis which will distinguish the similarities and dissimilarities among these nations. All share the dominant impact on their respective economies of Petroleum; yet a wide disparity exists in the level of economic development, the degree of achieved and potential economic diversification, the demographic problems of urbanization and problems associated with economic and administrative centralization. Each country exhibits special political and cultural elements which impact upon the developmental and/or spending priorities as well as the utilization of petroleum resources.

The countries have been selected to reflect a wide range of constraints on absorptive capacity with the attendent policy issues linked to the decision-making process in setting petroleum output rates. All are members of OPEC and together hold a critical share of the petroleum reserves represented by that organization.

Kuwait is small, both in geographic size and population, with a highly centralized and urbanized social system. For all practical purposes, it is agricultureless. Moreover, it has the longest history of capital surplus funds among the major oil producers and established the first institutionalized foreign aid agencies and programs. Saudi Arabia, the world's largest petroleum exporter, by contrast is of substantial size but sparsely populated. Its potential for economic diversification, while limited, is nonetheless greater than, for example, Kuwait. Saudi Arabia and Kuwait, are dependent upon imported labor, both skilled and unskilled. In recent years, Saudi Arabia has played a role in oil price moderation and has assumed a swing position in controlling output.

As the second most important oil exporter, fluctuations in Iranian output have caused reassessments in such crucial areas as production, exports, and :ing. Because of the traditional magnitude of Iran's share in international oil trade, changes there have significant impacts on the United

States, other industrialized nations, and the developing bloc. Moreover, there exists the demonstration effects of Iranian oil exploitation and development policies on other petroleum exporters.

The analysis of the recent Iranian experience will reveal lessons that may be learned from that country's oil and growth policies. Nonetheless, an awareness of the features special to the Iranian case is essential to allow valid comparisons to be drawn. Among the areas to be assessed vis-a-vis Iran are: (a) the level of output to be adopted when the initial fluctuations following the 1978-1979 production disruptions have diminished; (b) the effects the new Iranian production policy will have on world oil pricing; (c) the effect of changes in Iranian output policies on production policies of other oil exporters; and (d) the impact of Iranian output and oil prices on the balances of trade and payments of importers, particularly the United States.

The case of Iraq is somewhat distinctive from the other five Middle East OPEC states under consideration. First, its ideological bent as set by the Baathist party places its economy near the end of the non-communist but socialist spectrum. Recently, however, there has been a move on the part of the Iraqi government to expand trade with the West. A second element is its petroleum reserves, which are still a matter of some conjecture with indicators that its resources of this fossil fuel may be larger than those commonly appearing in trade publications. Third, next to Iran the most populous of the countries under study, Iraq does not suffer from excessive population pressures as does Egypt, for example. Within the region, it has of the more promising bases for developing a diversified economy. However, national cohesiveness must be considered, given the cultural and social divisions within the country such as the Kurds.

Our work has revealed a diversity of experience in these countries that can only be understood in the context of the unique constraints on absorptive capacity encountered in each country. From the initial factor endowments to differences in social, economic, and political institutions shaping their development efforts each country is unique. While they share an intense desire to diversify their economies to reduce dependence on petroleum exports they have chosen quite different paths to that diversification.

They have been forced to modify their development plans as a result of their interdependent linkages to an unstable world petroleum market. Each country has responded in a somewhat different way to the instability encountered in world markets. Efforts to unify and coordinate decisions in oil pricing and to a lesser extent oil output, through OPEC have had limited success.

The methodology of our work is uniquely designed to capture these different influences on the absorptive capacity and petroleum output decisons of the major oil producing nations. We develop a control solution with an econometric model which is then modified for alternative development strategies based upon an in depth analysis of both qualitative and quantitative factors influencing production decisions. The major contribution of the study is to show where there is consistency and inconsistency between the goals of economic growth, oil production, and exports, and the constraints on economic development inherent in each countries absorptive capacity. In some cases those constraints are encountered in the natural resource e___wments, the capital stock, the labor force, the balance of payments etc.

Through simulation experiments, we were able to incorporate a number of the constraints on absorptive capacity. The reference point for these scenarios is a base projection where oil prices grow at a rate of around twelve percent per annum in nominal terms. Other exogenous variables are projected to grow at the average of historical rates in the past five years. In alternative scenarios, constraints on labor force growth, agricultural productivity etc. are incorporated into the model. Detailed analysis of these scenarios yields insights into how absorptive capacity impacts output, consumption, investment, balance of payments, oil production and other endogenous variables in the model. Unfortunately, we found it difficult to successfully incorporate other constraints such as income distribution and political stability in the analytical model. The impact of these constraints is considered in a qualitative section which is developed in conjunction with the econometric analysis.

II. The Changing Concept of Absorptive Capacity

A. The Traditional constraints on Absorptive Capacity

The central concept used in this study is the concept of absorptive capacity. Absorptive capacity has been described as an ill defined concept; no less than nine different definitions of the concept were offered at a conference on capital movements in 1965. Our use of the concept is determined by the need for a macroeconomic framework for analyzing the historical trends and to project future levels on the production of petroleum in the OPEC countries. It is important to review the various approaches to absorptive capacity as a basis for understanding the concept as we use it in this study.

John H. Adler introduced one of the first rigorous definitions of absorptive capacity.

> "Absorptive capacity may then be defined as that amount of investment or the rate of gross domestic investment expressed as a proportion of GNP, that can be made at an acceptable rate of return, with the supply of cooperant factors considered as given."

A number of studies adopted this definition of absorptive capacity, with numerous refinements depending on the interests of the investigator. Some writers focused on the financial resources available to the country, distinguishing between the financial resources generated by domestic savings, foreign investment, and foreign aid. In some oil producing countries, financial resources were generated primarily through oil exports. For these countries, financial resources were equated with oil revenues or the foreign exchange generated by oil exports. Other studies focused not on financial resources but on the real resources available to the country. Branker Horvat, for example, regards the resources to be absorbed as the stream of output increments.

Much of the debate on absorptive capacity has focused on the transformation of financial resources into investment. some studies defined absorptive capacity as the ability to invest financial resources with a reasonable rate of return both at home and abroad. This broad definition included both the acquisition of real capital goods either through domestic investment or by importing capital goods, and the acquisition of foreign financial assets. Other studies adopted a narrower definition as the ability to invest financial resources at a reasonable rate of return in the domestic economy. Even this narrower definition of absorptive capacity is open to ate. Should domestic investment include expenditures for education and training as the proponents of human capital formation suggest? What is an acceptable rate of return a investment on the domestic economy?

In understanding the absorptive capacity of the OPEC countries the overriding consideration is that financial resources generated from oil revenues accrue to the government. Prior to the early 1970s a substantial share of oil revenues accrued to multinational oil companies operating in their countries. Those companies made production and investment decisions based upon profit maximization utilizing discount rates relevant to the firm. As those firms anticipated the transfer of property rights to the host country either through increase in royalties, taxes and sharing agreements, or through outright nationalization of the oil sector, they adjusted their production and investment decision accordingly. High discount rates on revenue generated from petroleum production beyond a short run of a few years resulted in low rates of investment and high rates of current production in order to maximize the returns on past investment in productive capacity.

The transfer of property rights in petroleum from the operating companies to the last governments of the OPEC countries coincided with a sharp and discontinuous rise in oil prices. Both of these changes had a profound effect upon the absorptive capacity of the OPEC countries. The shift in property rights to the governments of these countries meant that production and investment decisions in the petroleum sector reflected an entirely different time horizon with a corresponding change in the discount rate applied to petroleum revenues generated over that time period. The longer time horizon relevant to the government meant lower discount rates on future revenues generated by oil production. This tended to increase the value of petroleum left in the ground relative to petroleum produced. Conservation quickly emerged as a key issue in the energy policies of the OPEC countries as a rational response to the transfer of property rights in petroleum.

Sharp increases in the price of petroleum in the context of the newly nationalized petroleum sector brought a massive transfer of wealth from the petroleum importing countries to the OPEC countries. More specifically the petroleum revenue accrued to the governments of those countries virtually eliminating the financial constraints encountered by other developing countries.. Petroleum revenues initially freed these countries from the constraints encountered in developing economies. The balance of payments constraints was lifted by the rapid growth in petroleum exports that more than offset higher levels of imports. Capital goods imports permitted these countries to expand production capacity at a rapid pace, while imports of consumer goods permitted them to achieve a standard of living far beyond that productive capacity. Oil revenues far exceeded the ability of the government to spend those revenues obviating any budgetary constraints imposed on those governments. The removal of those external and internal constraints on expenditures permitted the government to engage in long term planning for economic development. They responded with ambitious development plans calling for industrialization and diversification of their economies. Investment and consumption spending increased to levels for exceeding even the most generous estimates made in the early 1970s.

The OPEC spending spree of the 1970s quickly encountered constraints to the ambitious development plans adopted by those countries, and absorptive capacity came to be defined in terms of these constraints. Traditionally these constraints are grouped into (3) major categories: (1) inadequate ...rastructure, (2) lack of complementary factors of production. (3) administrative bottlenecks.

As these countries accelerated their expenditures for imported capital and consumer goods they encountered the limits imposed by their inadequate infrastructure. The physical capacity of transportation and communication facilities cold not handle the higher volume of imports. Ships waited for months in ports due to inadequate dock facilities. Once unloaded, equipment and consumer goods sat in warehouses or in open dockside facilities because transportation systems were clogged. Communication facilities were inadequate to handle the transactions required by this higher volume of imports. These limitations imposed by the infrastructure were so important in the 1970s that some studies defined absorptive capacity in terms of the ability of these countries to utilize foreign exchange to finance higher levels of imports. Most OPEC countries recognized the constraints imposed by their physical infrastructure and reallocated resources so as to eliminate these bottlenecks. Saudi Arabia, for example, allocated a substantial portion of their development expenditures to the construction of modern roads, railroads, port facilities, communications. In retrospect it is fair to say that the Saudis and other OPEC countries have successfully removed many of the constraints on development imposed bay their infrastructure..

A second set of constraints emerged in the lack of complementary factor is of production, focusing on limitations of natural resources and human resources. Most of the OPEC countries, especially those in the Middle East, have severe limitations in terms of natural resource endowments. Beyond petroleum and natural gas, they have few mineral resources. The share of the total land resources which is arable is small or nonexistant. Limited plies fresh water impose a constraint not only on agricultural development but also on the growth and urbanization of the population. These natural resource constraints are difficult if not impossible to overcome. Some success has been achieved in producing fresh water from salt water and in tapping underground aquifers of water. Kuwait and Saudi Arabia have had some success with aquifersous and some countries have successfully reclaimed areas of the desert for cultivation and reforestation. But the prospects are for continued dependence of OPEC countries on foreign sources for the major share of their food supplies, and natural resource constraints will continue to limit their efforts to divesify away from dependence on the oil sector.

Human resource constraints are evident in all of the OPEC countries, at virtually all levels of education and training the available supply of manpower has been inadequate to meet manpower needs. Expatriate labor plays an important role in all of these countries and in some of them the majority of the labor force is composed of expatriates. Manpower constraints are especially evident at the technical and managerial levels, and these countries rely heavily upon expatriates to perform essential functions. Dependence on an expatriate labor introduces a unique set of social and economic problems. OPEC countries are increasingly sensitive to these problems and have implemented plans to upgrade their educational and training programs to reduce dependence and expatriate labor. For example foreign contractors are expected to train nationals of the country as part of their contractural arrangements. Priorities are set on development projects based upon their labor capital ratios and their requirements for expatriate labor. Countries such as Kuwait and Saudi Arabia have invested heavily in education of nationals at home and abroad. Despite these efforts human resource constraints have proven to be formidable obstacles to over come. Most of these programs yield benefits in upgrading the human capital of the labor force over a very long period of time. In the short run these countries will continue to rely heavily on expatriate labor and must cope with the problems associated with that labor force.

The final set of constraints on absorptive capacity in the traditional literature are administrative bottlenecks. Oil revenues in the OPEC countries are funneled through an administrative bureaucracy that imposes a formidable set of obstacles to development. These problems go beyond simply the limited capability of government administrators. The decision process required by this concentration of economic and political power would constrain even the most talented set of administrators. Those decisions must reflect the political influences of powerful interest groups in the society. They must not upset the delicate balance of power between the various government agencies. Add to this a government bureaucracy bloated by political patronage and filled with administrators lacking the training required to make decisions or the willingness to risk failure in their decision and the net result is inaction. Administrators postpone and avoid decisions or refer the decisions to some inefficient committee decision process that spreads the risk. The decision process then becomes a major obstacle in delaying or blocking development efforts. The experience of OPEC countries varies considerably with respect to administrative bottlenecks. In some countries such as Algeria the bureaucracy has become more firmly entrenched causing even greater administrative bottlenecks. Other countries such as Saudi Arabia have introduced policies to reduce those bottlenecks. They have set limits to the growth of the bureaucracy and attempted to increase efficiency by decentralizing the decision process. The relative success or failure of OPEC countries in eliminating administrative bottlenecks is influenced by their economic and political institutions which we will discuss in greater detail.

B. New Internal Constraints on Absorptive Capacity

As R. F. Mikesell has pointed out, apart from the lack of financial resources itself, the alleged limitations of absorptive capacity virtually coincides with the gamut of growth inhibiting factors. This is particularly true in the OPEC countries where oil revenues accrue to government which in turn utilize those financial resources in development planning affecting virtually every aspect of the economic and social life of these countries. The ubiquitous role of government in these oil producing countries further introduces a wide range of government failures to compound the traditional constraints encountered in terms of inadequate infrastructure, lack of complementary factors of production, and administrative bottlenecks. We will expand the concept of absorptive capacity to encompass these government failures.

Higher levels of government spending by the OPEC governments was accompanied by a sharp acceleration in monetary growth. In every OPEC country the inflation rate increased as a result of monetary expansion. In some countries this inflation was masked by government subsidies for food, housing, energy, transportation etc; and by price controls affecting a wide range of both producers and consumers goods. Yet every OPEC country suffered from the dislocations of rampant inflation. Inflation in turn was linked to a series of structural problems that become more apparent in OPEC countries in the late 1970s and 1980s.

In every OPEC country their is evidence of structural imbalance between industrial sectors. Sectors that were the direct or indirect beneficiaries of petroleum financed government expenditures prospered while other sectors lagged behind and in some cases declined in absolute terms. With few exceptions, the position of agriculture in OPEC countries deteriorated with the onset of higher oil prices and oil revenues. There was a mass exodus of resources out of the the traditional rural agricultural sector into more urbanized agricultural sectors. In some cases such as Iran under the Shah, this decline in agriculture was a conscious part of development planning, but more often it was due to the distortionary effects of inflation resulting from fiscal/monetary expansion. Even government offers of land, homes, tractors, and other inducements could not have farmers move into the agricultural sector once they had migrated to the high wage urban labor markets and experienced the amenities of urban life. The result was declining agricultural labor force, output, and productivity. OPEC countries became increasingly dependent on imported foodstuffs to feed their rapidly growing populations.

The traditional handicraft industries suffered the same fate as agriculture in the OPEC countries. Some countries that had successfully launched manufacturing industries found their production and exports declining in the 1970s. The effects of inflation on the labor costs, capital costs, and resource costs undermined the competitive position of these industries in the domestic as well as the international market. The result was the opposite to that envisioned in development efforts aimed at industrialization, these countries became increasingly dependent upon oil exports.

Related to the decline of agriculture was the rapid urbanization of population in OPEC countries. Some of these urban centers such as Riyadh, Saudi Arabia, and Tehran, Iran became classic examples of the disamenities resulting from rapid urbanization. The urban infrastructure was simply inadequate to meet the rapid growth in demand for housing, transportation and education. Skyrocketing property values absorbed much of the capital of the country into speculative rather than productive investments. That portion of the population without access to the largess of petroleum revenues found itself priced out of the urban sector. An increasing gap emerged between social and economic groups within the urban and rural sectors. A large portion of the lower income groups in the urban sector was composed of expatriate workers who saw themselves disenfranchised from the mainstream of economic and social life of the country.

It should not be surprising that the structural imbalances and dislocations resulting from rapid fiscal and monetary policy expansion in oil producing countries could not take place within a stable set of social and political institutions. Social and political unrest emerged in all countries and in Iran led to the revolutionary overthrow of the Shah's government.

The Shah attempted to modernize the Iranian economy more rapidly then the society could adjust to such changes. His modernization program was perceived by many as wasteful of the limited energy resources of the country. When oil prices fell in the mid 1970s, the Shah attempted to increase revenues by rapidly expanding production and exports. HIgher revenue from petroleum was used to finance an ambitious development program and the most powerful military force in the Middle East. The concentration of increase in the hands of the Shahs government and beneficiaries of government largess brought major qualities in wealth and income distribution.

Social tensions increased as westernization clashed with Islamic fundamentalism. Iranian nationals resented the existence of an expatriate labor force receiving wages and incomes that often exceeded that of the indigenous labor force. The expatriate workers in turn demanded a greater say in the social and political life of Iran as well as a larger share of the economic pie.

The Shah continued to pursue his policies of modernization without regard to their consequences for important interest groups within the society. As these groups became more alienated from the political system, political tensions increased. The revolution was triggered by an oil workers strike but it had its roots in the social and political instability generated by the Shahs programs for rapid modernization of the country.

The lessons of Iran have not been lost on other OPEC countries, indeed they now perceive a new set of internal constraints defined by the rapidity with which the social and political institutions can adapt to the changes resulting from rapid economic expansion.

C. New External Constraints on Absorptive Capacity

OPEC countries also encountered a new set of external constraints in their absorptive capacity in the late 1970s and 1980s. One set of constraints emerged from the volatility of the world petroleum market. That volatility has increased in recent years with the shortages in oil supplies and sharp increase in oil prices in 1979 and 1980 followed by an oil glut and declining prices in 1981 and 1982. These fluctuations in oil prices resulted in distabilizing changes in oil revenues. Governments in OPEC countries have not been successful in insulating their development plans from these fluctuations in oil revenues. In periods of rising oil oil prices and revenues, there are pressures to adjust government expenditures upward to match the higher level of revenues. When oil prices fall it is hard for these governments to adjust their expenditures downward to match the lower level of revenue. The result is a deficit in the governments budget that is correlated with deficits in the balance of payments. With the exception of Saudi Arabia, Kuwait, Qatar, and the United Arab Emirates, all of the OPEC countries are now constrained by limited foreign exchange reserves and balances of payments disequilibrium. Loans from the former group of countries are providing a short term respite to some countries such as Iraq, but the long term solution to their balance of payments problems will require major changes in their development programs.

The recent glut in world oil markets coincides with a worldwide recession. The resulting decline in oil prices has sharply reduced foreign exchange earnings of the oil producing countries. In order to maintain sales of petroleum and foreign exchange earnings, they have been forced to reduce the price of petroleum. This competitive downward bidding has sharply reduced the price of petroleum in world markets and with a continued glut, the price is expected to fall even further. Countries that cannot afford the reductions in oil revenues such as Nigeria and Iran have reduced their prices below the price level agreed to by OPEC members. These price cuts threaten the existence of OPEC as an organization attempting to control the price of petroleum. OPEC members have attempted to meet this threat through cutbacks in production designed to offset the current glut. Saudi Arabia has tacitly agreed to participate in scheduled cutbacks in production but has refused to enter into agreements that would subject their production decisions to OPEC decision ing. Other countries appear to be less willing to engage in further cutbacks as OPEC production has fallen from over 32 million barrels per day to less than 20 million barrels per day. The result is a very inelastic supply of OPEC petroleum. Downward shifts in demand for OPEC petroleum are accompanied by declining prices and revenues.

The wide swings in the world petroleum market are playing havoc with economic planning in the OPEC countries. Few of these countries have successfully insulated their economies from the balance of payments constraint. When oil prices and revenues are rising there is pressure to expand government spending and the money supply resulting in an inflationary expansion. When oil prices and revenues are falling, governments such as Iraq have borrowed abroad to maintain the higher level of expenditures. In 1982 OPEC as a group emerged as a net borrower in world capital markets. Increased foreign borrowing imposes a burden on these countries to pay the interest and refinance their foreign debt. That interest now accounts for a significant share of the government budget in many of the countries. This external constraint of servicing the foreign debt now has a major impact on governmental decisions in these countries.

The alternative to increased foreign borrowing is to reduce government expenditures to bring them into line with the lower level of revenues. Some countries such as Iran have chosen this alternative. However, cutbacks in government spending must come at the expense of domestic programs launched in a more prosperous era. If the cutbacks come in government investment this means that investment spending and growth fall below the targets in development plans. If the reductions are in current expenditures on social programs the result is dissatisfaction of social groups who have become ıstomed to a higher level of expenditure. In either case, cutbacks in government expenditures will tend to alienate important interest groups and possibly lead to social and political tension in the society.

OPEC countries with a surplus in their balance of payments would appear to be in a more enviable position. Note that countries with a significant surplus now include only Saudi Arabia, Kuwait, Qatar, and the United Arab Emirates. Yet even these countries have encountered an external constraint that has become an increasingly sensitive issue. In the late 1970s and 1980s the rate of inflation in western countries has accelerated. Despite sharp increases in the nominal rate of interest in Treasury Bills and other assets held by the OPEC nations, the real rates of return on those assets has declined and in some years been negative. Attempts by the OPEC countries to diversify their portfolio of foreign assets into equities, real estate, and other real assets has encountered discriminatory restrictions throughout western capital markets. The freezing of Iranian assets during the hostage crises introduced a new element of risk in the foreign asset holdings by OPEC countries. These countries have responded by diversifying their foreign assets away from the United States capital market into a number of different capital markets. But the criticism of foreign asset holding has had a major impact on government policies. The low and negative yield on foreign assets has supported the countries who call for conservation of energy resources on the grounds that petroleum left in the ground is appreciating faster than foreign assets. Restrictions on foreign investment by the U. S. and other western powers has tended to divert financial resources of OPEC countries in too domestic investments. OPEC members have also expanded their investments, loans and grants in third world countries. Institutions for regional ---peration in investment and trade will play a much more important role in the decisions of OPEC governments in the 1980s.

For OPEC members in the Middle East international political stability plays a major role in their planning. The war between Iran and Iraq currently dominates governmental decisions in those countries. Their success in achieving economic progress hinges on the cessation of hostilities. Other conflicts such as the border dispute between Jordan and Syria and the Arab Israeli conflict have repercussions on all of the countries in the region. A substantial share of government resources in these countries is devoted to military expenditures, and aid to friendly nations. On the positive side a number of institutions have emerged in the Middle East to achieve greater regional cooperation not only for defense of the region but also to coordinate investment and trade flows of the cooperating nations. These institutions will play a major role in the 1980s. Their success in achieving greater political stability in the regional will be crucial to the economic development in these countries.

III. Methodology

A. The Analytical Framework

Absorptive capacity is defined for analytical purposes as the domestic otal expenditures on goods and services which a country undertakes plus its xternal commitments (e.g., foreign aid). The domestic expenditure is eferred to as domestic absorption (or in national income terminology, Gross omestic Absorption, GDA). GDA can be expressed as

$$GDA = C + I$$

nere C is total consumption expenditures and I is total investment xp...itures. The level of disaggregation of the right-hand side variables ill depend on both the available data and the goal of the research.

To examine the economic implications of the different proposed scenarios an econometric model is constructed. This model specifies the interactions among the various sectors of the economy and their relationship with the oil sector. By focusing on various aspects of the economic system through this model, the internal workings of the growth process and the role of oil in the process can be better understood. In particular, the implications of different rates of oil extraction can be explored. This can be achieved by using the historical structure of the economic system to simulate the impact of future oil and other government policy. Implications for the level of output, consumption, investments, balance of payments etc. are derived using the simulation technique.

The stochastic equations, when specified are then estimated and combined with the identities to form a model upon which forecasting will be based. The forecasting methodology involves the following steps:

Step I: Predict the exogenous variables based upon a set of assumptions about their trends during the forecasting horizon (i.e., the period in which the forecasting is undertaken). Let the first set of assumptions be the control scenario. In some cases, it may be necessary to have more than one control scenario, depending on alternative assumptions about the time past of an important exogenous variable, the price of oil. Hence,, one may have two control scenarios (A and B) reflecting two alternative assumptions regarding the future rate of increase in the price of oil.

Step II: Define alternative scenarios representing the different c straints of absorptive capacity. Supposing there are eight such scenarios (1, 2,...8), then combining these with the two control (or oil price) scenarios will yield 16 alternative scenarios (A1 - A8 and B1 - B8) if A1 and B1 are based upon the assumption that the only set of constraints binding area those reflected in the original model.

Step III: Given the alternative series on the exogenous variables, simulate the model to solve for the values of the endogenous variables for each year in the forecasting horizon for alternative scenarios.

Step IV: Given the forecasts of the endogenous variables, policy analysis is carried out. A comparative analysis is also carried out among alternative oil price scenarios. The policy analysis includes an evaluation of policies of the country concerned vis-a-vis the forecasting results. Finally, what is considered to be the most realistic scenario is selected and its results compared to those of other studies, if available.

B. Incorporating Absorptive Capacity Constraints into Forecasting: Examples

As previously stated, the Impact of any single of group of constraints on the future path of the endogeous variables in the model can be derived through computer simulation, by using the basic model and adjusting the parameters and/'or the predicted path of the exogenous variable(s) which we believe are affected by the constraints.

For example, one may be interested in the impacts of the following constraints. (1) Labor constraints, (2) productivity contraints, (3) desired levels of government spending; and (4) production levels conservation of output.

(1) Labor Constraints: The constraints posed by labor are the easiest to identify and perhaps the most pressing in the majority of the

countries in this project. Labor-related constraints are also more amenable to practical interpretation and incorporation into forecasting exercises.. The labor market is described in the model by identities, and the sectoral distribution of labor is further divided into indigenous and foreign labor. For example, the labor constraint may therefore either be interpreted as inadequate supply of nonindigenous labor owing to inappropriate immigration policies or as a limitation imposed by the natural rate of growth of the indigenous population and/or the inhibitive social attitude towards female labor. The two sources of labor constraint (indigenous and nonindigenous) do not necessarily produce the same magnitude of effects on absorptive capacity or the optimal rate of petroleum production.. This is so because indigenous-nonindigenous labor ratios differ from one industry to another, while output-labor ratios for foreign labor are generally regarded as higher than those for indigenous labor.

(2) Productivity Constraints: Agriculture traditionally has been a stagnant economic activity in many of the oil-producing countries. For instance in Kuwait until 1975 the value added in agriculture had settled at KD 4 million. If, therefore, one can believe in the national income accounts and in the recent trend in the composition of the labor force, than the only interpretation which can be given to the increase in agricultural laborers from 802 in 1970 to 3,983 in 1975--and corresponding figures of value added in agricultural of KD 4 million to KD 6 million--is an accelerated decline in agricultural productivity. However, the big leap in the census figure for the agricultural labor force in 1975 can be attributed to the policy of the Kuwaiti government to naturalize the Bedouins who are then treated as members of the labor force in the agricultural sector, defined broadly to include

livestock, hunting, and fishing. Despite these qualifications, the harsh climate and poor soil make the expansion of absorptive capacity in the agricultural sector a difficult task. This constraint is more appropriately represented by a reduction in the output-labor ratio in this sector, given that the Bedouin naturalization policy will continue in the future. In this case, the value added in agriculture can be assumed constant in the foreseeable future then, if the labor force in this sector is known, the future output-labor ratio can be computed.

(3) Desired Levels of Government Spending: Government expenditures are the major determinants of absorptive capacity of most of the countries in this study. Given that one of the most effective ways to promote price stability is for the government to be prudent in its spending, then recognition of stable price as a policy goal will necessarily scale down the absorptive capacity and, by extension, impact upon the optimum rate of petroleum production of most countries. Yet this is not the end of the story. Certain government expenditures will increase supply at the same time as it increases aggregate demand. Examples are government expenditures on housing construction and subsidies on basic commodities, among others. But the close relationship between fiscal and monetary policies and a monetarist approach to the determination of the price level suggest that perhaps the most effective way to control prices is to control government spending. Hence,, price stability may be given empirical content in the policy of the government to limit the rate of growth of its expenditures, or to alter its composition in favor of the supply-creating expenditures. As will be recalled, however,, the redistribution of government expenditures (for example, from developmental to recurrent) may be inconsistent with the policy of ensuring fair distribution

of income.

Price instability,a highly skewed income distribution, and inappropriate employment and/or immigration laws might create social and political instability. Of greater importance are the policies which the government would adopt in order to ensure that a balance is achieved in the face of alternative objectives so as to create a stable political climate. The nature of the policies will differ from one country to another, depending on peculiar characteristics, the political system or machinery and responsibility, and on what the ruling government perceives to be the right policies. It is difficult to forecast the future dynamics of the politics in any of the nations under study. Indeed, the forecast depends also on the international scene, especially that in the immediate vicinity of the country concerned.

It can be said, however,, that whatever the perceptions the government has, they would be reflected in policies affecting government expenditures, income distribution, the rate of inflation, etc.. A major political break with the past will obviously change completely the scenarios upon which our forecasts are based. Internal political pressures can also bring about closer scrutiny over expenditures,. reflected in a slowdown or speedup in implementation of development plans and programs.

4. Production Levels Conservation of Output

In Iran, Saudi Arabia, Qatar, Kuwait, and United Arab Emirates, among other large-scale petroleum-exporting nations, there has long existed a school thought which favored a lower level of production aimed at lengthening the life-span of their major source of income--petroleum. A number of valid arguments for output conservation can be marshalled. The purely economic ones revolve about the dangers of overheating the economy and of disruptive inflation. Massive injections of oil-generated capital, inadequately absorbed, exacerbate both problems. And although overheating and inflation are economic in nature, there are undeniable ramifications in the political and social arenas.

Socio-economic issues raised by rapid economic growth and sizable infusions of government-induced spending and investment could include severe demographic imbalances, urban and environmental problems. Among the technical factors to contend with in production decisions are the availability of reserves given current recovery methods and costs, the problems of reservoir damage resulting from excessively rapid lifting, and such special matters as salt encroachment and underground pressure. Finally, despite changes in output level, there still remains the question of intense concern to major producing countries of the form exports cold take--what proportion of crude to product?

C. Forecasting Scenarios

The idea behind forecasting with a specific econometric model is to assume alternative paths for the predetermined variables and through simulation solve for the corresponding paths of the endogenous variables in the model. Each set of paths for the predetermined variables constitutes a scenario for forecasting, and there is virtually an infinite number of scenarios that can be created. The nature of the scenarios and the number for each country model will depend on the characteristics of the country and on ...t is foreseen to be the future behavior of the most important exogenous variables in the light of the constraints we are to introduce.

For each country, however, a "control scenario" may be based upon the assumption that socio-political factors remain unchanged during the forecasting horizon, and at the same time, that the future paths of exogenous variables follow the immediate past (i.e., the last five years of the sample period used for estimation). In other words, the structure of the economy is assumed unchanged for the "control scenario," implying no changes in the estimated coefficients of the stochastic equations in each country model.. Based upon the paths of the exogenous variables contained in the "control scenario," solutions of the endogenous variables are computed for the forecasting horizon. Then, alternative scenarios, reflecting both the different composition of the constraints and different levels of their effectiveness, are defined, after which the alternative sets of paths of the exogenous variables are fed into the model and the endogenous variables are recomputed. comparative analysis can be undertaking order to understand the deviation caused by the alternative assumptions about the absorptive capacity constraints. Policy conclusion is then attempted.

Evaluation of the economic impacts suggested by these different scenarios requires an elaborate data base. Fortunately, a number of macroeconometric models have been fitted for these countries and alternative scenarios can be generated using a computer simulation.

The framework which we have developed is applied to the analysis of the absorptive capacity in each country in this study. Saudi Arabia, and Kuwait are low capital absorbers. As noted earlier, they have neither large populations nor a well-developed industrial base. They depend heavily upon : rted labor and consequently have severe labor bottlenecks in absorbing capital funds. A large proportion of their oil earnings is annually invested in external sterling and dollar assets. Iraq could be classified as a medium capital absorber and may be expected to use its oil earnings primarily for internal development purposes. Given its population, employment requirements, and the considerable underdevelopment in the rural areas, it would appear that Iraq is capable of absorbing substantial amounts of capital in both the short and long run. However, it is critical to explore the manner in which these funds may be utilized. Deterioration in the distribution of income could evolve as a serious element in creating potential for disruption and turmoil if oil revenues are used only to further continued developments in the urban, industrialized sectors. Thus, the Iraqi government may be forced to consider some expenditures in agricultural and rural development. Moreover, the speed with which its resources are exploited is a crucial variable in the Iraqi development equation. In Iran, middle-class dissatisfaction and unrest were exacerbated by continued inflation. Similar consequences are possible in Iraq despite its central planning and controlled economy.

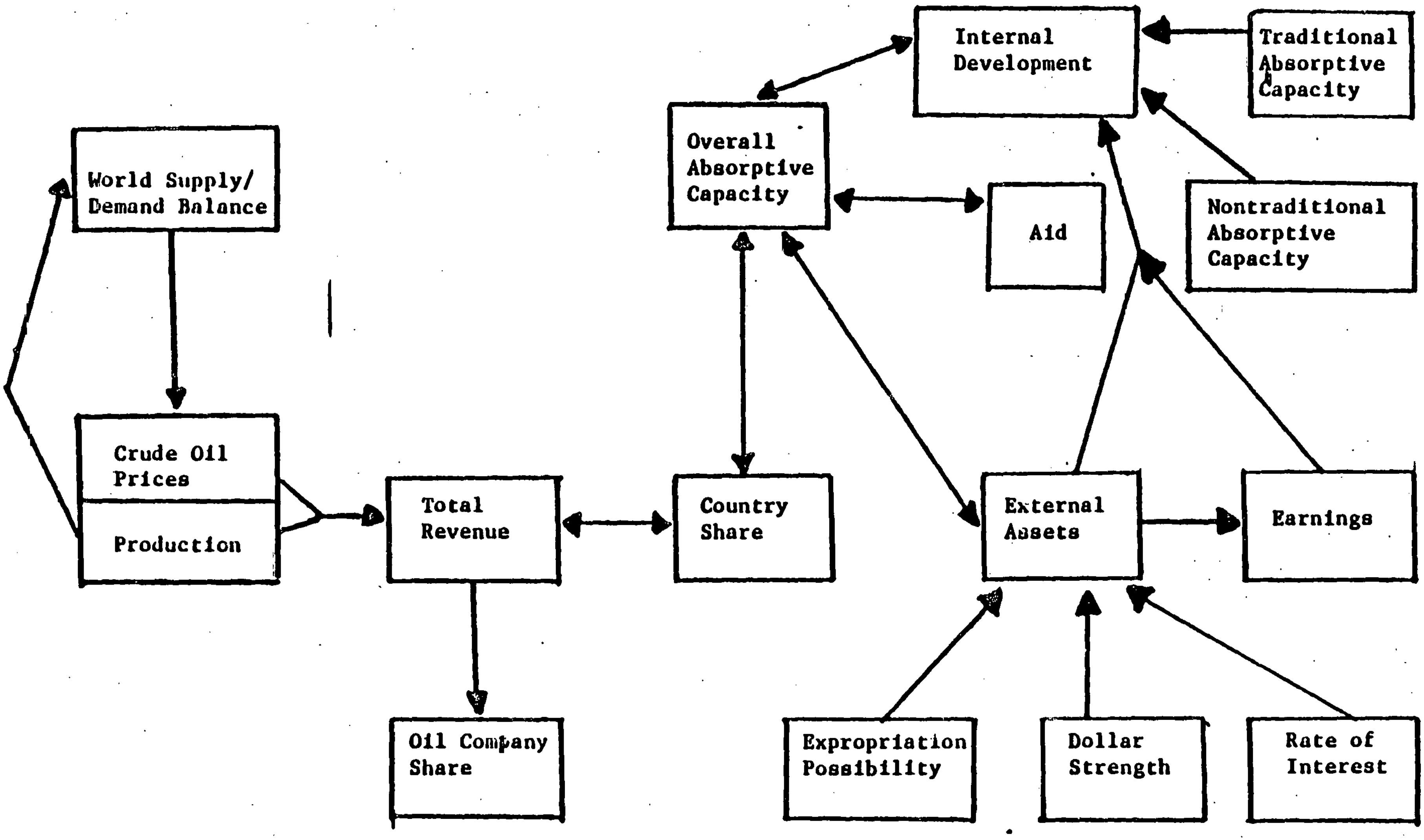
For Kuwait, and Saudi Arabia, the absorptive capacity issue is somewhat different. These countries could reduce oil output, some by substantial amounts, without seriously affecting the pace of internal capital formation. Rather, it would entail a reduction in dollar and sterling balances. The crux of the matter is whether this is acceptable or desirable. The decline in the value of dollar assets in recent years plus uncertainty which can surround the holding of massive foreign assets may lead many OPEC members toward concentration on internal development. This uncertainty has t fueled by recent developments in which Iranian foreign assets have been frozen by the U. S. government. With the potential shift away from foreign asset holdings in development planning, absorptive capacity will play an increasingly crucial role in determining the level of oil output from the point of view of these nations.

Figure 1

SCHEMATIC DIAGRAM OF NEW CONSTRAINTS ON ABSORPTIVE capacity IN OIL-PRODUCING COUNTRIES

Figure I

SCHEMATIC DIAGRAM OF NEW CONSTRAINTS ON ABSORPTIVE CAPACITY IN OIL-PRODUCING COUNTRIES



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COUNTRY REPORT: IRAN

A. Overview of the Economy

1. Background Information

Iran is located between the Middle East and South Asia. It is bounded by the USSR and the Caspian Sea to the north; by Iraq and Turkey to the west, by the Persian (Arabian) Gulf and the Gulf of Oman to the south; and by Afghanistan and Pakistan to the east. Several islands in the Persian Gulf also belong to Iran.

Iran is the fourth largest country in Asia. It has an area of 636,296 square miles, approximately 8,000 square miles of which are presently occupied by the invading forces of Iraq. To put this in perspective, its area is approximatley the combined area of New Mexico, Texas, Arizona, and California.

The climate of Iran is quite varied. In the north and west, precipitation is the greatest. Around the Caspian Sea this amounts to 68 inches per year. But in the southeast, it is only 2 inches per year. Temperatures are similarly extreme. In the Khuzestan, at the top of the Persian Gulf, temperatures can reach 123 degrees farenheit, or they can plummet as low as -35 degrees farenheit in the Azarbaijan region.[1] Winds are high during the "Wind of 120 Days" during the summer months in Baluchestan near the Pakistani border. The winds often reach speeds as high as 70 miles per hour. But during the winter, Siberian winds blow west and south into the Iranian Plateau interior.

Iran is well endowed with minerals. Most noteworthy of these is petroleum. Iran's reserves of petroleum in 1980 were estimated to be 57.5 billion barrels.[2]

Table 1 depicts the overall mineral wealth of Iran, giving mineral, location, estimated reserves, and recent rates of production.

Mining and quarrying employed 89,888 people in 1976, or about 1 percent of the total employed population[3] and contributed, excluding petroleum and natural gas,$1.1 million to exports in 1977/78, down from a high of $32.8 milion in 1974/75.[4]

Topologically, Iran consists of a vast plateau, elevating most of the country above 1,5000 feet. The Zagros Mountains are next to Iraq, reaching to the northwest border with Turkey to the north and running into Baluchestan to the southeast. Bordering the southern coast of the Caspian Sea are the Alborz Mountains. These extend along the Afghanistan border where they merge with the Koppeh-Dagh Mountains. Large salt deserts cover much of the area, but these are relieved by several oases. The Kavir Desert, 200 miles long and 100 miles wide is particularly desolate and impenetrable due to a salty crust and underlying mud deposits. The Dasht-e-Lut is a desert of loose stone equally as forbidding as the Kavir.

Fifty-one percent of Iran is desert, wasteland, or urban. Only 16 percent can be cultivated with sufficient irrigation. Fourteen percent is agricultural land, 11 percent forest, and 8 percent migratory, grazing, and other land. Temperature and precipitation vary with elevation in Iran. The most fertile area is the Caspian littoral which receives relatively high average annual rainfall.

TABLE 1

MINERAL PROFILE OF IRAN

neral	Location	Deposits	Extraction rate
ad-zinc	Bafqnean Yuzd Khomein west of Isfahan Ravanj near Qom		600 tons of concentrates daily (potential) 40,000 metric tons (1977) 61,500 metric tons (1977)
rome	Elburz mountains and near Bandar Abbas		80,000 metric tons of chromite (1977)
d Oxide	Hormuzin Persian Gulf		
rquois	Nishapur		
on ore	Kersman province, at Bafq	600 million tons (proven) 1,000 million tons (probable)	670 metric tons (1977)
	Gol-e-Gahr	200 million tons (probable)	
al	Kerman and Elburz mountains	1,000 million tons (est)	900,000 metric tons (1977)
pper ore	Azerbaijan Kerman Yazd and Anarutearias	400 million tons at an average of 1.12 percent copper content and 400 million tons beneath this deposit	(potentially) seventh largest world producer at 145,000 metric tons/ year but only 6,000 metri tons in 1977
nganese			15,000 metric tons

urce: W. B. Fisher, "Iran," The Middle East and North Africa, 1981-82, 2nd ed. (london: Europa Publications Limited, 1981), pp. 387-88, 393.

Iran is divided into 23 provinces. The wealthiest of these provinces is Khuzestan in the southwest. That province contains the largest area of potentially arable land, most of the country's proven reserves of oil and natural gas, and the only navigable river. Khuzestan also contains the major deposits of iron ore, copper, lead, salt, manganese and chrome; and the province is the major source of hydroelectric power and installed electric power in the country.

In January 1980, there were 38,146,000 people in Iran and the population was growing at an average annual rate of 3.0 percent.[5] Ethnically, the population consisted of 63 percent Persians, 3 percent Kurds, 13 percent other Iranian, 18 percent Turkic, 3 percent Arab and other Semitic, and 1 percent of other ethnicity.[6] Regarding religious identification, 93 percent of the population were Shia Moslem, 5 percent Sunni Moslem, 2 percent Zoroastrians, Jews, Christians, and Baha'ist.[7]

2. Recent Economic Performance

The 1979 Iranian Revolution and the out break of war in September of 1980 with Iraq have been the major two elements that have caused a retrogressio in the advance of the Iranian economy. Past trends up to 1979 imply very littl regarding future trends. Disarray is presently so great that past performance reflects only proven potential. But due to the instability, both externally and internally that Iran is now experiencing, past potential is largely irrelevant. No one can be certain when, how, or if the levels of economic development and the rates of economic growth achieved in the past will be achieved again.

Prior to his political exile in June of 1981, Bani-Sadr announced in March 1981 serious retrogression in the growth of the Iranian GNP.

In 1978, GNP declined by 9 percent, in 1979 by 13 percent, and in 1980 by no less than 10 percent.[8] In 1980, money in circulation increased from $11 billion to $20 billion,[9] foreshadowing even higher inflation, when inflation , as measured by the consumer price index was more than 20 percent between 1979 and 1980.[10]

The Iraq-Iran war was estimated to be costing Iran $400 million per month for imported war material alone in mid-1981.[11] This huge expense of financing a war is worsened by Iran's need to finance the purchase of large amounts of foodstuffs from abroad. In 1979 the food import bill totaled $2 billion.[12] And by December of 1981, Australia and New Zealand had refused to unload shipments of lamb to Iran pending Iran's payment for 5 cargo loads of meat that had previously been delivered.[13]

Unpaid bills were mounting while Iran's means of payment were lessening. Once oil exports constituted 95 percent of Iran's foreign exchange earnings. In 1977 these government oil revenues were $23 billion.[14] In the 1980/81 budget, oil and gas revenues were expected to reach $22.4 billion.[15] However, due to war damage, the lack of oil technicians, the absence of eager buyers, and the world oil glut, estimates are that Iran will earn only $13.0 billion from petroleum and gas in 1981/82 sales.[16] Oil exports had dropped to 500,000 barrels per day in September 1981, from a previous high of 5 million barrels per day.[17]

On the whole, capital formation was not occurring. Several pieces of evidence warrent this conclusion. At $400 million dollars per month, the war effort is requiring $4.8 billion per year to sustain. This war expenditure as far as capital formation was concerned, a dead-weight loss since little, if any was used to construct a capital base for the production of goods and services. (The budget estimate for defense was at $4.7 billion. See Table 2 below.) However, these expenditures do drain valuable resources from other sectors particularly if the expenditures are monetized. This is precisely what appeared to be happening in Iran in 1981. Oil and gas revenue would be only 58 percent of that estimated in the budget. The budget would then receive only 63 percent of its estimated revenue. Inflating the currency would be one way to meet the short term budgetary aims. During the six months after the beginning of the war, Iran's central bank issued $5.400 billion in new notes and coins,[18] during 1980, money in circulation increased by 82 percent.[19] The parasitic effects of war upon capital formation are perhaps even better known.

Out of this economic disarray will surely come structural change. Agriculture will certainly play a larger role in Iranian GNP output since, if for no other reason, petroleum and petroleum products have lessened as a proportion of total GNP output. Another reason is that the lack of foreign exchange will constrain the importation of agricultural food stuffs as had already occurred in the case of meat from New Zealand and Australia.

It is very uncertain when Irans petroleum sector will ever recover in order to play as large a part as it once did in the Iranian economy. The damage to the Abadan petroleum refining area was a tremendous set back to Iran. It will surely take a great deal of time to replace the large numbers of foreign trained technicians who have fled the country.

TABLE 2

GOVERNMENT BUDGET ESTIMATES, 1981/82
(millions of dollars, where $1 = 78.28 riyals)

Revenue		Expenditure	
e from tax	5.3	Public services	3.4
nd gas	22.4	Defense	4.7
nment enterprises	.5	Education, health, welfare, housing	6.7
of goods & services	.4		
llaneous	1.9	Agriculture, electricty, & industry	12.4
gn borrowings & estic borrowings	.5	Total	27.2
est on loans to eign countries	.7		
	3.7		
Total	35.4		

Source: Adopted from W. B. Fisher, "Iran," The Middle East and North Africa, 82, 28th ed. (London: Europe Publications Limited, 1981), p. 391.

Furthermore, the present ruling Islamic government has encouraged considerable anti-Western bias and stressed a return to Moslem fundamentals. This turn will divert energies away from supplying the badly needed technological knowhow to run very sophisticated refineries and oil field operations as well as to conduct further petroleum exploration.

Structurally, it appears that Iran's economy will regress to a more primitive state. Though many were of the opinion that under the Shah a fair distribution of an increasing output was not accomplished, it remains to be seen if a decreasing output will be distributed in a more equitable manner under the present government.

Demographic Change. Iran's population increased at a rapid rate of almost 3 percent throughout the 1960s and into the mid 1970s. Recent evidence shows a slowing down in the rate of population growth which is expected to decline to 2.4 percent between 1977 and 1982, and to just over 1 percent by the turn of the century. The absolute size of the population is projected to increased from 38.1 million in 1980 to 55 million in 2002.

Migration patterns in Iran have been very much influenced by government policies. In the 1960s, a land reform program was introduced to break up large private agriculture estates and to grant the land to small farmers. However, the government soon reversed itself, pursuing a policy of establishing large government-controlled farmers' cooperatives, incorporating the more productive villages. The government also encouraged large scale private investment in agriculture. Private agribusiness complexes were set up on the most productive land involving capital-intensive technology and government subsidies in the form of price supports, guaranteed purchases, subsidized fertilizer, and

TABLE 3

POPULATION DISTRIBUTION BY SECTOR
(thousand)

Year	Male	Female	Total	Urban	Rural	Ratio of urban to total	Economically active population
1972	15,867	15,169	31,447	13,447	17,798	42.7	8,851
1973	16,353	15,648	32,001	13,920	18,081	43.5	9,117
1974	16,841	16,135	32,976	14,641	18,335	44.6	9,396
1975	17,329	16,622	33,951	15,380	18,571	45.3	9,673
1976	17,812	17,103	34,915	16,166	18,749	46.3	9,955
1977	18,317	17,605	35,922	16,991	18,931	47.3	10,242

direct grants. As a result of these policies, many small producers and villages that were considered uneconomic were pushed out of the agriculture sector. Many of these rural residents migrated to the urban sector, aggravating the problems of unemployment and congestion. Much of this rural-urban migration occurred in the Markazi Province which includes Tehran with the largest urban concentration in the country.

It is difficult to assess the recent migration patterns in Iran because there is little if any quantitative information. The statements by government officials calling for development of the agricultural sector and ultimate self sufficiency for Iran in foodstuffs would suggest a decline and perhaps reversal in rural-to-urban migration. However, it is not clear what the magnitude of this shift is or whether this represents an interruption in the long run trend toward urbanization of the Iranian population.

3. International Trade and Finance

Comprehensive data for Iranian trade and finance ends with the fifth plan period, 1973-1978. For more recent periods we must rely on fragmentary evidence and statements by public officials. The following table shows the balance of payments for Iran during the fifth plan. Exports were dominated by oil revenues which account for 90 percent of total current receipts.

The Shah's government pursued a policy of rapid expansion in oil output and exports to finance an ambitious development program. The goal was to increase oil production to 7.5 million b/d. While that goal

SUMMARY OF IRAN"S BALANCE OF PAYMENTS DURING THE FIFTH PLAN
(billion dollars)

Current receipts		114.0
a. Receipts from oil sector	102.2	
b. Foreign exchange earnings from export of goods	4.9	
c. Foreign exchange earnings from export of services	4.9	
d. Foreign exchange earnings from investments abroad	2.0	
Current payments		94.7
a. Sale of foreign exchange for import of goods	79.1	
b. Sale of foreign exchange for import of services	14.3	
c. Servicing of foreign loans	1.3	
Current balance		19.3
Receipts on capital account		4.7
a. Foreign loans and credits received by the government	2.2	
b. Other loans and foreign private investment	2.5	
Payments on capital account		6.5
a. Repayment of principal of government loans and credits	6.0	
b. Repayment of private loans and transfer abroad of private capital	0.5	
_.ital balance		-1.8
Net balance on current and capital account		17.5

was never reached, it is estimated that Iran could have maintained output between 5.5 and 6 milion b/d if the Shah had not been overthrown.

The ambitious development program pursued by the Phalavi government is reflected in a high level of imports. During the fifth plan, imports increased at a rapid pace, eliminating the large surpluses in the current account that were generated in the Iranian balance of payments in the early 1970s.

In the early 1970s, Iran exported over 95 percent of its oil. By the mid 1970s that share had fallen below 90 percent. Following the Iranian revolution, production and exports of oil decreased sharply.

In 1979 Irans oil production fell from 5.2 million b/d to 3.2 million b/d. Oil exports declined by approximately the same amount from 4.4 million b/d to 2.4 million b/d. The outbreak of war with Iraq brought even further reductions in oil output and exports. In 1980 production fell to 1.6 million b/d and by the fourth quarter of 1981, production had declined to close to 1 million b/d. In a statement by Dr. Ali Shams in the OPEC seminar held on November 26, 1981, exports were put at 900,000 b/d. The level of oil exports should be increased to 1.2 million b/d to meet financial requirements. He maintained that 75 percent of Iranian exports are loaded off Khaj Island in the Gulf. This area has not been seriously affected by the war. He admitted, however, that because of war conditions with Iraq, Iran could not increase its exports beyond 1.4 million b/d.

Plans were announced in early 1981 to bring one-half of Iran's trade under government control.[20] As a result of the trade embargo on

Iran by several western nations for Iran's taking U.S. hostages, Iran developed trade links with many Third World and Eastern Bloc nations. During 1980, there was a three-fold increase in the value of goods coming via the U.S.S.R. This increase was attributed to the Iran-Iraq war that partially discourages trade in the Persian Gulf area.[21] In fact, Iran has been offering discounts to shippers carrying petroleum from Kharg Island to compensate them for their huge insurance premiums for operations in the war zone.[22]

The continuation of the war with Iraq is a heavy strain on foreign exchange. As mentioned previously, this war is requiring that Iran import $400 million per month of war material alone. Spare parts of various sorts, food imports, refined oil products and the need for pharmaceuticals are imposing further demands on Iran's limited supplies of foreign exchange.[23] Iran will continue to need to import certain categories of goods: particularly essentials, wheat, rice, sugar, barley, corn, beans, and eggs, pahrmaceuticals; raw materials, soda and soda ash, polyethylene, polystyrene, wool, synthetic yarns, timber, iron aluminum, and even copper; spare parts for pumps, ball bearings; capital goods, and finished goods, soap, detergents, light bulbs and buttons.[24] However, the problem now is to earn enough foreign exchange in order to afford these imports.

Iran's future outlook concerning international trade and finance is bleak, and the prospects for an improving change are not on the horizon. Iran's primary source of foreign reserves, petroleum production was earning only $550 million per month in September 1981.[25] Estimates placed Iran's total import bill for the first seven months of 1981 at $7.9 billion, or a more than $4.05 billion trade gap. Dr. Ali Shams reported in the OPEC seminar in November 1981 that Iran has $2 billion in reserves, in addition to $3 billion held by the United States.[26]

4. Sectoral Analysis

a. Petroleum

Before the 1979 revolution, petroleum was the driving force behind Iran's economic progress. Table 4 below shows the contribution of oil revenue as a percentage of various economic aggregates.

TABLE 4

Relative Contributions of Oil to the Iranian Economy
(percent)

	1971/72	1972/73	1973/74	1974/75	1975/76
Value added to GDP	19.7	17.9	30.3	45.0	36.9
Percentage					
Percentage of Government Revenue	56.5	54.7	63.1	84.3	76.7
Percentage of Foreign Exchange Receipts	77.3	76.0	81.4	89.4	87.3

Source: Jahangir Amuzegar, Iran: An Economic Profile, (Washington, D.C.: The Middle East Institute, 1977), p. 63.

It is apparent that there was a growing dependency upon oil exports from 1971 to 1975 as a source of foreign exchange receipts and as a source for government revenues. The average export level of crude petroleum was 5.4 million b/d. In late 1981 experts estimated that Iran was exporting 900,000 barrels per day, but needed 1.1 or 1.2 million barrels of export to meet its minimum revenue requirements. On November 1, 1981, Iran was offering its light - 34° API curde for $34.00 per barrel and its heavy - 31^{o} API crude for $33.40 per barrel as can be seen in Table 4 below which give a history of the price of Iranian crude.

As of December 31, 1980, Iran's crude oil reserves were estimated to be 57.5 billion barrels.[27] This is the third largest estimated reserve of OPEC, behind only Saudi Arabia and Kuwait. But Iran is first among OPEC countries in terms of estimated natural gas reserves, which stood at 13,736 billion cubic metres.[28] The reserve-to-production rate was 107 years for crude pertoleum.

These are very different production statistics than prior to the Iran-Iraq war. In August of 1979, 4 million b/d were produced, and 3.3 million barrels were exported.[29] At that time, the now Iraq damaged Abadan region was exporting 250,000 - 300,000 barrels per day of products.[30]

And prior to the Iran-Iraq war, Iran's oil industry had suffered considerable damage from the 1979 revolution. For instance, the events of the revolution caused the discontinuation of the gas reinjection secondary recovery programs which would have increased the recovery factor from 18 percent to 25 percent.[31] Furthermore, many construction firms look forward to the end of the war so that they might contract to help rebuild oil field installations and refineries.[32]

The petroleum sector is presently a declining sector. The world oil glut has put downward pressure on the price that Iran is able to charge per barrel of oil, e.g., from July 30, 1981 to November 1, 1981 the price for light - 34^{o} API declined form $37.00/b to $34.00/b. The war has shut down operations in Abadan. Many skilled and semi-skilled technicians from the west have mostly fled the country, and

TABLE 5

PRICE OF IRANIAN CRUDE
(dollars per barrel)

	Light 34° API		Heavy 31° API	
	Posted price	Official sales price	Posted price	Official sales price
1962	1.780	---	1.630	---
1969	1.790	---	1.630	---
Feb. 14, 1971	2.270	---	2.130	---
Jan. 1, 1972	2.467	---	2.417	---
Oct. 16, 1973	5.341	---	4.991	---
Jan. 1, 1974	11.875	---	11.635	---
Jan. 1, 1975	---	10.674	---	10.450
Jan. 1, 1976	---	11.620	---	11.495
Jan. 1, 1977	---	12.810	---	12.490
Dec. 31, 1978	---	12.810	---	12.490
Jul. 1, 1979	---	22.000	---	19.900
Jan. 1, 1980	---	30.370	---	29.640
Jul. 1, 1980	---	35.370	---	34.370
Jul. 30, 1981	---	37.000	---	36.000
Nov. 1, 1981	---	34.000	---	33.400

Source: J. Amuzegar, op. cit., p. 60, and Petroleum Intelligence Weekly, Special Supplement, February 23, 1981, p. 1, and Novmber 16, 1981, p. 9.

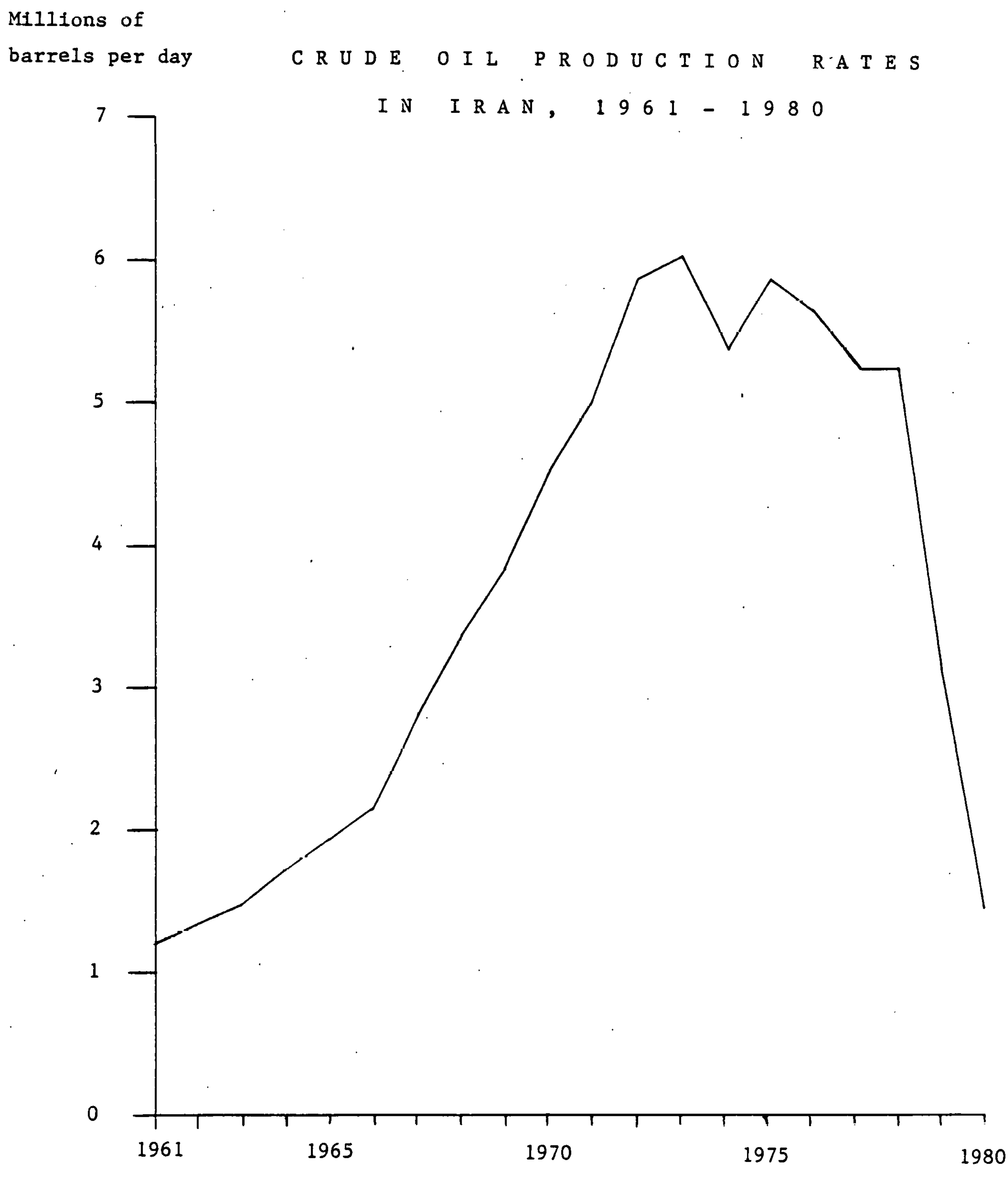
spare parts for petroleum operations are in short supply and available mostly from only the west. Diagram 1 shows the history of Iran crude oil production from 1961 to 1980. In the fourth quarter of 1981, crude oil production averaged very close to Iran's 1961 levels of production, at 1 million b/d. Iran has a long way to go to recover its previously high levels of petroleum output.

Energy analyst and consultant Bijan Mossavar-Rahmani has given some estimation as to the magnitude of required petroleum and energy infrastructure and rebuilding after the cessation of the Iran-Iraqi war:

> The size and scope of the energy infrastructure will be massive; indeed, Iran may face expenditures totaling over $50 billion by the turn of the century on power generating facilities, refineries, pipelines, dams, and the like, to meet even the most conservative projection of demand. Repairs to facilities damaged during the Iran-Iraq war will cost additional billions of dollars.[33]

Even if Iran is successful in repairing the damage to its production facilities resulting from the war and recovering to higher levels of oil production it will encounter a rapid growth in the domestic demand for petroleum.

Internal consumption of petroleum in 1980 was approximately 500,000 b/d, and that level of consumption would have been much higher if the economy had not experienced the instability of revolution and war. Clearly domestic oil consumption will not increase as rapidly as that projected in earlier government plans. Those plans projected that the rate of growth in domestic oil consumption would fall from 15 to 20 percent in the 1970s to just under 10 percent per year in the



SOURCE: Adapted from OPEC's <u>Annual Statistical Bulletin 1980.</u>

TABLE 6

Iran's Crude Oil in an International Setting

	1974	1975	1976	1977	1978	1979	1980
Reserves[a] (billion barrels)	60.0	66.0	64.5	63.0	62.0	59.0	58.0
Percentage of OPEC	14.2	13.6	14.3	14.4	14.1	13.3	13.3
Percentage of world	9.6	9.2	9.8	9.9	9.6	9.2	9.0
Production (thousand b/d)	6,022	5,350	5,883	5,663	5,242	3,168	1,622
Percentage of OPEC	19.6	19.7	19.1	18.1	17.6	10.2	6.0
Percentage of world	10.7	10.0	10.2	9.5	8.7	5.0	2.7
Exports (thousands b/d)	5,369	4,671	5,214	4,867	4,447	2,407	n.a.
Percentage of OPEC	19.7	19.4	19.0	17.6	17.0	9.0	n.a.
Percentage of world	17.1	16.4	16.3	15.1	14.2	7.5	n.a.

Source: Organization of the Petroleum Exporting Countries, Annual Statistical Bulletin 1979, OPEC, Vienna, 1980.

[a]Proven reserves as of January 1.

[b]In addition to crude oil, Iran historically has exported significant quantities of refined oil products; such exports totaled 147,000 b/d in 1973, 163,000 b/d in 1974, 215,000 bld in 1975, 116,000 b/d in 1976, 119,000 b/d in 1977, 128,000 b/d in 1978, and 173,000 b/d in 1979.

1980s. Under those assumptions domestic consumption would have been approximately 1.0 million b/d in 1982, 1.5 million b/d in 1987, and 3.0 million b/d by the year 2000.

Recent events suggest a much slower growth in domestic consumption of oil in Iran. Apart from the disruption of the revolution and the war with Iraq, the present regime in Iran will pursue a slower pace of industrializtion and development. Indeed the Iranian government has already drastically reduced financing for a number of development projects planned and launched in prior years. The objective is to limit financing of development projects to the limited supplies of foreign exchange generated by lower levels of oil production and exports. This is in contrast to the attempts by the Iraqis to continue high levels of development expenditures despite the war with Iran. Even with these scaled down development efforts in Iran, the demand for petroleum for domestic consumption will absorb a larger share of production over the next two decades. By the 1990s, Iran could be exporting only a few hundred thousand barrels of oil.

b. Natural Gas

Natural gas could emerge as a major export base industry in Iran, particularly in the light of the pessimistic projections for the oil industry discussed in the preceeding section. As of January 1980, Irans reserves of natural gas of 490 tcf ranked second only to that of the Soviet Union. Almost all of Irans natural gas production has been in association with oil production, primarily in the Khuzestan and offshore oil fields.

Gross production of natural gas increased from 4,660 million cf/d in 1973 to 5,337 cf/d in 1978. Over that same period, flaring was reduced from 2,753 million cf/d to 2,490 million cf/d; by 1978 less than half of the gas produced was being flared. Exports of natural gas remained relatively constant,while domestic compsumption increased from 1,066 million cf/d to 2,145 cf/d over that period. By 1978 over 40 percent of the gas produced way being utilized in the domestic economy.

The prerevolutionary government in Iran had launched an ambitious plan for expansion in natural gas production both for export and for domestic consumption. In 1977 about 44 percent of the gas used domestically was reinjected into oil fields to enhance the recovery of oil. Planning at that time called for rapid expansion in the production of gas for reinjection, and for other domestic use by producers and consumers. The Phalavi government also developed several projects for the export of natural gas. The most ambitious of these was the IGAT project. The Iran Gas Trunkline (IGAT) was completed in 1970 to export assoicated gas from the Khuzestan fields to the Soviet Union. Exports averaged about 880 million cf/d before the revolution. Plans called for the expansion of this trunkline to transport gas to the Soviet Union which would in turn expand its gas shipments to Western European partners in the agreement, including West Germany, France, and Austria, and Czechoslovakia. Other plans called for construction of new LNG plants in Iran for export to Western Europe, the United States, and Japan.

TABLE 7

Iran's Natural Gas in an International Setting

	1974	1975	1976	1977	1978	1979	1980
Reserves (tcf)	n.a.	330.0	329.5	330.0	500.0	500.0	490.0
Percentage of OPEC	n.a.	32.7	44.3	42.9	52.8	52.2	49.4
Percentage of world	n.a.	13.0	14.7	15.6	19.9	20.0	19.0
Net Production (million cf/d)[b]	2,153.4	2,112.3	2,175.4	2,936.9	2,846.5	1,934.1	n.a.
Percentage of OPEC	22.2	21.3	20.4	23.6	21.6	16.8	n.a.
Percentage of world[c]	1.7	1.6	1.6	2.1	1.9	1.3	n.a.
Exports (million cf/d)	879.4	926.0	898.6	895.9	701.4	n.a.	n.a.
Percentage of OPEC	59.7	53.5	49.0	45.2	28.6	n.a.	n.a.
Percentage of world	7.9	7.5	6.5	6.0	4.3	n.a.	n.a.

Source: Orfanization of the Petroleum Exporting Countries, Annual Statistical Bulletin 1979, OPEC Vienna, 1980.

[a]Proven reserves as of January 1.

[b]Net production includes, as far as possible, natural gas actually collected and utilized as fuel or as petrochemical, feedstock, and obtained from natural gas fields and oil fields. It excludes natural gas flared, vented, or wasted.

[c] the United States, production figures are reported marketed production; figures for other countries may include some gross production.

Natural gas production declined sharply in post revolutionary Iran. In 1979 production declined to 1,934 million cf/d, mainly due to the disruption to the oil sector caused by the revolution. Production has continued to decline in 1980 and 1981 according to preliminary estimates.

Irans natural gas production will recover only when oil production expands from the current low levels. However, the new regime is not likely to expand gas production at the pace planned by the Phalavi government. The program for natural gas reinjection to enhance oil production has been scaled down drastically. Negotiations for delivery of gas to the Soviet Union have broken down in a dispute over pricing. Plans for expansion of IGAT with the Soviet Union and the European partners have been cancelled. The proposed LNG plants have not moved beyond the drawing boards. In short, the near term prospects for expansion in natural gas production in Iran are not very promising. However, in the long run, there will be increasing pressure to develop Irans vast reserves of natural gas. As domestic oil consumption expands leaving less oil available for export, Iran will have an incentive to expand natural gas production in order to generate needed foreign exchange both by exporting gas and by substituting gas for oil in domestic consumption.

c. Agriculture

Agriculture remains in a very poor state of affairs. In February 1981 at Bandar Abbas, now the main port of Iran, more than one-half of imports were for food, and much was coming from the United States.[34] Harvests of rice and wheat were down by nearly 50 percent in 1980 from 1979.[35]

The Shah had made efforts to modernize agriculture, but like many leaders of less developed countries, got carried away with capital-intensive agri-business projects. There was great controversy about how productive the Shah's agriculture programs were. The Agriculture Ministry under the Shah had maintained the Iran's growth rate was quite high, averaging 6 to 9 percent per year. However, World Bank representatives reported growth rates of 2 to 3 percent in agricultural output. The Iranian government responded to these reports by closing down the World Bank's office in Tehran.[36] After the Shah, one observer remarked, "agriculture was, in any case, so badly crippled that it had no way to go but up."[37]

Perhaps the most revealing evidence ragarding the impact of political instability and war in Iran is the huge volume of food imports. A United States Agriculture Department spokesman estimates that Iran will import $4.5 billion to $5 billion in foodstuffs in 1982, up from $3.5 billion last year and $2.8 billion in 1980. Iran has resumed food purchases from the United States since the hostage crisis was settled. In 1981 the same source estimates that the United States sold $300 million in farm products to Iran including over one million tons of wheat costing $200 million. The United States also exported corn, corn oil, rice, sugar, and cheese to Iran. The disruption in United States trade with Iran during the hostage crisis permitted other countries, most notably the European countries, to capture most of the trade in foodstuffs with Iran.

The political instability in Eygpt and other countries resulting from food shortages and higher prices for foodstuffs has not gone unnoticed by the Kohmeini government.

agricultural import bill was $2billion.[42]

The continuing war with Iraq will also drain agricultural productivity. To fight the war required mostly the young and healthy who could also contribute to agricultural productivity. Also much of the war was being fought in previously very productive areas of Iran, namely the Khuzestan and Kurdestan regions.

Since less money is coming into the cities via oil production, and since the largely capital-intensive agricultural emphasis of the Shah has ended, more Iranians can be expected to return to the rural areas. Here they will likely take up work which is close to subsistance farming. The Shah once announced that holdings less than 20 hectares were uneconomical. This was part of his effort to industrialize agriculture. Since his fall from power, many large farmers and friends of the regime have been dispossessed of their agricultural holdings.

It is very questionable whether Iran will again ever be self-sufficient agriculturally. Its population has grown by more than 50 percent since it was last self-sufficient, and more than 51 percent of the land is not cultivable. And population continues to grow by about 3 percent per eyar.

In summary, the Iranian agricultural sector is faltering under the repercussions of the 1979 Revolution and the present war with Iraq. Agricultural production, due to lack of sufficient alternatives, will certainly become more primitive and labor intensive.

d. Industry

The industrial base in Iran was eroding. Even prior to the 1979 Revolution, Iran was heavily dependent upon imports to develop an industrial infrastructure and to keep established industries running.

Unfortunately, recent evidence suggests that agriculture has declined to levels of output even lower than during the Shah's rule. Meat is known to be in short supply and supplementary quantities must be imported. Some is imported from New Zealand and Australia. As mentioned earlier, Iran was dilatory about paying New Zealand for 3,600 tons of lamb landed in Iran in October of 1981.[38] This was only one of five other shipments during 1981.[39] In late 1980, there were reports that there were long lines in Tehran for eggs, meat, chicken, milk, yogurt, rice and sugar, and that French chicken found its way to the Iranian market place via Libya which tacked on a handling surcharge.[40]

There are a number of factors underlying the expansion in food imports by Iran. The surplus of foodstuffs in world markets has depressed prices making food imports a bargain. Iran is better able to handle a larger volume of food imports through expanded port facilities. Most important, however, is the failure of the Kohmeini regime to expand domestic production of foodstuffs in line with growing domestic demand. Massive food imports are the only alternative to widespread shortages of food.

Iranian domestic agricultural policies have not been the most conducive to agricultural development. In 1979, Iran was maintaining price subsidies on imported foods which in effect helped foreign farmers at the expense of the local producer.[41] In 1979, the annual

Many of the reported import needs of Iran are also the type that are required to prevent industrial bottlenecks. In the past, to pay for these imports, oil production and exports were increased. Today, these options are closed by the world petroleum glut and Iran's lack of production and export capacities. Imports are crucial to support Iran's industrial development. But presently, Iran has little means by which to finance imports.

Iran's prospects for industrial development were further dashed by the collapse of two large industrial operations. One of these was the Abadan refinery complex. Iraq severely damaged this industrial installation and it is unlikely to be repaired until after the Iran-Iraq war. Abadan refinery was once producing from 250,000 to 300,000 barrels per day of exportable petroleum products.[43] The other complex was under construction. Mitsui declined to further finance, on Iran's desired terms, the completion of a troubled multibillion dollar ($3.6 billion) petrochemical complex at Bandar Khomeini in southern Iran.[44] The complex was already 85 percent complete when the Iran-Iraq war broke out.[45]

In summary, there are many factors which dim Iran's industrial development prospects. The presently high and increasing rate of inflation largely caused by the war financing; the instability of the investment climate due to the lack of development planning worth any mention; the nearly anti-profit, anti-industry sentiments of the ruling Moslem clergy; and the lack of business entrepreneurs willing to take risks in an uncertain business climate all make it very unlikely that the industrial sector will grow or prosper in the foreseeable future.

e. Labor and Human Capital

In 1966, when Iran's population was 25.7 million, the work force was placed at 7.8 million persons,[46] or 30.4 percent of the population. Since population growth has remained at approximately the same level, the proportion of population in the workforce has probabably changed very little. In 1976, the workforce was placed at 10,000,000 of which 37 percent was engaged in agriculture and 30 percent in industry.[47] In 1980, the workforce population would have been approximately 11,000,000 and it was estimated that one-third of this workforce was unemployed.[48]

Prior to the 1979 Revolution, Iran was spending about 5.4 percent on education.[49] Illiteracy was about 63 percent in 1976.[50] The 1979 Revolution cost Iran many highly-trained and educated individuals as they fled the country. Many of the gains made towards allowing women access to the labor market will probably be lost. The requirement that women wear the chador was only a symptom of what many view as the foreshadowing of further erosion of these womens rights. Also, since so many men were having difficulty finding employment, it is likely that women will be crowded out of the job market.

Education is very much a luxury of a prosperous economy. The surplus wealth that undergirds educational expenditures is absent and, in Iran, events seem to imply it will be very difficult to return to the high levels of absolute educational expenditure previously existent, in the relevant future.

4 ~~5~~. Planning and Public Policy

a. Economic Planning

Iran's last economic plan, the Fifth Plan, running from March

21, 1973 to March 21, 1978, attempted to accomplish too much in too short a time. Consequently economic growth was never transformed into real economic development. Income for oil sales was largely spent bidding up prices of scarce goods, defraying prevalent bottleneck expenses, and worsening the already poor distribution of income and wealth.

The Fifth Year Plan was intended to address the following development problems:

1. the undersupply of specialized manpower;
2. the lack of capacity of infrastructure facilities, including ports, road and rail networks;
3. limited sources and supplies of energy;
4. the indadequate supplies of building materials, including cement and structural steel.

Headway could be made in dealing with these problems but only headway. (Often not even headway was made.) Solutions to them would would entail more time than provided in the Fifth Plan.

Productivity of the Iranian economy had not kept pace with the ability of the economy to afford foreign purchases. Thus Iran tended to pay high prices for imported goods rather than wait for them to be supplied domestically. This situation highlighted the domestic bottleneck problems that were a focus of the Fifth Plan.

The Fifth Plan took many aspects into consideration. It embodied hopes and some practical measures to avoid absorption problems, worsened inflation, a conflict between rapid growth of financial resources and productive factors, and aggravation of the inequitable distribution of income. Total public and private investment was to be 4.699 billion Rials (roughly 69.5 billion U.S. dollars) as a practical step. This was below the full financial potential during the Fifth Plan period. Also, public and private investment would aim at sectors that could go ahead without encountering bottlenecks while holding back on expenditures in areas where bottlenecks were commonly encountered. It was hoped that agriculture would regain much of its former standing and that the industrialization program would not drain it of badly needed resources. In this way, both industry and agriculture would prosper. This intention was not fulfilled.

There were at least ten generalized objectives of the Fifth Plan.

1. To raise the quality of life for all social groups.
2. To maintain rapid, balanced and sustained economic growth.
3. To increase the income of various groups,particulary with a view to raising living standards among low-income groups.
4. To expand comprehensively social, economic, political and cultural justice with particular emphasis on the equitable distribution of services among all social classes and groups.
5. To improve the quality and increase the supply of active manpower so as to increase productivity and eliminate the development bottlenecks.
6. To preserve, rehabilitate and improve the environment, and raise the quality of life, particularly in large centers of population.
7. To develop science and technology and promote creativity and initiative.
8. To establish relative competitiveness in the production and

export of industrial goods, at the international level.

9. To utilize foreign exchange reserves to the fullest so as to remedy domestic shortages and check inflationary pressures for foreign investment and for the creation of a source of national wealth to replace depleting oil resources.

10. To maintain and resuscitate the nation's valuable cultural heritage, to carry out research and teaching in cultural and artistic fields, to expand culture and the arts, to establish facilities for artists and literary creation, and to promote cultural relations.

The above were just a few of the numberous well intentioned and High-minded goals of the Fifth Plan. All the goals appeared desireable. But the difficult economic problem was the allocation of scarce resources among competing wants. The Fifth Plan set forth the wants or aims but seemed somewhat oblivious to the questions concerning proportionality--How much of a limited economic pie should or could be allocated where? Many of the more specific goals would and did require sacrifices elsewhere.

Also, by enumerating such high-sounding social and economic goals, expectations were raised. But the infrastructural, cultural and social where-with-all to attain them was lacking, nor could it be developed within the limited time of the Fifth Plan.

In short, the Fifth Plan was too ambitious and promised too much. It inflated expectations. The results of the Fifth Plan, in comparison to expectations, were disappointing. This disappointment was a large contributing factor to the overthrow of the Phalavi regime in 1979.

Due to the chaos created during and immediately after the Revolution and the Iran-Iraq war, information is sparse concerning details and the most general aspects of Iran's economic plans. No economic development as yet exists, but there is a possibility that the clerical government will provide a 10 to 20 year economic framework within which a future government would operate.[51]

b. Monetary and Fiscal Policy

Monetary and fiscal policy in Iran seems to be in shambles. The war has required the goverments appropriating of resources from private sectors of the economy. Since there are limits to the possibility of direct taxation, the government has found it convenient to use the indirect method of inflationary taxation. It was reported at the end of March 1981, that the quantity of money in circulation shot-up by 40 percent since the start of the war in September 1980.[52] The war has pushed Iran into a very serious deficit financial situation that would, in proportional terms to the United States economy, be about an $185 billion budget deficit in mid-1981.[53] In the six months following the out break of the war, Iran's central bank issued $5.4 billion in new notes and coins.[54]

The 1981/82 budget appeared to be out of line the day it was submitted. The Iranian government submitted a budget for $41 billion initially and this was trimmed to $37.9 billion.[55] However, oil revenues, which previously had provided the bulk of government revenues were estimated to be only $18.7 billion, well below the expected $34 billion the the budget makers had implicitly assumed.[56] The government was planning alternative sources of revenues, mainly taxes, that would increase the total revenue by 30 percent.[57] This would increase the total revenue by 30 percent.[58] This would still mean an $8.9 billion shortfall.[59]

In the fall of 1981, Iran's central bank took rather drastic, but badly needed action. It ordered that for two weeks no letters of credit be issued and that trade be restricted over the long term.[60]

c. Finance

Iran, in its efforts to establish a truly Islamic Republic, has introduced several changes in its banking system. At first blush these changes appeared to be ideal since no modern state has implemented such sweeping changes. Since the Koran forbids the taking of interest on loans, commissions of 4 percent will replace 14 percent interest rate charges.[61] As have other attempts to control prices, this low commission will likely result in credit shortages since demand for credit will accelerate but supply, if inflation is of concern, of credit will be discouraged. The resulting issuance of credit will tend to be based more upon political and non-economic considerations and less on the profitability of the particular undertaking.

Also, depositors will be paid profits, expected to run at 7 - 8.5 percent. But this appears to be inconsistent, given that commissions on loans are limited to only 4 percent.[62] The 3 to 4.5 percent difference between the amount paid to depositors and the amount charged as loan commissions will have to come from another source.

Another method to preserve Koranic sanctity in the banking sector will be the taking of shares in large industries by banks, rather than charging interest.[63] Fluctuating prices of industrial shares may make this method difficult to carry out in practice and still return to the lender an expected return.

Mergers of the banking sector have occurred to enable closer control and more specialization of the remaining banks. Twenty banks have merged into eight groups. The nation's bank will be Bank Mellat. The trade bank will be Bank Terjarat. Three banks, Bank Mell: Iran, Bank Seraph and Bank Saderat are retained as before; and three other banks will specialize in agriculture and industry.[64]

The bank reforms raise serious questions concerning efficient and equitable performance but answer the Islamic cultural objections. The import restrictions under this policy will not likely succeed and are of the nature that would tend to promote graft and corruption. The restrictions are intended to restrict imports to the absolute necessities. But the definition of a necessity is always quite elusive, and the appropriate quantity of such a necessity is likely to be just as elusive. Food ($800 million in imports per month)[65] and armaments ($400 million of imports per month)[66] alone totaled $1.2 billion of imports per month. The restrictions would, if successfully carried out, bring imports to about $600 million per month.[67] This is lower than any single monthly total in the past two years. Furthermore, not one committee, but two committees will decide upon import priorities.[68] One committee will be at the executive level, the other tehcnical.[69] The members of these committees, vested with so much power, will likely be targets of bribes. Also, the restrictions will tend to promote a black market, and its attendant corruption.

John Sarpa, the International Chamber of Commerce's Middle East Affair director, (in early 1981) described how companies regarded doing busines with Iran: "There isn't a company in its right mind that would deal with Iran right now."[70]

Despite Iran's lack of an overall development plan it does have many projects on the drawing board. In 1981, plans were set to build new roads and harbors, amounting to $1 billion in expenditures.[71] A pipeline network is planned to take four years in construction and will reach 180 towns and 1,400 villages.[72] A 91 meter-high concrete dam with 1,950 million cubic meter capacity is planned to provide multiple uses.[73] A $300 million plan to build smelting plants with capacity of 50,000-70,000 tons to tin and 35,000-40,000 tons of lead were set.[74] These seem to be excessively ambitious projects given the troubled state of the Iranian economy.

B. Absorptive Capacity Constraints

Iran is an example of a country that tried to absorb its oil revenues beyond the absorptive capacity. It was not the traditional constraints that were the most binding, but the new internal constraints on absorptive capacity.

Prior to the 1979 Revolution, Iran was making considerable headway in pushing back its traditional constraints on absorptive capacity. Iran's industrialization program required huge quantities of investment. Import capacity continued to enlarge. Considerable resources were spent on education to loosen up manpower constraints. Physical bottlenecks, though existent, were becoming less and less a problem.

One of the Shah's gravest mistakes was his not taking sufficient care to deal with several of the following new internal constraints on absorptive capacity.

The distribution of income and wealth in Iran was notoriously inequitable. The percentage share of income going to the poorest 40 percent of the population in Iran in the early 1970s was only 12.5 percent.[75] This caused social friction. A sense that wealth and income were a function of ones nearness to the regime, prevailed.

Expatriate labor force requirements were quite large.

> "By mid-1975 there were some 35,000 foreigners living in Tehran alone-mostly Europeans acting as technicians, managers, advisers or foreign company representatives, including a sizeable portion connected with defense and defense-related contracts."[76]

Many felt that Iran's oil wealth was to an excessive degree benefiting foreigners more than the Iranians themselves.

In the later years of the Shah inflation too began to accelerate. Table 8 below gives the average annual growth rate in percent in inflation during various time spans.

TABLE 8

Average Annual Growth Rate of Inflation In Iran
(percent)

	1950-1960	1960-1970	1970-1977
Consumer price index	7.4	1.6	12.4
Wholesale price index	5.9	1.4	11.0

Source: World Bank, World Tables: The Second Edition (1980), (Baltimore: The Johns Hopkins University Press, 1980), p. 109.

Urbanization and congestion were worsened by deliberate policies of the Shah to reduce the number of villages from 60,000 to 5,000 by providing those villages that were among the top 5,000 most conveniently placed with water and electricity. Those located more remotely and less conveniently were termed "uneconomical" and were given no such amenities.[77] This helped to cause very high rates of migration to the urban areas and congestion. Also, policy attempts to gain economies of scale in agricultural production through capital intensity displaced many rural inhabitants who then moved to urban area.

And last but not least the government miscalculated the social and cultural stability of the nation. The economy was growing and modernizing too rapidly for the pace of cultural change. This insensitivity towards the fundamental Moslem cultural underpinnings and the cultures resistance to westerization were perhaps the factors in the overthrow of the Peacock Thrown.

The situation in Iran now is chaotic. The world awaits stability to take hold so that Iran can once again return to the international community.

Iran's needs are great. The absorptive capacity problem - how to efficiently use surplus petroleum revenues is hardly a problem. Instead Iran needs as much oil revenue as possible, but lacks the means to produce it.

The Iran-Iraqi war appears to be a war of attrition. Iraq's oil exporting capacity had suffered considerably less than has Iran's before the Kurdish distruction of a major pipeline in mid-January 1982. Iran was even importing diesel and heating fuels that its ports were not equipped to handle.[78] Iran had to offer discounts to customers loading petroleum exports at Kharg Island to compensate them for huge insurance premiums in the war zone.[79] Saddan Hussein was hoping that as a consequence of Iran's serious attrition another internal revolution will breakout.[80]

Iran is threatened not only by Iraq but by dissension from within. The Moslem ruling clergy are set upon destroying opposition to preserve the fundamentalist gains already made. The Fedayin, a Marxist guerilla group, is active within Iran, but is suffering from radical divisions.[81] The Tudeh is Iran's Moscow-directed communist party which maintains allegiance to Russia dictators. But nominally the Tudeh supports the ruling Mullahr's as it once supported the Shah.[82] But since the expulsion of Bani-Sadr, the clergy have perpetrated massive executions. It was estimated that from mid-June to October 1981, 1,800 people have been executed;[83] since the Shah's fall a total of 3,350 people have lost their lives in this manner. These often arbitrary executions alienate and delegitimatize the ruling cl

The future of Iran is not clear, nor is it predictable. It appears safe to say that it will take many years to regain its once prominent position in world economic affairs. If revolution should again occur, which could very possibly happen, the prospects are even more unpredictable, depending on the rationality and stability of any new regime. An end of the Iran-Iraqi war would only return a relative degree of stability due to internal unrest. Before the bombing of a major pipeline that cut Iraq's total exports of crude to 300,000 barrels per day, Saddam Hussein seemed content with the protraction of the war. Before this incident Iraq had been loosing considerably less than Iran and had gained over 8,000 square miles of Iranian territory. This incident may be a major impetus to conclude the war.

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ECONOMETRIC MODEL: IRAN

A. Specification of the Model

1. Absorptive Capacity Equations

The domestic absorptive capacity of Iran is defined as the utilization of the flow of goods and services in the economy for the purpose of domestic consumption and investment. However, total consumption consists of the sum of private consumption (NCP) and government consumption (NCG). Total domestic absorption is therefore described by the following relation:

$$NGDA=NCP+NCG+NGDI \qquad (1)$$

where NGDI is the gross domestic investment.

In this study, the private consumption is assumed to be a function of the summation of non-oil gross domestic production (NGDPN) and net government injection (NGJ)

$$NCP=a_0 + a_1(NGDPN + NGJ) \qquad (2)$$

where net government injection is defined as the sum of government's deficit (NGOEX - NGR) and government's revenue of oil (NROIL).

$$NGJ= (NGOEX-NGR)+NROIL \qquad (3)$$

The governments private consumption expenditure is made a function of total government expenditure. However, we have also included lagged consumption to reflect the distributed lag response of consumption to change in total expenditure.

$$NCG=b_0 + b_1 \ (NGOEX) + b_2 \ (NCG)_{-1} \qquad (4)$$

Gross domestic investment is assumed to be determined by the previous level of gross domestic product.

$$NGDI=c_0 + c_1 \ (NGDP)_{-1} \qquad (5)$$

2. Non-Oil Output

Gross domestic product in the oil sector (NGDPO) is treated as a residual component of gross domestic product (NGDP)

$$NGDPO=NGDP-NGDPN \qquad (6)$$

where real gross domestic product in the non-oil sector (GDPN) is the sum of real output in each non-oil sector of the economy.

$$GDPN=GDPA+GDPM+GDPC+GDPS \qquad (7)$$

Real output in agriculture (GDPA), manufacturing (GDPM), construction (GDPC) and services (GDPS) are made functions of the corresponding real capital stock in the same sector. For example,

$$GDPA=d_0 + d_1 \cdot (KSA) + d_z \cdot D74^* \qquad (8)$$

$$GDPM=e_0 + e_1 \cdot (KSM) \qquad (9)$$

$$GDPC=f_0 + f_1 \quad (KSC) \qquad (10)$$

$$GDPS=g_0 + g_1 \quad (KSS) \qquad (11)$$

where KSA = real capital stock in agriculture

KSM = real capital stock in manufacturing

KSC = real capital stock in construction

KSS = real capital stock in services

To transfer the real non-oil gross domestic product to nominal term we have used the general price deflator index (PGNP). Therefore,

$$NGDPN = GDPN * PGNP \qquad (12)$$

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* A dummy variable is included in equation 8 to reflect the declining shift in agricultural production since 1974.

However, by definition gross domestic product (NGDP) can be determined by the following identity.

$$NGDP=NGDA + NBOP \qquad (13)$$

where NBOP is the balance of trade which is the difference between nominal export (NEX) and nominal import (NIM).

$$NBOP=NEX-NIM \qquad (14)$$

Furthermore, considering net factor income (NFY), we can define gross national product as follows:

$$NGNP=NGDP-NFY \qquad (15)$$

3. Oil Output

As we have already mentioned, the gross domestic product in the oil sector (NGDPO) is derived as a residual variable (see equation 6). However, the quantity of oil product (OILQ) is made a linear function of the current and lagged real gross domestic product in the oil sector.

$$OILQ=h_0 + h_1 \left(\frac{NGDPO}{OILP}\right)+h_2 \left(\frac{NGDPO}{OILP}\right)_{-1} \quad (16)$$

4. Foreign Trade

The balance of trade (NBOP) has been defined in identity 14 as the difference between exports and imports. However, exports consist of oil and non-oil components

$$NEX=OILX + NOLX \qquad (17)$$

where the value of oil exports (OILX) is explained by

$$OILX=m_0 + m_1 \ (OIQX) + m_2 \ (OILP) \qquad (18)$$

As it can be seen, a regression has been used to estimate the value of oil exports rather than a single indentity with price times quantity because the price of oil is expressed as an index.

The quantity of oil exported is assumed to be a constant proportion of the amount of oil produced.

$$OIQX=n_0 + n_1 (OILQ) \qquad (19)$$

Non-oil exports are postulated to be determined by non-oil GDP.

$$NOLX=p_0 + p_1 (NGDPN) \qquad (20)$$

Imports are simply made a function of gross domestic absorption (NGDA). This makes the demand for imports derived from domestic spending

$$NIM=q_0 + q_1 (NGDA) \qquad (21)$$

5. Government Sector Equations

Revenue from oil (NROIL) is made a linear function of gross domestic product in the oil sector. However, the revenue from non-oil sources (NRNOL) is assumed to be a function of gross domestic non-oil production (NGDPN). The following set of relations therefore describe the government sector in the model in terms of government revenues (NGR).

$$NGR=NROIL + NRNOL \qquad (22)$$

$$NROIL=p_0 + p_1 (NGDPO) \qquad (23)$$

$$NRNOL=r_0 + r_1 (NGDPN) \qquad (24)$$

6. Monetary Sector

The money supply (MONY) is estimated as a function of the domestic base, including claims on the private sector (CLPS), government deposits (NGVD) and other deposits (NOA); and of the foreign monetary base compased of foreign assets (FA).

$$MONY = s_0 + s_1 \text{ (CLPS)} + s_2 \text{ (NGVD)} + s_3 \text{ (NOA)} + s_4 \text{ (FA)} \quad (25)$$

Government deposits (NGVD) is made a function of government surplus (NGR-NGOEX).

$$NGVD = t_0 + t_1 \text{ (NGR-NGEOX)} + t_2 \cdot D74 \quad (26)$$

Foreign assets (FA) are a function of the volume of balance of trade.

$$FA = x_0 + x_1 \cdot \text{(NBOP)} \quad (27)$$

Claims on the private sector (CLPS) are a function of gross domestic product in the non-oil sector.

$$CLPS = u_0 + u_1 \text{(NGDPN)} + u_2 \text{(NGDPN)}_{-1} \quad (28)$$

7. Prices

Domestic prices (PGDP) in Iran are affected by the large share of imported goods in the total consumption of the country. The price equation incorporates variables for the money supply and for the prices of imported goods and services (PIM).

$$PGDP = v_0 + v_1 \text{ (MONY)} + v_2 \text{ (PIM)} \quad (29)$$

Furthermore it is assumed that general price level (PGNP) is a weighted average of domestic prices (PGDP) and prices of imported goods as services (PIM).

$$PGNP = .76\text{(PGDP)} + .24\text{(PIM)} \quad (30)$$

where .76 is equal to the average ratio of gross domestic product and total import $\left(\frac{NGDP}{NIM}\right)$ over the period of 1974 to 1977.

B. Estimation Results

1. The Forecasting Model

We need to estimate only the stochastic equations in the model, i.e. relations other than identities. We obtain a system of equations forming the model for forecasting under alternative scenarios. The summarized estimation results are obtained based on the sample period from 1966 to 1977. In evaluating the results note that:

(i) - t - values are given in parenthesis; and

(ii) - DW* denotes that the Cochran-Orcutt Correction Procedure was applied.

1. Absorptive Capacity

$$NCP = \underset{(5.1)}{158.2} + \underset{(29.3)}{.41}\,(NGDPN+NGJ) \qquad (2)$$

$R^2 = .99$
DW = 2.35

$$NCG = \underset{(-.17)}{-2.34} + \underset{(8.1)}{.48}\,NGOEX + \underset{(4.4)}{.42}\,NCG_{-1} \qquad (4)$$

$R^2 = .99$
DW = 2.1

$$NGDI = \underset{(-4.5)}{-147.2} + \underset{(29.7)}{.42}\,GNDP_{-1} \qquad (5)$$

$R^2 = .99$
*DW = 1.9

2. Non-oil Output

$$GDPA = \underset{(15.6)}{360.8} + \underset{(1.9)}{.12}\,KSA \underset{(4.7)}{-74.7}\,{}^{*}D74 \qquad (8)$$

$R^2 = .73$
DW = 1.8

$F_9^2 = 12.2$

$$GDPM = \underset{(8.2)}{256.9} + \underset{(3.6)}{.18}\,KSM \qquad (9)$$

$R^2 = .91$
DW = 1.81

$$GDPC = \underset{(.9)}{13.6} + \underset{(11.0)}{.92}\ KSC \qquad (10)$$

$R^2 = .95$
DW = 1.86

$$GDPS = \underset{(8.4)}{766.0} + \underset{(4.7)}{.18}\ KSS \qquad (11)$$

$R^2 = .91$
DW = 1.96

3. Oil Output

$$OILQ = \underset{(3.1)}{3.28} + \underset{(1.2)}{.02}\left(\frac{NGDPO}{OILP}\right) \underset{(-3.3)}{-.05}\left(\frac{NGDPO}{OILP}\right)_{-1} \qquad (16)$$

$R^2 = .96$
*DW = 2.1

4. Foreign Trade

$$OILX = \underset{(-4.4)}{-.236.3} + \underset{(23.7)}{14.0}\ (OILP) + \underset{(4.1)}{197.2}\ (OIQX) \qquad (18)$$

$R^2 = .99$
DW = 2.5

$$OIQX = \underset{(7.0)}{-.11} + \underset{(50.5)}{.94}\ OILQ \qquad (19)$$

$R^2 = .99$
*DW = 1.5

$$NOLX = \underset{(2.0)}{23.3} + \underset{(1.5)}{.0072}\ NGDPN \qquad (20)$$

$R^2 = .71$
*DW = 1.8
F = 18.0

$$NIM = \underset{(-4.6)}{-98.7} + \underset{(34.3)}{.32}\ NGDA \qquad (21)$$

$R^2 = .99$
DW = 1.64

5. Government Sector

$$NROIL = \underset{(-2.3)}{-58.3} + \underset{(33.1)}{.95}\ NGDPO \qquad (23)$$

$R^2 = .99$
DW = 1.8

$$NRNOL = -25.6 + \underset{(2.2)}{} .14\ \underset{(20.8)}{NGDPN} \tag{24}$$

$$R^2 = .98$$
$$DW = 1.8$$

6. Monetary Sector

$$MONY = \underset{(4.8)}{.81\ CLPS} \underset{(-1.0)}{-.42\ NGVD} + \underset{(.62)}{.54\ NOA} + \underset{(1.9)}{.28\ FA} \tag{25}$$

$$R^2 = .99$$
$$DW = 1.86$$

$$NGVD = \underset{(4.2)}{150.8} + \underset{(1.65)}{.24} (NGR - NGEOX) \underset{(-2.1)}{-143.7} (D74) \tag{26}$$

$$R^2 = .55$$
$$*DW = 2.45$$

$$FA = \underset{(-.16)}{-12.6} + \underset{(2.4)}{.72}\ NBOP \tag{27}$$

$$R^2 = .72$$
$$DW = 2.0$$

$$CLPS = \underset{(-3.4)}{-100.7} + \underset{(.8)}{.20}\ GNDPN + \underset{(.7)}{.22}\ NGDPN_{-1} \tag{28}$$

$$R^2 = .99$$
$$DW = 2.27$$
$$F_q^2 = 645.3$$

7. Prices

$$PGDP = \underset{(-3.2)}{-.74} + \underset{(3.9)}{.0018}\ MONY + \underset{(5.9)}{1.51}\ PIM \tag{29}$$

$$R^2 = .99$$
$$DW = 2.35$$

The forecasting model consists of thirty equations made of nineteen stochastic equations and eleven identities. It is a linear model but it contains equations which are related. A single equation method may, therefore, not be appropriate for the estimation of some of the stochastic equaitons. The objective of this subsection is to examine the rationale for the estimation methods used in the study.

The system of equations in the model may be grouped under three blocks as described by Table 1. The system of equations are block-recursive. In other words, the equations in the first block can be solved without reference to the third block. The solution of the equations in the second block is preceeded by the solution of the first block of equations, while the solution of the equations in the third block is preceeded by solutions of the equations in both the first and second blocks. The solution of the first block is not preceeded by the solution of any block of equations.

In addition, the equations in the first block are recursive, and hence the application of ordinary least squares estimation procedure to the stochastic equations will yield full information estimators. This observation also applies to the subsystem of equations in the third block. However, the second block contains equations which are simultaneously related, and it is in the estimation of the stochastic equations in this block that one should use the two stage least square method. These equations are (2), (16), (18), (19), (20), (23), (24), (25), (26), (27), (28), (29) with dependent variables NCP, OILQ, OILX, OIQX, NOLX, NIM, NROIL, NRNOL, MONY, NGVD, NFAB, CLPS, and PGDP, respectively.

2. Two Stage Least Square Estimation

Here we summarize the estimation results of the stochastic equation in the second block. However, for the purpose of forecasting

TABLE 1

BLOCK RECURSIVENESS OF THE MODEL

BLOCK ONE	BLOCK TWO	BLOCK THREE
(4) NCG	(1) NCP	(15) NGNP
(5) NGDI	(2) NGJ	
(7) GDPN	(3) NGR	
(8) GDPA	(6) NGDPO	
(9) GDPM	(12) PGNP	
(10) GDPC	(13) NGDP	
(11) GDPS	(14) NIM	
	(16) OILQ	
	(17) NEX	
	(18) OILX	
	(19) OIQX	
	(20) NOLX	
	(21) NGDA	
	(22) NRNOL	
	(23) NROIL	
	(24) NGDPN	
	(25) NFAB	
	(26) NGVD	
	(27) NBOP	
	(28) CLPS	
	(29) MONY	
	(30) PGDP	

we replace these estimations for their corresponding OLSQ in the model.

$$NCP = \underset{(5.1)}{158.2} + \underset{(29.3)}{.41}\,(NGDPN + NGJ) \qquad (2)$$

$$R^2 = .99$$
$$DW = 2.35$$

$$OILQ = \underset{(4.3)}{1.45} + \underset{(3.3)}{.03}\,\frac{(NGDPO)}{OILP} + \underset{(2.7)}{.02}\,\frac{(NGDPO)}{OILP}_{-1} \qquad (16)$$

$$R^2 = .97$$
$$^{*}DW = 2.3$$

$$OILX = \underset{(-3.9)}{-254.6} + \underset{(22.3)}{14.0}\,(OILP) + \underset{(3.7)}{210.5}\,(OIQX) \qquad (18)$$

$$R^2 = .99$$
$$DW = 2.5$$

$$OIQX = \underset{(-4.8)}{-.49} + \underset{(33.3)}{1.05}\,(OILQ) \qquad (19)$$

$$R^2 = .99$$
$$^{*}DW = 2.27$$

$$NOLX = \underset{(2.0)}{25.6} + \underset{(1.28)}{.0066}\,NGDPN \qquad (20)$$

$$R^2 = .68$$
$$^{*}DW = 1.84$$
$$F^{1}_{10} = 19.2$$

$$NIM = \underset{(-4.2)}{-101.5} + \underset{(32.)}{.33}\,NGDA \qquad (21)$$

$$R^2 = .99$$
$$DW = 1.66$$

$$NROIL = \underset{(-2.2)}{-63.5} + \underset{(31.1)}{.96}\,NGDPO \qquad (23)$$

$$R^2 = .99$$
$$DW = 1.81$$

$$NRNOL = \underset{(-2.6)}{-26.0} + \underset{(23.7)}{.14}\,NGDPN \qquad (24)$$

$$R^2 = .98$$
$$DW = 1.63$$

$$MONY = \underset{(4.7)}{.81}\,CLPS - \underset{(1.0)}{.44}\,NGCB + \underset{(.7)}{.58}NOA + \underset{(1.9)}{.29}\,FA \qquad (25)$$

$$R^2 = .99$$
$$DW = 1.85$$

$$NGVD = \underset{(4.3)}{149.26} + \underset{(1.7)}{0.25}(NGR - NGOEX) - \underset{(-2.1)}{146.4}(D74) \quad (26)$$

$R^2 = 0.55$
$*DW = 2.4$
$F^2_9 = 5.0$

$$NFAB = \underset{(-0.11)}{07.6} + \underset{(2.48)}{0.69}(NBOP) \quad (27)$$

$R^2 = 0.72$
$DW = 2.1$

$$CLPS = \underset{(-3.4)}{-101.1} + \underset{(0.8)}{0.19}NGDPN + \underset{(0.7)}{0.23}NGDPN_{-1} \quad (28)$$

$R^2 = 0.99$
$DW = 2.28$
$F^2_9 = 645.3$

$$PGDP = \underset{(-3.2)}{-0.28} + \underset{(3.0)}{0.00066}MONY + \underset{(5.9)}{0.997}PIM \quad (29)$$

$R^2 = 0.993$
$DW - 2.36$

3. List of Endogenous and Exogeneous variables:

A. Endogeneous variables

(1) NGDA = Gross domestic absorption

(2) NCP = Private consumption

(3) NCG = Government consumption

(4) NGJ = Net government injection

(5) NGDI = Gross domestic investment

(6) NGDPN = Nonoil gross domestic product

(7) GDPA = Real output in agriculture

(8) GDPM = Real output in manufacturing

(9) GDPC = Real output in construction

(10) GDPS = Real output in services

(11) NGR = Government revenue (total)

(12) NROIL = Government revenue of oil

(13) NRNOL = Government revenue of nonoil

(14) NGDP = Gross domestic product

(15) NGNP = Gross national product

(16) NBOP = Balance of trade

(17) NEX = Total export

(18) OILX = Value of oil export

(19) NOLX = Value of nonoil export

(20) OILQ = Total quantity of oil produced

(21) OIQX = Quantity of oil exported

(22) NGDPO = Gross domestic product of oil

(23) NIM = Total import

(24) MONY = Money supply

(25) NGVD = Government deposits in the Central Bank

(26) CLPS = Private claims

(27) FA = Foreign assets

(28) GDPN = Real gross domestic product in the nonoil sector

(29) PGDP = Domestic price level

(30) PGNP = General price level index

B. Exogenous variables

(1) PIM = Price of imports

(2) NFY = Net foreign income from abroad

(3) KSA = Real capital stock in agriculture

(4) KSM = Real capital stock in manufacturing

(5) KSC = Real capital stock in construction

(6) KSS = Real capital stock in services

(7) NOA = Other deposits in the Central Bank

(8) OILP = Price of oil

(9) NGEOX = Government expenditures (total)

Note: D74 = zero for 1966 to 1973, and = one for 1974 on.

IV. Simulation

The general idea of forecasting the absorptive capacity and the level of petroleum output involves two steps. First is the description of the assumptions which define the scenarios under which the forecasting is done. This also implies projecting all the exogenous variables in the model for the entire forecasting horizon, and making adjustments to the coefficients of the structui equations necessitated by the assumptions. The second step involves simulating the model under alternative scenarios to solve for the endogenous variables for the years covered by the forecasting horizon which in this study is 1978 to 1990.

A. Description of the Assumptions

1. PIM = price of imports:

The price of imports is projected upon the assumption that it will follow the time path in the 1973-1977 period, during which the price grew at an annual rate of 11 percent.

2. NFY = net foreign income from abroad:

Since this variable indicates no certain trend over the period of 1966 to 1977, its projected value is taken to be constant at the level of -37.0 billion rials over the forecasting period (1978-1990).

3-6. Real capital stocks in different nonoil sectors (KSA, KSM, KSC, and KSS):

These variables are projected based on the assumption that they will grow at an annual rate of 2 percent. This rate of growth is not consistent with the historical rate of growth of capital stocks in these sectors. But regarding the present situation it might be a safe assumption.

7. NOA = other assets:

This variable is projected based on the assumption that it will fluctuate over a constant level through the forecasting period. This constant level, however, is taken to be equal to the 1977 level of other deposits which is equal to 440.49 billion rials.

It should be noted here that the dummy variable that we used in equation 8 (the production function of the agricultural sector) will not be effective over the forecasting period since the governmental policies in the 1980s will again focus on agricultural production. The dummy variable in equation 26 (the government deposit function) will be effective over the forecasting period.

B. Control Scenarios

We define four control scenarios based on alternative paths for government expenditure (NGEOX) and the price of oil (OILP).

Scenario 1:

i. NGEOX grows at an annual rate of 11 percent through 1990.
ii. OILP grows at an annual rate of 11 percent through 1990.

Scenario 2:

i. NGEOX grows at an annual rate of 11 percent through 1990.
ii. OILP grows at an annual rate of 16 percent through 1990.

Scenario 3:

i. NGEOX grows at an annual rat eof 16 percent through 199(
ii. OILP grows at an annual rate of 11 percent through 199(

Scenario 4:

i. NGEOX grows at an annual rate of 16 percent through 19!
ii. OILP grows at an annual rate of 16 percent through 199(

V. Comparison of the Scenarios

The forecasting results for alternative scenarios are summarized in tables 2 and 3. The level of oil production (OILQ) can be said not to be very sensitive to different levels of oil prices and government expenditures. In general, however, the results indicate that the level of oil production has a decreasing trend over time for all scenarios. This decreasing trend is a faster rate for the first two scenarios (with 11 percent increase in government expenditure) than in the last two scenarios (with 16 percent increase in government expenditure). This result indicates that the government will attempt to keep the oil producic (regardless of the price of oil) at a higher level when there is a faster rate of growth in its expenditures. In other words, government's policy on the production of oil is more dependent on its need to finance its expenditures than the price of oil.

Again, since the production of oil is not very sensitive to the different levels of oil prices and government expenditures, one expects that the revenue from oil and therefore, total government revenue will be higher for the scenarios where the price of oil grows at higher rates. The forecasted results for total government revenue (NGR) and for government revenue from oil (NROIL) are consistent with this reference.

TABLE 2

IRAN FORECASTING RESULTS BASED ON DIFFERENT ASSUMPTIONS ON OILP AND NGEOX

Scenario	Year	NBOP	NGDA	NGDP	NGDPN	NGNP	NGR	NIM	OILQ	OIQX	PGNP	NROIL
1	1980	634.2	5,978.0	6,612.0	3,196.3	6,575.0	3,626.3	1,866.5	2.611	2.257	1.86	3,208.4
	1985	613.0	10,536.0	11,149.0	6,744.6	11,112.0	5,065.8	3,367.1	2.354	1.988	3.53	4,155.3
	1990	287.9	19,209.0	19,497.0	14,954.0	19,460.0	6,338.6	6,222.6	2.023	1.640	6.72	4,288.3
2	1980	909.9	6,064.7	6,974.6	3,217.7	6,937.6	3,956.0	1,895.1	2.572	2.217	1.87	3,535.3
	1985	2,070.1	11,258.0	13,328.0	6,839.2	13,291.0	7,075.8	3,604.8	2.357	1.991	3.58	6,152.2
	1990	4,862.2	21,706.0	26,569.0	15,291.0	26,532.0	12,837.0	7,044.7	2.186	1.811	6.87	10,740.0
3	1980	539.4	6,316.4	6,855.8	3,180.2	6,818.8	3,873.0	1,978.0	2.681	2.331	1.85	3,457.4
	1985	31.4	12,507.0	12,539.0	6,583.6	12,502.0	6,528.9	4,016.1	2.642	2.291	3.44	5,640.8
	1990	-1,596.5	25,323.0	23,726.0	14,263.0	23,689.0	10,955.0	8,235.3	2.581	2.226	6.41	9,001.1
4	1980	813.3	6,402.9	7,216.2	3,201.5	7,179.2	4,200.8	2,006.5	2.635	2.283	1.86	3,782.3
	1985	1,470.1	13,221.0	14,691.0	6,677.0	14,654.0	8,514.1	4,251.0	2.556	2.200	3.49	7,613.0
	1990	2,926.9	27,790.0	30,717.0	14,596.0	30,680.0	17,379.0	9,047.7	2.490	2.130	6.56	15,379.0

TABLE 3

Forecasted average annual rate of growth in nominal gross national product (NGNP) over the period of:

Scenario	1980-1985 %	1985-1990 %
1	13.8	15.0
2	18.3	19.9
3	16.7	17.9
4	20.1	21.9

Forecasted average annual rate of growth in nominal nonoil gross domestic product (NGNPN) over the period of:

Scenario	1980-1985 %	1985-1990 %
1	22.2	24.3
2	22.5	24.7
3	21.4	23.3
4	21.7	23.7

Forecasted average annual rate of inflation over the period of:

Scenario	1980-1985 %	1985-1990 %
1	18.0	18.1
2	18.3	18.4
3	17.1	17.3
4	17.5	17.6

Forecasted average annual rate of growth in NIM over the period of:

Scenario	1980-1985 %	1985-1990 %
1	16.1	17.0
2	18.0	19.1
3	20.6	21.0
4	22.4	22.6

Forecasted annual average rate of decline in the quantity of oil produced (OILQ) over the period:

Scenario	1980-1985 %	1985-1990 %
1	2.0	2.8
2	1.7	1.5
3	0.3	0.5
4	0.6	0.5

Forecasted annual average rate of decline in the quantity of oil exported (OIQX) over the period of:

Scenario	1980-1985 %	1985-1990 %
1	2.3	3.5
2	2.0	1.8
3	0.3	0.6
4	0.7	0.6

The results on the balance of trade indicate that it is positively higher when the price of oil grows at 16 percent than when it grows at 11 percent. However, it is also very sensitive to the different level of government expenditures. In other words, when the government expenditure grows at a higher rate it provides higher levels of gross domestic absorption through government injections. This, in turn, makes imports (NIM) grow at a higher rate (see table 3). A higher level of imports with a relatively constant level of exports under different scearios provides a lower level of balance of payment. Another interesting result is that the balance of payments is negative by the end of the forecasting period when the price of oil grows at 11 percent and when government expenditure grows at 16 percent (scenario 3). This scenario with the price of oil growing at a lower rate generates a lower value of exports. The higher rate of growth in government spending, on the other hand, increases domestic absorption and the rate of growth in imports, resulting in a negative balance of payments.

The results on the rate of inflation (table 3) indicate that this rate is not sensitive to the different level of oil prices. But it is sensitive to the different level of government expenditur When government expenditure grows at a lower rate the balance of payment is positive and higher which in turn generate a higher level of foreign assets. The higher level of foreign assets increases the monetary base and the money supply resulting in a higher level of inflation.

The results on the rate of growth in nonoil gross domestic product (NGDPN) (table 3) are analogous to that for the rate of inflation. In other words, these changes in nonoil gross domestic product (NGDPN) are due entirely to changes in the rate of inflation. Changes in real nonoil output (GDPN), on the other hand, are determined entirely by changes in real capital stocks, and are independent of different levels of oil prices and government expenditure.

COUNTRY REPORT: IRAQ

Overview of the Economy

1. Background Information

The Republic of Iraq is situated in the southwest of Asia, northeast of the Arab Peninsula. It is bounded by Turkey from the north, Syria, Jordan, and Saudi Arabia on the west, and Arabian Gulf, Kuwait, and Saudi Arabia on the south, and Iran on the east.

The area of Iraq is about 438,000 square kilometers (about 170,000 square miles). One-fifth of the area covers the alluvial plain which forms the fertile basin of the two rivers, the Tigris and the Euphrates; three-fifths of the area covers the desert plateau situated in the west of Iraq; and the remaining one-fifth of the area covers the mountainous region which is situated in the north and northeast of Iraq.

Iraq's climate is continental and subtropical with rainfall restricted to the winter, autumn, and spring as is the case in Mediterrainean climatic conditions. The Mediterranean climate prevails in the mountainous regions as well,which are characterized by cool winters and moderate summers. Annual rainfall ranges between 400-1000 mm. The hot desert climate prevails in the alluvial plain and the western plateau, which is characterized by hot dry summers and warm winters. There, the annual rainfall ranges between 50-200 mm.[1]

The estimated potentially arable land in Iraq is 48 million donums[2] which is equivalent to about 27 percent of the total area of Iraq.

However, only about half of this area is actually utilized and, due to the agricultural techniques followed in Iraq, half of the cultivated area remains fallow at all times.

Agriculture in Iraq depends for irrigation on rain in the north and on the Tigris and Euphrates and their branches and tributaries in the central and southern parts of the country. The main agricultural crops are wheat, barley, dates, rice, cotton, tobacco, vegetables, and fruits.

The most prominent mineral resource of Iraq is crude oil. Iraq ranks fourth in crude reserves among OPEC countries with an estimate of about 31,000 million barrels in proved reserves in 1980. Iraq's natural gas proved reserve was estimated at about 779 cubic meters in 1980, ranking her eighth among OPEC countries. However, only a fraction of the produced natural gas is commerically utilized at present.

Iraqi proven oil reserves stand currently at about 30 billion barrels. Given the highest rate of production of about 3.5 million barrels per day attained prior to the war, these reserves will last for some 30 years. If, on the other hand, we assume, as it is likely, a rate of oil output of about 6 million barrels per day starting in 1990, current reserves will last only until the turn of the century. Even considering current reserves alone, the present production-reserve ratio is not high. But the point is that potential reserves may be two-fold current reserves and the recent discoveries by Brazilian and french oil companies in the South appear to bear out the oilmen's guestimates. New discoveries are certainly going to stress the need for expanding the country's production capacity even further. In sum, other things being equal, the higher the reserves the greater the desired level of production.

Apart from oil and gas, Iraq is also rich in sulphur, phosphate, salt, limestone, gypsum, and a number of other non-metallic minerals. With regard to metallic minerals, there is a possibility of occurrence of lead, zinc, iron ore, copper, and bauxite. Geological surveys for these metallic minerals are not complete, and none of them are commercially produced at present.

Iraq is considered to be a sparsely populated country. According to the general census of 1977, the population of Iraq reached 12 million, equivalent to about 27 persons per square mile. The population of Iraq has increased many-fold since 1927 from 2.97 million to the current 1977 figure of 12 million.

2. Recent Economic Performance

a. Economic growth

The war between Iran and Iraq has proved to be a stumbling block in the Iraqi's ambitious plans for development in the 1980s. The five-year plan (1981-1985) called for expenditures to reach as high as $75 billion. The plan calls for rapid industrialization to exploit Iraqs mineral wealth including gypsum, glass sand, lead, iron ore, and copper. High levels of investment are planned in services, electricity, transport, and construction.

In September 1980, Iraqi troops intered Iran to oppose Iranian expansionist plans and to regain 500 square kilometers of land allegedly ceded to Iran in the 1975 Algiers agreement. The agreement was declared null and void by the Iraqi Revolution Command Council and war erupted on September 23 when Iranian aircraft attacked the Khor Al Zubai petrochemical complex.

The initial impact of the war brought a halt to some development projects, mainly in the industrial areas of Basra, Mosul, and Kirkuk. Some contractors left sites in Baghdad and other parts of the country that were relatively unaffected by the war. The foreign contractors who stand to lose the most from the war are the Japanese. Five major heavy industrial Japanese firms --Nigata Engineering, Mitsubishi Heavy industries , Chiyoda Chemical Engineering and Construction, Toyo Engineering and Sumitomo Heavy Industries -- pulled out their workers after the initial fighting. Some of these firms have since returned their workers but the pace of their projects has been sharply curtailed. Other countries also pulled out workers in response to the war; South Korea's Hyrendai called home 680 workers, Engineers Projects India sent home 1700 employees, and a United States company, Combustion Engineering,pulled out 1000 employees. Most West European companies have continued work on projects for the Iraqis although some have reduced their work force.

The Iraqis from the outset viewed the war as a slight interruption to their massive development program. They attempted to calm the fears of foreign companies by establishing a special committee to set compensation terms and revise fixed price contracts affected by the war. But they also warned companies that abandoned projects due to the war. Iraqs First Deputy Premier, Toho Yassin Ramadan, announced a new set of regulations to deal with "foreign companies in Iraq that have reduced their activities or violated their contracts by exploiting the state of war in which the country is engaged at present."

As the war has dragged on, both the Iraqis and Iranians have reconciled themselves to the economic impact of a long term conflict. But they have responded in quite different ways. The Iranians have drastically scaled back their expenditures to a level commensurate with a low level of oil exports and revenues. According to Iranian officials the level of spending at the end of the year in 1981 was about half the level of spending in 1978 when the late Shah of Iran last governed the country. The Iraqis, on the other hand, have forged ahead with ambitious development plans launched before the war.

b. Demographic change

Iraq is experiencing a demographic transition, where the population growth rate will gradually rise to a maximum, then decline to a steady rate after the birth and death rates have stabilized at lower levels in the future.

The reason for the rising population growth rate is that the death rate is declining at a much faster rate than the birth rate. Between 1960 and 1975, the crude birth rate per thousand population declined from 49 to 48, only 2 percent down, while the crude death rate per thousand population declined from 20 to 14, which is 30 percent down.[3] The reasons for the faster decline in the death rate are due to improved public health methods, better diets, higher incomes, etc.

Until the early 1960s the population of Iraq was predominantly rural. However, the share of the rural population has been persistently declining since the 1940s. The percentage of rural population was 64.0 in 1947; this percentage declined to 61.2 in 1957, 48.9 in 1965, and 36.3

in 1977 (see Table 2).

It is true that industrialization and expanded services have always attracted populations from the rural areas to the urban centers, and this has been the case with Iraq. However, this factor played only a minor part in the urbanization of Iraq during the 1950s and early 1960s. The reason behind migration to the cities during that period was mainly due to the wretched life of the Iraqi peasant arising from the land tenure system and the continuous deterioration of the quality of agricultural land.

This process of migration, although it reduced the degree of underemployment prevailing in the agricultural sector, it contributes, on the other hand, to depressed wages and unemployment in the cities. Although it can be argued that the process of migration from the agricultural sector increases the labor supply badly needed by the other sectors of the economy, the effect of such process is very minor in the short run. The labor requirements of the modern sectors of the economy are more qualitative than quantitative, while the migrants are almost totally unskilled and illiterate.

c. Structural change

Iraq inherited from the past an underdeveloped economy largely dominated by feudal and primitive agriculture. Apart from the crude oil production industry which was a separate enclave totally controlled by foreign oil companies, the industrial sector was insignificant.

After the revolution of 14 July 1958, a series of agrarian reform laws were promulgated, aimed at abolishing the feudal system. In 1964 all banks, insurance companies, and major industries were nationalized, steering the economy on a more socialistic course. In 1972 the government partially nationalized the crude oil industry. In 1975 the nationalization of this industry became complete, thus integrating the extremely important crude oil industry with the rest of the indigenous economy.

The economy of Iraq gradually became an oil export economy in the sense that by 1975 a single export, crude oil, accounted for about 98 percent of the total goods export; 58 percent of the GDP; and 75 percent of the ordinary budget.[4] The income derived from crude oil exports not only provided the government with the major share of the funds for current expenditure, but also made possible the undertaking of broad plans for long term economic development.

3. International Trade and Finance

Aside from a small portion of crude production which is reserved for satisfying the requirement of the domestic refining industry which in 1979 had a refining capacity of 188,830 barrels per day, the balance is devoted entirely to exports. Decisions pertaining to crude sales are entrusted to the Ministry of Oil and an interministerial planning board. Prior to the settlement of Iraqs dispute with the IPC, a period characterized by lax oil markets, Iraq used to dispose of its share of crude production via barter deals mostly with the Soviet bloc. Subsequently, however, the country insisted on cash payments at market prices for all the oil it exported. Futhermore, western concern with the security of oil supplies is being exploited to further the economic development of the country. Specifically, emphasis is placed on government-to-government deals for the purpose of securing reciprocal supply agreements for industrial capital goods, transfer of technology and, in some cases, direct investment in the domestic economy. This viewpoint is expressed by one top Iraqi offical as follows:

> "To the more developed countries of the world, oil is becoming more and more vital as demand grows and supply prospects become tighter. For us oil producers, basically one-resource countries, this situation provides a unique opportunity to employ our oil resources as a means for achieving rapid and balanced economic growth in all sectors. We must stop looking at oil as a normal commodity to be bought and sold like cotton and rice. We need to use this commodity as a tool for economic development. You might even say that oil is our lifeline to economic development." [5]

The volume and the time frame, but generally not the price(which remains largely dictated by market conditions) of exported oil, is directly linked to the level of the reciprocal demand made by Iraq on her trading partners. Iraq seems however not interested in attaching political conditions to oil sales. Even in 1973, the country characteristically and conspiciously abstained from joining the Arab oil embargo.

Most of the oil is exported to Europe, mainly France (23 percent), Italy (21 percent) and to Spain and England with six and eight percent respectively. These countries are all Western industrial powers that do not fit the radical image of Iraq in the Western media and yet they constitute most of the country's trade partners. This radical image is misleading because it is exclusively based on rhetorical Iraqi statements designed primarily for internal or Arab consumption.

The United States is at the bottom of the list of Iraqi customers having received only 75,000 barrels per day in 1978. If Iraq is successful in arranging future technological transfers from the United States, the latter could pave the way to further supply contracts between the two countries. The United States has the oil technology and the expertise to increase the production capability of the the Iraqi wells as well as assist in further searching the drilling for oil. A closer rapport seems natural, but the radical foreign politics of Iraq and its aspirations to become the future Egypt of the Arab world would dictate a more careful approach to a United States "rapprochement." No matter how the Iraqis go about achieving closer ties with the United States, the next decade will continue the clear tilting of Iraq towards the United States and the West in general. Current major contracts are awarded to Western concerns and the bulk of Iraqi imports still comes from the West, particularly West Germany, France, Japan, and Italy. The experience of Iraq with the eastern bloc has proved unfruitful, primarily in the area of technology transfer. An indication of this future trend followed the Israeli attack on the Iraqi nuclear power station. Condemnation of the United States by Iraq was expected but never materialized, perhaps indicating a tilt in Iraqi policy.

In the future, Iraqi oil sales will continue to have supply agreements attached to them more than political conditions. The supervision of the oil sales by the Iraqi government allows it to extract the maximum returns from other countries, including the imports of various capital goods, weapons, and technical assistance.

Generally speaking and considering the economic perspective, there are two opposing views regarding future oil prices. Some believe that oil prices will continue to rise over time as existing reserves are rapidly depleted and the rate at which new discoveries are made continues to decelerate. Adherents to this view advocate a lower rate of exploitation of reserves as the course that maximizes the benefits to the oil-producing country over time. Others conten that market responses to high and rising oil prices are bound to stimulate technological developments that will ultimately undermine the dominant position of oil in the profile of the world's energy picture. These observers contend, oil prices would precipitously decline. It is however generally believed that no new energy sources would supercede oil until perhaps the turn of the century, if at all. It takes not only time to develop a new source of energy but also to convert the extant industrial structure to the new alternative.

Obviously, a country with large reserves and limited immediate needs for additional financial resources should be interested in moderate oil prices so as to retard the development of alternatives and thus to maximize the return on its oil resources over their lifetime. Historically, Iraq seemed to be advocating the former view but more recently there is a discernable shift in favor of the latter. It is doubtful however that this change of position emerged from a reassessment of the realities of the oil market; rather we believe that this change of heart is in the main politically motivated as will be further discussed.

Iraqi oil exports were sharply curtailed by the war. Before the war, they were shipping three million barrels per day through the Persian Gulf. Since the destruction of their loading stables on the Gulf at Khor al Umaya and Mina al Bakr, they have fallen back on two pipelines that carry oil to the Mediterranean. Pipeline shipments through Turkey were disrupted by Iranian bombing raids on Iraqi oil installations in the Kirkuk oil fields in northeastern Iraq. However, those pipelines have been restored and are carrying 650,000 barrels per day. The Syrian pipeline branches out at two outlets at its tail end, one going to Banias Syria, and the other going to Tripoli, Lebanon. Very little oil has flowed over the pipeline to Tripoli. However, the Iraqis are negotiating with Lebanon to open the Tripoli terminal. If they are successful, they hope to ship 400,000 barrels a day to the Tripoli terminal. That would enable the Iraqis to increase oil exports to 1.3 million barrels a day.

Mikesell[6] refers to retained value as the "net foreign exchange effect" of the resource operation defined as the sum of local wages, local purchases, tax payments, and other transfers. The net foreign exchange receipts of the government do not constitute the whole oil export value. Transfers abroad have to be made for imports, employees remittances, and foreign investment income or dividends. Of these three transfers, investment income is by far the largest.

Investment income was 50 percent of the profits during the period 1952-70. It was reduced to 45 percent of the profits in 1971. Investment income was 46 percent of the oil export value in 1969 and declined to 43 percent in 1972 and 9 percent in 1975 as illustrated in Table 14. This decline was due to the nationalization which was started partically in June 1972 and completed in December 1975.

As a consequence, retained value increased from 53 percent of oil export value in 1969 to 62 percent in 1972 and 91 percent in 1975, thus almost all the rent was retained by the country.

Table 14, which was extracted from an analytic presentation for the Iraqi balance of payments for the period 1967-75, also shows non-oil export values for the stated period. Oil export value constituted a low of 91 percent of total export value in 1972, when oil production from the north was reduced, to a high of 98 percent in 1974 and 1975. These figures reveal the great extent of Iraq's dependence on oil exports for its foreign exchange earnings.

The expansion of oil exports is crucial to the success of Iraqi development plans. When the war began, the Iraqis had currency reserves estimated by the International Monetary Fund at some $35 billion. The Iraqis have stopped supplying the IMF with figures on their currency reserves so it is impossible to say what their reserve position is. Most experts believe that the Iraqis have used up most, but not all, of their currency reserve. In order to maintain the high level of expenditure for economic development the Iraqis have had to resort to heavy borrowing from their Arab neighbors. There are no accurate figures on the magnitude of the borrowing but Arab bankers and IMF officials place the figure between $8 billion and $20 billion. The money has been obtained as interest free loans from two of its oil producing neighbors; Kuwait and Saudi Arabia -- much of it in the last few months of 1981. The Iraqis have opted to accept these interest free loans and maintain some reserves with the IMF because the latter collect interest.

Recovery in oil exports is crucial to the success of Iraqi development plans. The main obstacle to the Iraqis at this point is the depressed state of world oil markets. Even if they succeed in lifting 1.3 billion barrels per day and shipping it over their pipelines to the Mediterranean, it is not clear that they will find customers for their oil. Failure to sell their oil exports will pose a major policy dilemma for the Iraqi planners. They will either have to borrow more money from Arab neighbors or from the financial markets, or cut back on development expenditures. There are clearly limits to their ability to borrow to finance their high level of expenditures Cutting back on expenditures exposes the Iraqi government to criticism and a political back lash at home. Many experts feel that the option the Iraqis have chosen to forge ahead with development plans calling for high levels of government spending, despite the war, will make it difficult for that country to fight a long war of attrition with Iran.

4. Structural Analysis

a. The structure of output

The economy of Iraq was dominated by agriculture until the early 1950s when crude oil production started gaining importance. An important indicator of the under-development of the Iraqi economy is its domination by primary production. Agriculture and mining and quarrying, mainly crude oil production, accounted for 54 percent of the gross domestic product in 1960 at constant 1969 prices. The share of primary production has been slowly declining due to the growth of other sectors of the economy. THe share of agriculture and mining and quarrying declined to 48 percent of the GDP in 1970 and 37 percent of the GDP in 1977.

The domestic product of Iraq is conventionally divided between the following three sectoral categories:

1. Commodities Sectors which include agricultural sector, mining

and quarrying sector, manufacturing sector, construction sector, and electricity, water, and gas sector.

2. Distribution sectors which include transport, communication, and storage sector, wholesale and retail trade sector, and banking, insurance, and real estate agents sector.

3. Services sectors which include ownership of dwellings sector, public administration, and defense sector, and services sector.

Due to the limited space, our intention here is only to analyze very briefly the agricultural, mining and quarrying, and manufacturing sectors. Appropriate references and comments will be made to other sectors whenever necessary. A relatively more elaborate review of the crude oil industry will be made since it is the backbone of the Iraqi economy and, indeed, it is the output of this sector whose behavior is the main issue of this project.

b. Mining and Quarrying sector

This sector involves mainly crude oil production. Other minor activities involved in this sector are production of salt, rocks, sulphur, sand, gravel, etc. Since these activities do not contribute more than one to two percent of the GDP of the mining and quarrying sector, we will ignore their effect and assume this sector as only involving the activity of the crude oil industry. This industry constitutes the production and transportation of crude oil. Any further downstream operations such as crude oil refining or petrochemical industries are not included within the mining and quarrying sector, but included within the manufacturing sector.

Oil was discovered in Iraq in 1927 in the Kirkuk area, two years after granting the concessions to the Iraqi Petroleum Company (I.P.C.)

in 1925. A new concessionary agreement was signed in 1931 in which I.P.C. acquired rights over 35,126 square miles.

In 1932, the British Oil Development Company Ltd. acquired rights over 41,302 square miles. This company was taken over by I.P.C. in 1936 and became Mosul Petroleum Company (M.P.C.). Oil was discovered by this company at Ain Zalah in 1939, but the field was not developed until 1952.

In 1938, a concession was granted to Basrah Petroleum Company (B.P.C.), another subsidiary of I.P.C., and this company acquired rights over 87,236 square miles. There was little activity in this area during the war, but in 1949 the company discovered Zubair oil fields from which oil started flowing in 1951.[7]

With these three concessions, I.P.C. and its affiliates controlled virtually all the area of Iraq. With relatively little exploration and drilling, these companies made their oil discoveries first in the north of Iraq, Kirkuk and Ain Zalah, and then in the south of Iraq in the Zubair oil field. They concentrated their efforts almost exclusively on the development of these huge fields, leaving the other parts of Iraq unexplored and some of the discovered reserves undeveloped.

In July 1934, the export of Iraqi crude oil commenced when the first oil piplines (12 inch diameter) was completed between Kirkuk and Tripoli, Lebanon on the Mediterranean Sea. Another pipeline (16 inch diameter) was competed between these two cities in 1949. In 1951, a pipeline was completed between Zubair and Fao on the Arabian Gulf, and the export of crude oil from the south was started for the first time. In 1952, crude oil of Kirkuk was exported for the first time from Banias in Syria on the Mediterranean Sea after the completion of a 30 inch diameter pipeline between these two cities. In 1961, another 30 inch diameter pipeline was completed between Kirkuk and Tripoli on the Mediterranean.[8]

The concessions provided for a fixed royalty of 4 shillings gold per ton (approximately 12.5 percent of the value of a ton of crude oil in 1925). The royalty was raised and reached its ceiling of 6 shillings per ton in 1950. The profit sharing agreement (50 percent) was adopted for the first time in Iraq in 1952.[9]

After the revolution of July 1958, the Iraqi government started negotiations with the oil companies to resolve many outstanding issues, the most crucial one being the relinquishment by the companies of the areas covered by the concessions except those being actually exploited. The Iraqi government looked at this issue as an abuse of the right of concessions since the companies retained vast areas, all of oil potential, and left them either unexplored or unutilized.

Since no agreement was reached after 3 years of negotiations, the government promulgated in 1961 Law No. 80, appropriating 99 percent of the I.P.C. concession territories, and confining the exploratory operations of the I.P.C. and its affiliates to the areas it was then exploiting.

In 1964, the Iraqi National Oil Company (I.N.O.C.) was established to engage in the various phases of petroleum industry inside and outside Iraq. In 1967, I.N.O.C. was assigned most of Iraq's territory including territorial waters, the Continental Shelf, and the Iraqi interests in the Neutral Zone.

In 1968 and afterwards, I.N.O.C. started exploratory activities, development, and production, either through service contracts or through direct exploitation in all the areas assigned to it.

In settlement to the dispute on outstanding issues such as stagnation of production, investment policy, and the royalty expensing issue, which could not be solved by negotiations, the operations of I.P.C. in Iraq were nationalized in 1972. Such operations were taken over by the Iraqi Company for Oil Operations (I.C.O.O.) which was established immediately after nationalization.

In 1973, during the Arab Israeli War, the government nationalized the shares in Basrah Petroleum Company, of Standard Oil of New Jersey (Exxon) and Mobil Oil Corporation, Royal Dutch Company, and the interests of Partex owned by Gulbenkian Foundation, leaving the British and the French as the only foreign producers in the country. These last shares were nationalized in 1975 and thus the entire oil industry came under the control of the government with the operation of B.P.C . intrusted to I.N.O.C.

In December 1975, the "strategic pipeline" (42 inch diameter) was completed between Haditha, a pumping station on the Kirkuk-Mediterranean line, and the port of Fao on the Arabian Gulf. This line was designed to introduce the flexibility of transporting Kirkuk crude to the Arabian Gulf, or Rumaila crude to the Mediterranean. In January 1977, another line (40 inch diameter) was completed between Kirkuk and the Mediterranean port of Dortyol in Turkey.

In addition to crude transportation by pipelines, Iraq also endeavored to own its tanker fleet for crude transportation. By the end of 1980, the Iraqi General Establishment for Oil Tankers, attached to I.N.O.C., owned 19 tankers with 2,112,000 dwt.

Characteristics of the Oil Industry of Iraq. In addition to the characteristics which pertain to the oil industry in general, such as economies of scale, high initial cost, and capital intensity,[10] there are some characteristics peculiar to the oil industry of Iraq in particular, and the Middle East in general and they are:

1. Low Finding Cost. Due to the nature of geological formations in Iraq, exploration has been an almost sure event, and consequently, the risks and outlays involved in this stage were minimum.

It did not take the I.P.C. more than two years after obtaining its concession in 1925, to make the discovery of the famous oil field near Kirkuk. The average finding cost of a barrel of oil in the Middle East, which is a representative of the finding cost in Iraq, was estimated to be two cents compared to higher cost in other parts of the world, reaching 75 cents in the United States.[11]

2. High Development Cost. This is particularly true in all oil producing regions of the developing countries, including Iraq. This is mainly due to the fact that all necessary machinery and equipment have to be imported. Most of the specialized and skilled personnel have to be hired from abroad, although the extent of this problem has been reduced by persistent training. Adding to these problems is the lack of adequate infrastructure which necessitates huge capital investments.

3. Large Size of Oil Reserves. The biggest oil fields of the world are known to be in the Middle East. And although the exact size of the reserve of the specific oil fields are not released, Iraq is known to contain two great oil fields with immense quantities of oil, Kirkuk in

the north and Rumaila in the south. This feature made investment per barrel of reserve in Iraq very low.

4. High Productivity of Oil Wells. The productivity of the Iraqi oil wells is very high compared to other regions outside the Middle East. While the average productivity of the single well per day is 12 barrels in the United States, 80 barrels in the Soviet Union, 300 barrels in Venezuela, 5,000 barrels in the Arab World, in Iraq it reaches more than 13,000 barrels per day.[12]

5. Low Cost of Production. The average cost of production per barrel of oil in Iraq is very low indeed compared with any other producing country in the world.

As an example for comparison, while the average production cost in Iraq was 4 cents per barrel during the period 1962-1964, it was 62 cents in Venezuela, 46 cents in Algeria, 10 cents in Saudi Arabia and Kuwait for the same period, and it was 151 cents in the United States during the period 1961-1962.[13]

6. Nature of Geological Formations. As mentioned above, Iraq contains two of the world's largest oil fields, Kirkuk and Rumaila. Generally, the oil fields in Iraq, as in other areas of the Middle East, do not require deep drilling, and unlike most oil fields in the world, which use mechanical means for oil production, Iraqi oil fields produce under their own gas pressure, and have a porosity which permits very high productivity per well. Except, of course, when such natural drive is depleted and some means to increase recovery is introduced such as secondary recovery, which is already in use in the north.

Perhaps the words of Longrigg, in his historical description of the discovery of Kirkuk can give a picture of the nature of oil fields in Iraq.

> The well spudded in at Baba Gurgur, immediately north of Kirkuk, on 27 June 1927, was in contrast to all these disappointments destined profoundly to alter both the economic fortunes of Iraq and the oil history of the world. The strike at Baba No. 1 on 15 October, when the oil by the violence of its force broke all control, flowed "wild" for a week, and cost the lives of two drillers, indicated an oil field so important as to lead the Turkish Petroleum Company, a few months later, to abandon for some years all operations in other areas.[14]

Such kind of favorable formations have been an important factor behind low production cost. Another important factor which helped in lowering production cost was the favorable terms of concession. The concession obtained by the I.P.C. group covered the entire area of Iraq until 1961, in contrast to the situation in Venezuela where exploration permits cover only 38 square miles, or the United States where leased areas are generally small.[15]

The fact has lowered production cost in Iraq by preventing competitive drilling and the sinking of unnecessary wells. Consequently this made substantial savings in capital cost due to optimum well drilling, and the prevention of loss in gas pressure and ultimate recovery which might have resulted from excessive drilling.

Crude Oil Production. Production of crude oil in Iraq started in 1934. The amount produced in 1934 was 7,335 thousand barrels and rose to 27,294 thousand barrels in 1935.[16]

During the period 1960-1977, crude oil production increased from 347,915 thousand barrels in 1960, reaching a peak of 1,269,105 thousand barrels in 1979 and then falling to 965,790 thousand barrels in 1980. The growth rate for the period 1960-1971 was about five percent per annum. This low rate was neither consistent with the capacity of the oil fields nor with crude oil installations. On the other hand, this growth rate was lower than the growth rate of world oil consumption of 7.5 percent, or the growth rate of crude oil entering international trade of 10 percent which happened to be the same growth rate of oil production in other Middle East oil producing countries for the same period.[17]

This low growth rate in oil production was a result of the oil companies' policy of "punishment". Such policy was followed with Iraq due to its independent oil policy especially after promulgation of Law No. 80 in 1961. In 1972 just prior to the nationalization, the companies reduced crude oil offtake from the northern oil fields drastically. This step was taken as a means of bringing pressure on the Iraqi government to settle the conflict over outstanding issues.

Before nationalization, the quantity produced from the Iraqi oil fields was controlled by the oil companies. Rather than tailoring production according to the needs of the indigenous economy, the oil sector in this period behaved as an exogenous component, introducing great uncertainty to government income and development planning.

Oil production increased from 618,375 thousand barrels in 1971 to 1,269,105 thousand barrels in 1979, with an average annual growth rate of 10.4 percent. This relatively higher growth rate was achieved when the government assumed control of oil production in 1973.

Immediately prior to the Iraq-Iran war, Iraq's oil production capacity stood at 3.5 million barrels per day. At present, it is difficult to assess the damage the oilfields have sustained as a result of the war but one thing is certain: Iraq's ability to export oil via the Gulf has, for all practical purposes, ceased. The country is attempting to reactivate the use of the pipelines to the Mediterranean through Syria and Turkey. The pipelines running through Syria have not been in use for some time, mainly due to the political vicissitudes characterizing the volatile reltaionship of Iraqi and Syrian branches of the Ba'ath party. Despite Syria's explicit sympathy with Iran, the Syrian government was responsive to Iraqi requests to reactivate the use of the pipelines. Here again, economic considerations seem to be setting the tune: Iraq needs an outlet for its oil to the Mediterranean and Syria needs the transit fees amounting to some 35 cents per barrel which could again contribute significantly to Syria's foreign exchange earnings when the pipelines are used at their full capacity of 1.4 million barrels per day.

Oil is also shipped through another pipeline across southern Turkey. The capacity of this pipeline is being expanded from the present 700,000 barrels per day to about 1 million barrels per day by installing new pumping machines. Given Iraqi flexibility reflected in their ability to draw on the Southern oilfield of Rumaila via the "strategic" Rumaila-Haditha pipeline, it appears likely that the country could resume oil production within perhaps six months at a maximum rate of about 2.4 million barrels per day. At present, Iraq exports about 1 million barrels per day basically from its northern oilfields in Kirkuk using both the Syrian and Turkish pipelines.

Iraq has always strived to increase its lifting capacity and this policy is expected to continue in the future both for economic as well as political reasons. First, the country is said to belong to the group of "high absorbers" owing to its diversified resource base and relatively large population. Moreover, the need for revenues in the foreseeable future is likely to be acute as a result of the war. Cessation of hostilities would confront the government with the task of rebuilding the army and attending to the war damages which many economic facilities have sustained. Second, the government as well as many informed sources in the international oil business believe that Iraq possesses reserves far exceeding its official proven ones. The relatively low proven reserves are attributed to little exploration and prospecting activities up until the early 1970s. The government was embroiled in a number of disputes with the Iraq Petroleum Company a foreign concessionaire that used to dominate the Iraqi oil scene until 1971-72 (as mentioned earlier). A higher production rate would, according to the government, rectify the present too low production-to-reserves ratio. Finally, a higher rate of production is politically beneficial since it is bound to improve the position and leverage of the country within OPEC and internationally. It would also put at the disposal of the country the economic means to play a larger and more prominent role both regionally and internationally. Given the quest for leadership and influence in the Arab world by most Iraqi leaders, this motive should not be underestimated.

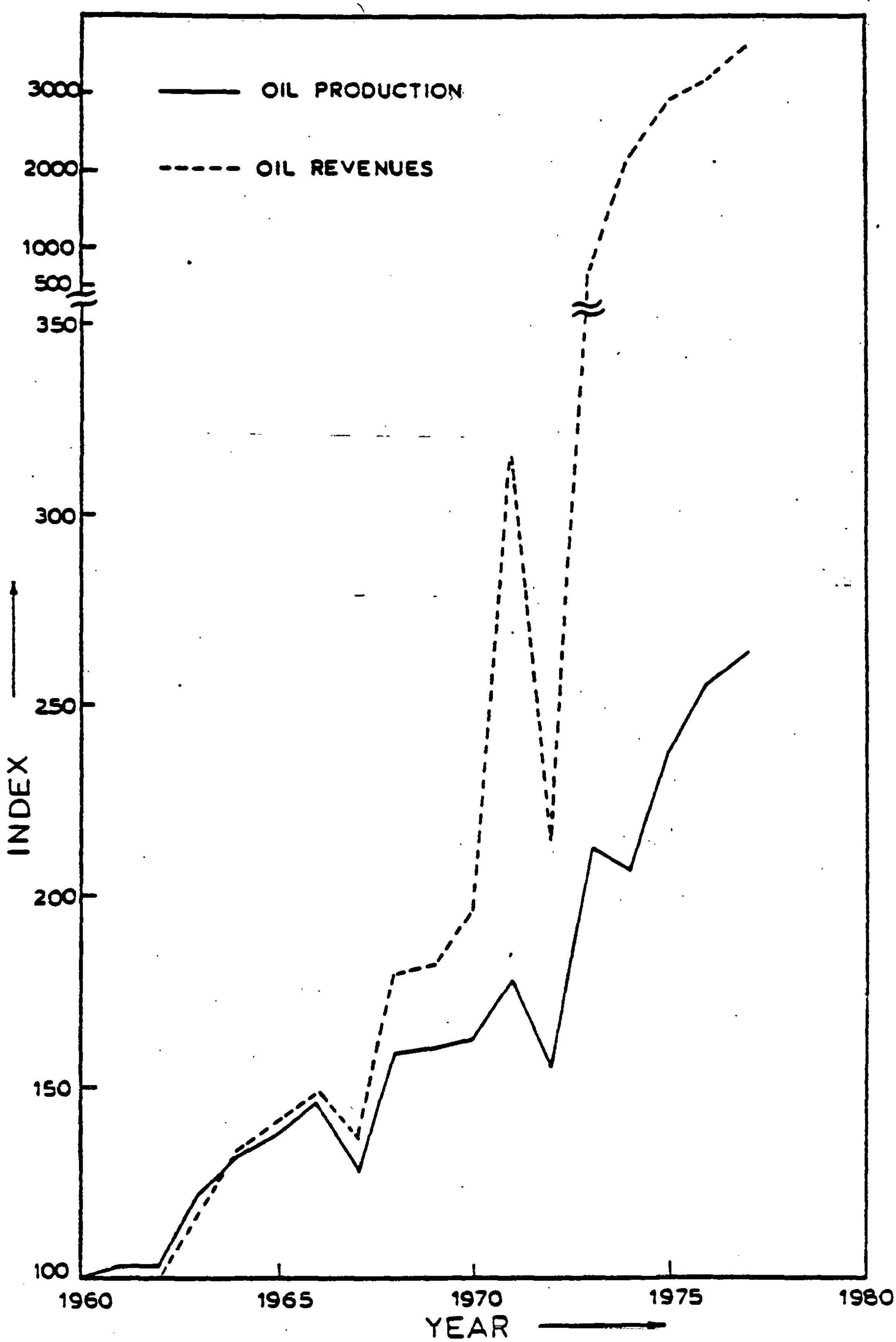
The greatest stumbling block facing the Iraqi depletion policy is technology. Iraq lacks the appropriate technology to expand production levels at a fast rate. Technical assistance from Moscow has alleviated but not resolved the problem and this helps explain in part the tilt of

Iraq towards Western powers, primarily towards the United States, attitudes notwithstanding. Given the technological contraint, it would be safe to assume that Iraq's production policy is to expand production well beyond the pre-war level of 3.7 million barrels per day to perhaps 5 to 6 million barrels per day by 1990 for the reason outlined above.

Crude Oil Revenues. Oil revenues received by Iraq during the period 1960-1978 are shown in Table 12. Over this period there was a steady increase in revenues except for 1967 when oil export from the Mediterranean ceased for a period of three months, due to differences between the Syrian government and I.P.C.; and also for 1972 when offtake from the Mediterranean ports was drastically reduced as a means of increasing the oil companies' leverage in the negotiations as mentioned before.

Oil revenues increased, in current prices, from ID 266 million in 1960 to ID 9800 million in 1978. The rate of growth in oil revenues was much higher than the average growth rate of oil production and resulted from the dramatic increase in oil prices in 1973-1974.

The growth pattern of oil revenues is illustrated in Figure 5 as compared with the growth pattern of oil production. During the decade of the sixties, oil prices became very stable after the price reductions in August 1960. This was one of the first achievements of OPEC after its formation in September 1960. Due to this price stability, the growth of oil revenues should follow closely the growth of oil production. While this was almost true for the period 1960-1966, the growth of oil revenues took a lead in 1967 and 1968. This discrepancy may be justified by probable retrospective claims, leads and lags in payment dates, and the confusion which may arise between calendar



GROWTH PATTERN OF OIL PRODUCTION AND REVENUES (1960 = 100) and fiscal year. These factors may eliminate the expected one-to-one correspondence between oil production and the accruing revenues.

Due to changing market conditions, oil revenues started growing faster than oil production, first in 1970 due to adjustments in meditarranean and Gulf oil prices as an effect of the Libyan price increase; and then in 1971 after the Tehran and Tripoli agreements between OPEC and the oil companies. The benefits obtained by Iraq from these agreements were, among other things, an increase in oil price of about 30 percent and a rise in the rate of income tax from 50 to 55 percent.[18]

The greatest leap in the growth of oil revenues came after oil prices were quadrupled in 1973-74 as figure 5 shows. Between 1973 and 1974 oil revenues increased by a factor of 3 inspite of the reduction in oil production by 2.3 percent in 1974 due mainly to world economic recession during that year. Through the rest of the period under study, i.e., until 1978, oil revenues kept growing moderately faster than oil production due to OPEC countries raising prices slightly once in 1975 and again in 1977 in order to protect their terms of trade.

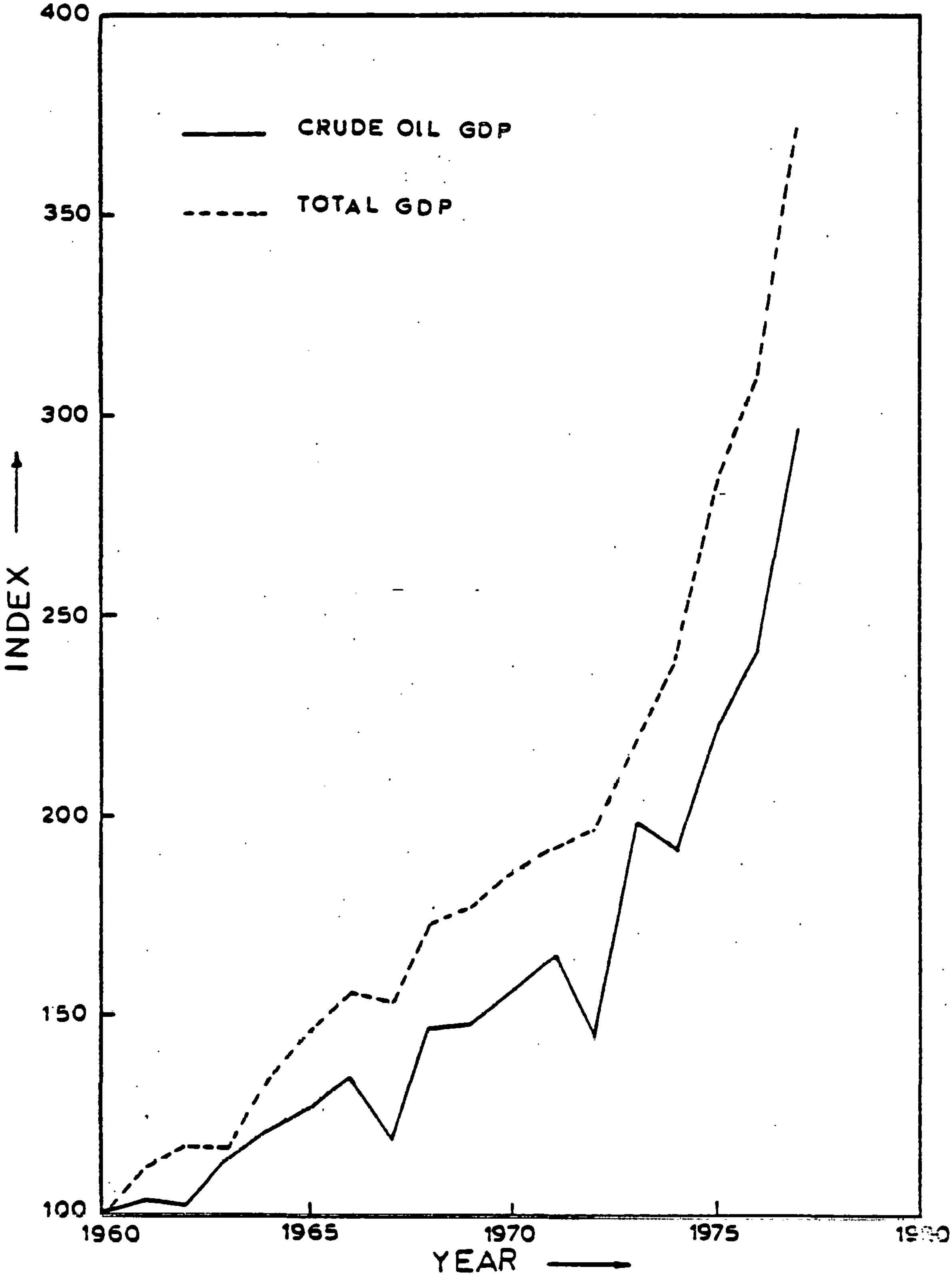
Crude Oil GDP. The mining and quarrying sector which is completely dominated by the crude oil production industry represents the largest sector in the Iraqi GDP. During the period 1960-1977, the value added by this sector constituted not less than 30 percent of the total GDP at any year. The crude oil GDP at constant 1969 prices was 37 percent of the total GDP in 1960, and it declined to 30 percent in 1977 indicating that the total GDP was grwoing faster than the oil GDP.

The average growth rate of the crude oil sector at constant 1969 prices was 6.6 percent per annum during 1960-1977 as compared to an average growth rate of 8 percent per annum for the total GDP during the same period. The reason for this high growth rate of the total GDP is that except for the agricultural sector, all other sectors of the economy were growing faster than the crude oil sector, especially the construction, services, and manufacturing sectors. However, has it not been for the impact of the crude oil sector itself, the faster growth rate in the rest of the economy, except for agriculture, would not have been possible.

Figure 6 illustrates the growth pattern of the crude oil sector as compared with the growth pattern of the total GDP. The crude oil GDP seems to be affected, as it should, by the growth pattern of oil production. It registered severe negative growth during the years 1967, 1972, and 1974 due to reductions in oil production in those years for reasons mentioned before. During the period 1960-1971, the average growth rate was 4.7 percent per annum, almost similar to the average growth rate of oil production during this period. Between 1971 and 1977, the average growth rate was 10.3 percent per annum. This high growth rate was due to a combination of higher growth rates of oil production and higher oil prices.

The statistics above indicate that the Iraqi economy is dominated by the crude oil sector. The policy objective here is to develop a mature and diversified economic base to which the contribution of the crude oil sector should be minor compared with the contribution of the other sectors.

At the rate the economy has been growing, the objective of lessening the share of the oil GDP to a reasonable level seems to be



GROWTH PATTERN OF CRUDE OIL GDP AND TOTAL GDP (1960=100) extremely far away. The share of crude oil GDP at constant 1969 prices was 37 percent of the total GDP in 1960 and only dropped to 30 percent in 1977. This decline represents a negative growth rate in the share of crude oil GDP of about 1.2 percent. At this rate then, ceteris paribus, the time required for the share of crude oil GDP to drop to 15 percent of the total GDP will be 56 years. This is a long period indeed assuming that the crude oil resource is not exhausted by then. A more reasonable target date is 20 years from 1977, that is 1997, will be the year when the crude oil GDP declines to 15 percent of the total GDP. If the crude oil sector is allowed to grow at an average rate of 5 percent per annum, then the total GDP should grow at least at 9 percent per annum. This high rate of growth should be secured by faster growth of other commodity sectors of the economy, especially agriculture and manufacturing.

Linkages of the Crude Oil Industry. The process by which one product stimulates the production of others and thereby encourages growth has been called linkages by Hirchman.[19] The crude oil industry is characterized by strong forward linkages.[20]

In the case of Iraq, backward linkage associated with crude oil production industry is almost non-existent. Perhaps this can be justified by the fact that oil production, being a primary commodity industry, does not need substantial and varied inputs as non-primary production industries do. On the other hand, material inputs required by the oil production industry such as machinery, equipment, chemicals, etc., are capital as well as technology intensive, and the demand for them by this industry in Iraq is not of economic size such as to warrant the establishment of such industries.

Forward linkages have also been very weak. Despite the fact that cr oil production industry exhibits strong forward linkages, this feature did not induce the establishment in Iraq of such industries as will benefit from the cheap inputs like crude oil and natural gas for oil processing and petrochemical industries.

Iraq has been one of the smallest crude oil refiners in the world compared with its output of crude oil. One of the major reasons behind this is the nature of oil concessions. The oil companies were not obligated to establish a refining industry in Iraq on a commercial basis. They only undertook, according to article 15 of the 1925 convention, to meet domestic consumption and for this purpose they erected the small Al-Want refinery in Iraq. In contrast, the situation in Venezuela, for example, was far better. Article 5 of the Law of hydrocarbons of 1943, obligated the oil companies to refine locally at least 10 percent of the crude oil produced; in 1950, the minimum figure was raised to 15 percent; and in 1964 about 32 percent of domestically produced crude was refined.[21]

The oil industry is a vertically integrated industry, and oil companies naturally prefer to construct their refineries in the consuming centers. European and other consumers would want to have oil refining done at home due to a variety of reasons, strategic, political, and economic.

Consuming countries prefer to become independent of imports of refined oil, thus gaining more flexibility in securing the desired oil products. Also, the consuming countries want to reduce foreign exchange expenditures through saving the value added by refining crude oil. Refining also creates employment opportunities since it is more labor intensive than crude oil production, and creates new investment opportunities through the utilizat--

of refinery gases and other by-products as inputs to petrochemical industries.

Refinery construction in Iraq has so far been for the purpose of meeting domestic demand. The present refining capacity is 305.500 barrels per day. Iraq is planning to build a huge export refinery in the south, however, on this important issue the government of Iraq has been very lax.

The Iraqis were slow to develop their petrochemical industry. Most of their production capacity in petrochemicals has been installed since 1980. Despite these recent investments most natural gas continues to be flared rather than used as feedstock.

Existing Petrochemical Facilities

Complete name and state	Products	Capacity tons/yr	Start up date
Basrah	Ammonia	66,000	1971
	Urea	52,800	
	Sulphuric Acid	103,950	
	Ammonium Sulphate	138,600	
Basrah	Ammonia	264,000	1978
	Urea	429,000	
Khor Alzubair	Ammonia	660,000	1980
	Urea	1,056,000	
Al-Karim	Sulphuric Acid	500,000	1980
	Phosphoric Acid	400,000	
	Triple Super Phosphate	600,000	
	Ammonium Phosphate	250,000	
	NPK	250,000	
	Ammonia	50,000	
Basrah	PVC	60,000	1980
	VCM	60,000	
	LDPE	60,000	
	HDPE	30,000	
	Ethylene	150,000	
	Chlorine	43,200	
AlKashat	Phosphate Rock	1,700,000	1980

Source: OPEC Annual Report 1980, p. 124.25.

Construction is already underway for expanding existing and adding new fertilizer plants, and erecting ethylene and LPG plants. Nevertheless, the size of the petrochemical industry envisaged for Iraq at present is not commensurate with the volume of associated gas produced.

Employment. Employment by the crude oil sector has always been extremely small. Indeed, this is not due to inequitable concessionary agreements which preferred foreign personnel. On the contrary, Iraqization of oil companies' personnel had proceeded very competently, and after nationalization, very few foreign employees had to be replaced. The reason for the very small size of employment is due to the nature of this industry which has a very high capital-labor ratio indeed.

The most striking feature of the crude oil industry is its capital intensive nature. Consequently, it employs a very small labor force and investment and value added per worker is very high compared to other industries

In 1977, the contribution by sector to total employment was as follows: agriculture 56 percent, services 21 percent, manufacturing 8 percent, wholesale and retail 6 percent, transport and communication 5 percent, and mining and quarrying 0.7 percent. Considering that employment in the crude oil industry constitutes about 75 percent of the mining and quarrying labor force, then contribution of the crude oil sector to total employment of the country was only about 0.5 percent in 1977. Yet, this tiny labor force contributed 30 percent of the value added by the nation in that year. Perhaps the oil industry's most striking characteristic, its high capital-labor ratio and high value added per worker can very well manifest itself in the observation just mentioned.

c. Agricultural Sector

The total GDP of Iraq increased from ID 625 million in 1960 to ID 2,330 million in 1977 in constant 1969 prices (see Table 6).[22] This equals roughly a fourfold increase in 17 years or an average annual growth rate of 8 percent. The sectors contributing to this growth rate are the mining and quarrying, manufacturing, construction, distribution, and services sector. More importantly, the high growth rate in these sectors, apart from mining and quarrying, is only made possible by the impact of the mining and quarrying sector, literally crude oil production.

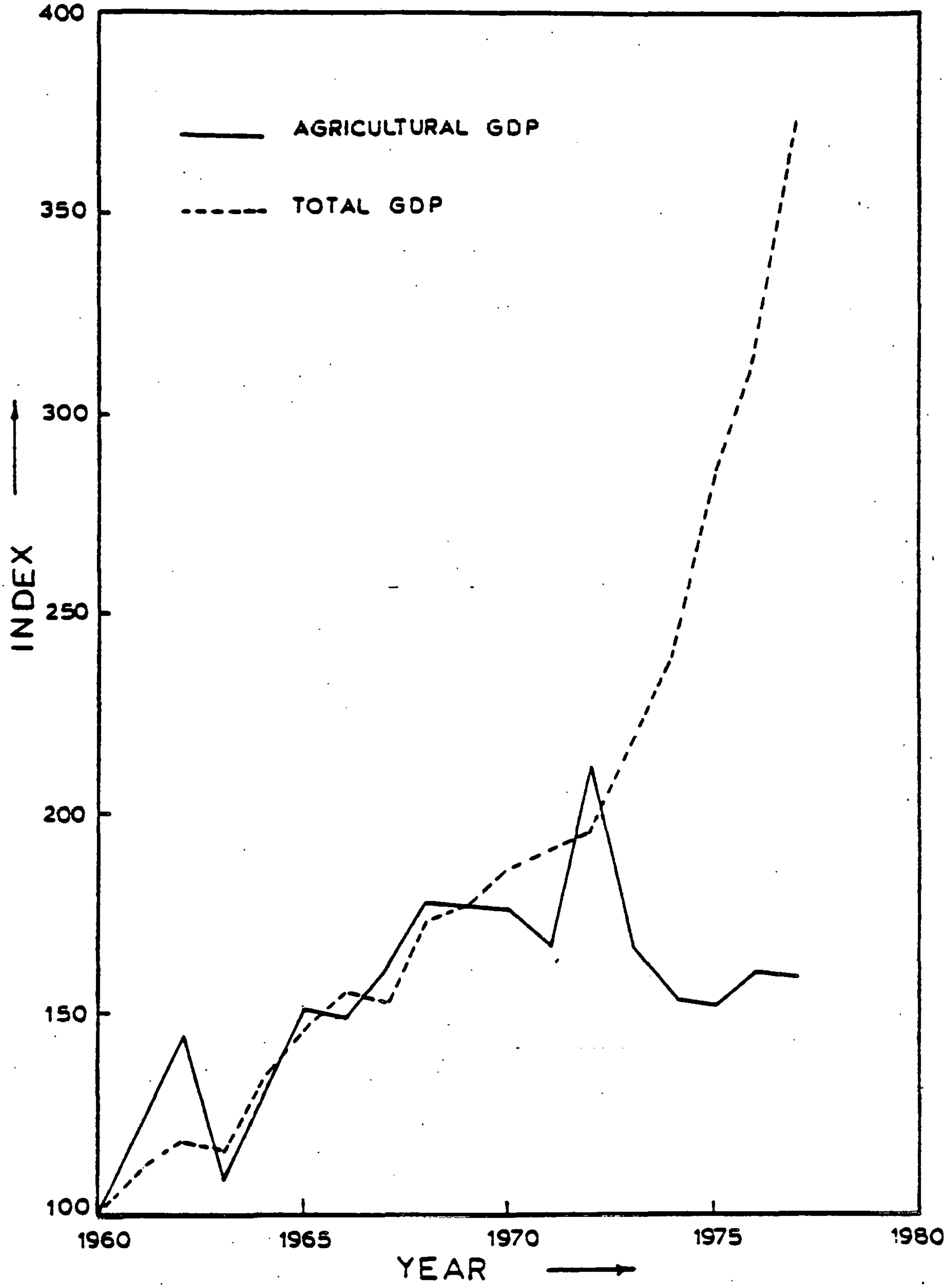
The only sector whose progress has been very weak and not commensurate with the endowments of the country is the agricultural sector. The contribution of this sector, in constant 1969 prices, was ID 108 million in 1960 an increased to ID 171 million in 1977, with an average annual growth rate of only 2.7 percent, even lower than the population growth rate of the country during this period

The growth of the agricultural sector does not seem to show a smooth trend; it severely fluctuates about a very slowly rising mean. At one year the growth is remarkably high, yet at another year the growth is negative. For example, in 1970, the agricultural GDP in 1969 prices was ID 191 million making 17 percent of the total GDP, it declined to ID 180 million in 1971 making 15 percent of the GDP, then jumped to ID 229 million in 1972, the highest ever in this time series, making 19 percent of the GDP, then again dropped to ID 181 million in 1973 making 13 percent of the total GDP.

This fluctuation is illustrated in Table 7 which shows index numbers for production, cultivated area, and average yield per donum. This table shows that agricultural production fluctuates due to fluctuations in the magnitudes of the yearly cultivated area and average yield per donum. Such fluctuations may be attributed to severe weather variations in the rain fed area in northern Iraq. Unless the dams and irrigation projects, scheduled for this area are completed, agricultural production is not expected to stabilize.

The share of agriculture in the GDP in 1960 was 17.3 percent at constant 1969 prices. This share dropped to 7.3 percent in 1977. This is, of course, due to the faster growth rates of the other sectors of the economy. The weak growth rate of the agricultural sector is illustrated in Figure 1. The agricultural GDP and the total GDP seem to follow almost the same pace of growth until 1972. After that year, the agricultural GDP declined abruptly and then resumed the previous low rate of growth, while the total GDP started a much faster rate of growth, especially following the dramatic rise in oil prices in 1973 and after.

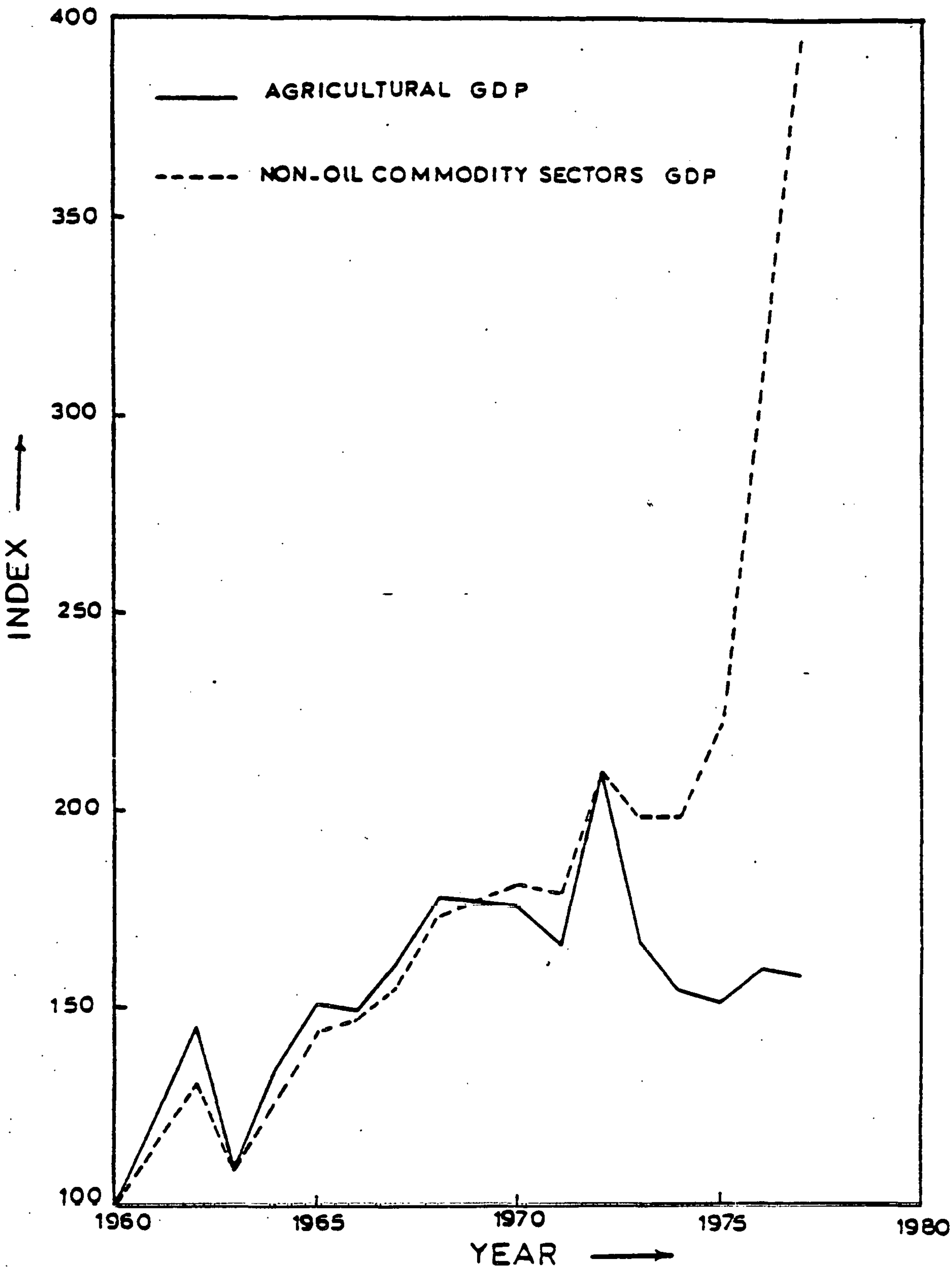
Until 1972, crude oil production was exogenously determined by foreign oil companies. In 1972, this industry was partially nationalized. In 1973-1974, crude oil prices were quadrupled. In 1975, the nationalization of the crude oil industry became complete. Since the crude oil sector, in the time period under study, is mostly exogeneous, it is more favorable to compare the performance of the agricultural sector with the performance of the rest of the indigenous commodity sectors, thus excluding the effect of the oil sector.



GROWTH PATTERN OF AGRICULTURAL GDP AND TOTAL GDP (1960 = 100)

Figure 2 illustrates the growth of the agricultural sector compared with the growth of non-oil commodity sectors. Similar to the previous case, the agricultural sector and non-oil commodity sectors seem to follow almost the same growth path during the period 1960-1972. Both of these sectors registered an average annual growth rate of 6.4 percent.[23] However, after 1972, agricultural production declined first, then resumed a very modest growth rate in 1975 while the non-oil commodity sectors assumed a very dramatic rise in production. Between 1973 and 1977 agriculture registered a negative growth while the non-oil commodity sector registered a high growth rate of 10 percent per annum. Between 1975 and 1977, agricultural growth turned positive and registered a modest rate of 2.3 percent per annum, while the non-oil commodity sectors achieved a dramatic growth rate of 33.5 percent per annum.

The aim behind comparing the agricultural sector with the non-oil commodity sectors was to exclude the effect of the oil sector. This, however, was only accomplished partially. Although the annual contribution of the oil sector to the GDP was excluded, this did not exclude the impact the oil sector had on the other sectors of the economy. The non-oil commodity sectors, especially the manufacturing and construction sectors, have been growing lately at faster rates than other sectors of the economy, and certainly much faster than the agricultural sector. This, indeed, is the result of continuous heavy investment made possible by the overflow of the oil sector, especially after 1973.



GROWTH PATTERN OF AGRICULTURAL GDP AND NON-OIL COMMODITY SECTORS GDP (1960 = 100)

But this, however, does not mean that investment in the agricultural sector was lacking. On the contrary, investment in agriculture matched, and sometimes surpassed investment in other sectors of the economy. The matter, simply, is that agriculture in Iraq is surrounded by many problems which are bound to take longer time and truly harder efforts to overcome.

Before 1958, the semi-feudal system was dominant. There was extreme inequality in agricultural land onwership. Two percent of the owners, mainly tribal sheiks and city merchants, owned 68 percent of the cultivated land,[24] which resulted in a majority of landless peasants. These peasants, who led a subsistence life, were mostly illiterate, sick and malnurished. The land tenure system, essentially a sharecropping tenancy system, with absentee landlords led to the neglect of land and resulted in continued deterioration and salination of the soil.

In 1958, after the overthrow of the monarchy, the first land reform law was promulgated. This law aimed at more equitable land distribution by defining a maximum limit of land ownership at 1000 domums of irrigated land, and 2000 domums of rain-fed land. The rest of the land to be distributed among landless peasants in the form of small holding ranging between 30-60 donums for irrigated and 60-120 donums for rain-fed lands. To overcome the many defects associated with this law, another agrarian reform law was promulgated in 1970. The new law reduced the maximum limit for individual landholdings to 40-600 in the irrigated areas and 1,000-2,000 donums in the rain-fed areas, the allotted size depending on the type of irrigation, average rainfall, type of land, crop, and proximity to the market.[25]

The first twelve years of land reform (1958-1970) proved to be a bitter experience. The distributed land was of inferior quality to the land retained by the original landlords. Irrigation of the distributed plots proved to be technically most difficult. But worst of all, the distributed lands remained in the hands of the land reform authorities who leased them on short-term contract bases. This state of affairs led to more deterioration of agriculture, which is described below by Penrose & Penrose.

> The land reform of 1958 substituted a government department for landlords. Such a department had less direct interest in the cultivation of the land than had even the bad landlord and, at the same time, through ignorance, incompetence, technical inadequacy, and political confusion, it could not fulfill the function of the landlords whose places the bureaucracy now occupied.[26]

After 1971, land distribution was substantially accelerated, coupled with an increase in collective and state farms. However, until 1975 only about 40 percent of the expropriated lands were distributed. This led to even more deterioration of the agricultural land as Penrose & Penrose state below.

> Nevertheless, over one-third of the country's agricultural land was still cultivated by farmers who were on very short-term contracts (one crop year annually) and who therefore had no direct interest in its long-run improvement or even its preservation, and who received little help form a government which preferred to put its efforts into cooperative farms. Land is still going out of cultivation through inadequate drainage and improvident farming... [27]

Agriculture remains the least productive sector of the Iraqi economy. In 1977 this sector employed more than half of the country's labor force but produced only 7.3 percent of the GDP. The reasons for the low productivity are best described by a "follow-up report" on the 1964-1969 development plan, quoted in Penrose & Penrose.

> Low level of agricultural productivity...is due to faint propagation of modern technological methods of agricultural production owing to the weakness of the agricultural guidance agencies, weakness of the agricultural cooperative agencies, presence of salinity in many agricultural lands, absence of field drainage, ineffectiveness of the agencies responsible for the fight against plant and animal pests and diseases and non-pursuance of a wise fertilization policy that would help to propagate the use of fertilizers and to raise the level of productivity per meshara[28] in the various regions.[29]

Inspite of all the heavy investments in water control, irrigation, drainage , land reclamation, agricultural machinery and equipment, and the government endeavors towards propagating modern farming practices, most of the shortcomings stated in the above quotation still prevail. Unless these defects are overcome, radical improvement in agricultural productivity and the size of cultivated land will not materialize.

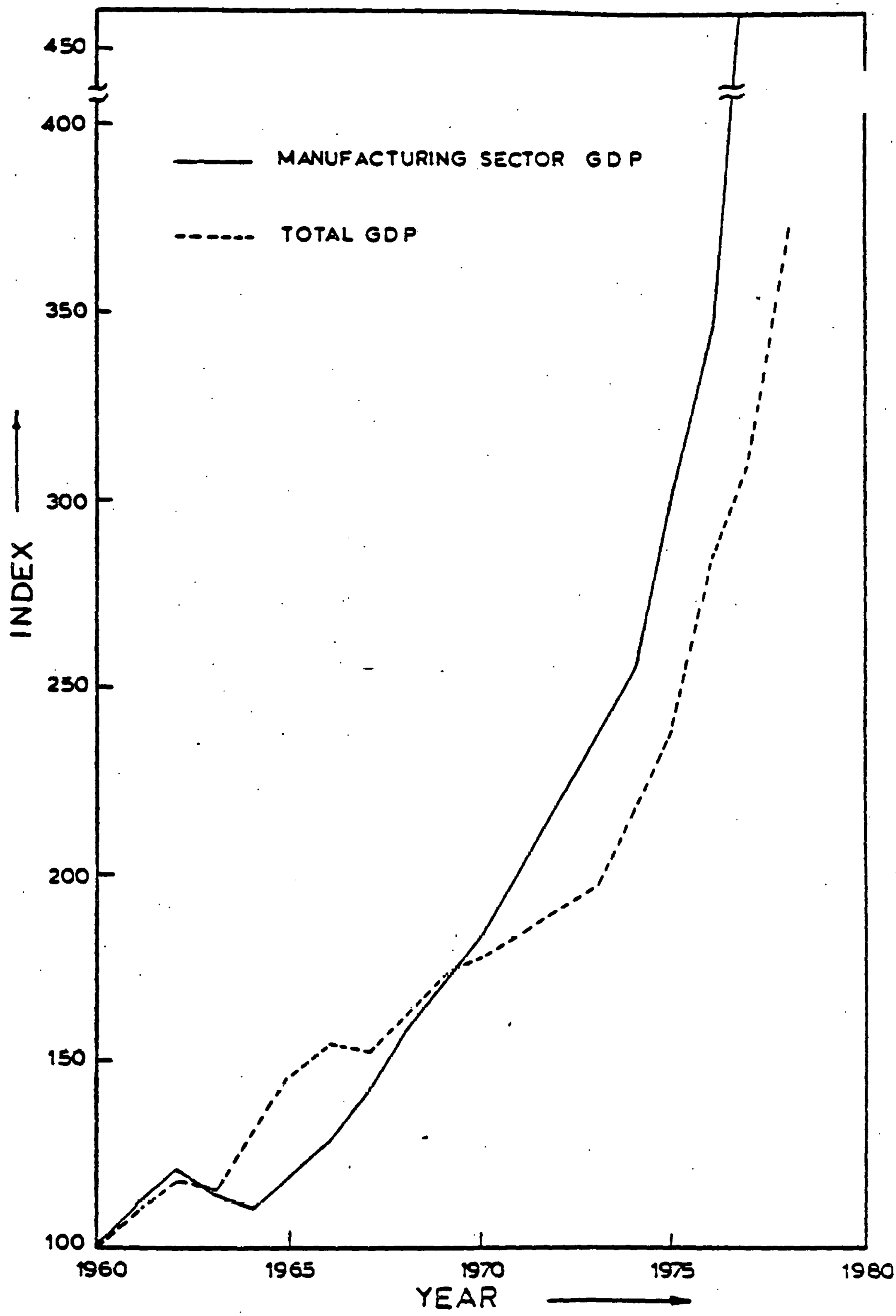
d. Manufacturing Sector

The manufacturing sector is one of the most vigorous sectors of the Iraqi economy. It grew from ID 60 million in 1960 to ID 277 million in 1977 at constant 1969 prices (see Table 6). The average growth rate of this sector during this period was 9.4 percent per annum, higher than the average growth rate of the total GDP during the same period, which was eight percent per annum. The share of the manufacturing sector in the GDP was 9.6 percent in 1960 and increased to 11.9 percent in 1977.

Figure 3 illustrates the pattern of growth of the manufacturing sector as compared with the growth pattern of the total GDP. Between 1960-62, the manufacturing sector grew at 10 percent per annum, while the total GDP grew at a slightly lower rate of 8.5 percent per annum. After 1962 the manufacturing sector took a sharp decline due to political instability and nationalization of the large industries, and recovered after 1964 at a slower rate of growth of 8.9 percent per annum. The total GDP declined slightly in 1963 but recovered in 1964 at a lower growth rate than the manufacturing sector. Both growth rates improved sharply after 1973 with the total GDP growing persistently at lower rates than that of the manufacturing sector.

Again, in order to remove the instantaneous effect of the oil sector, figure 4 compares the growth pattern of manufacturing sector with the growth pattern of the non-oil commodity sectors. The output of the non-oil commodity sectors seem to fluctuate, being affected by the severe fluctuations of the agricultural sector, while the manufacturing sector follows a rather smooth exponential growth pattern. During the period 1960-77, the average growth rate of the non-oil commodity sectors was 8.4 percent per annum, lower than the average growth rate of the manufacturing sector. Between 1960-62, the non-oil commodity sectors grew at a very high rate of 14.1 percent per annum, but registered a severe decline in 1963. This decline was mainly due to a 25 percent drop in agricultural production, However, the non-oil commodity sectors recovered after 1963 registering a slower rate of growth throughout the rest of the period.

In fact, the manufacturing sector grew at a faster rate than the agricultural, mining and quarrying, and the construction sectors during the period 1960-75. But it was surpassed by the construction sector during the



GROWTH PATTERN OF MANUFACTURING SECTOR GDP AND TOTAL GDP

(1960 = 100)

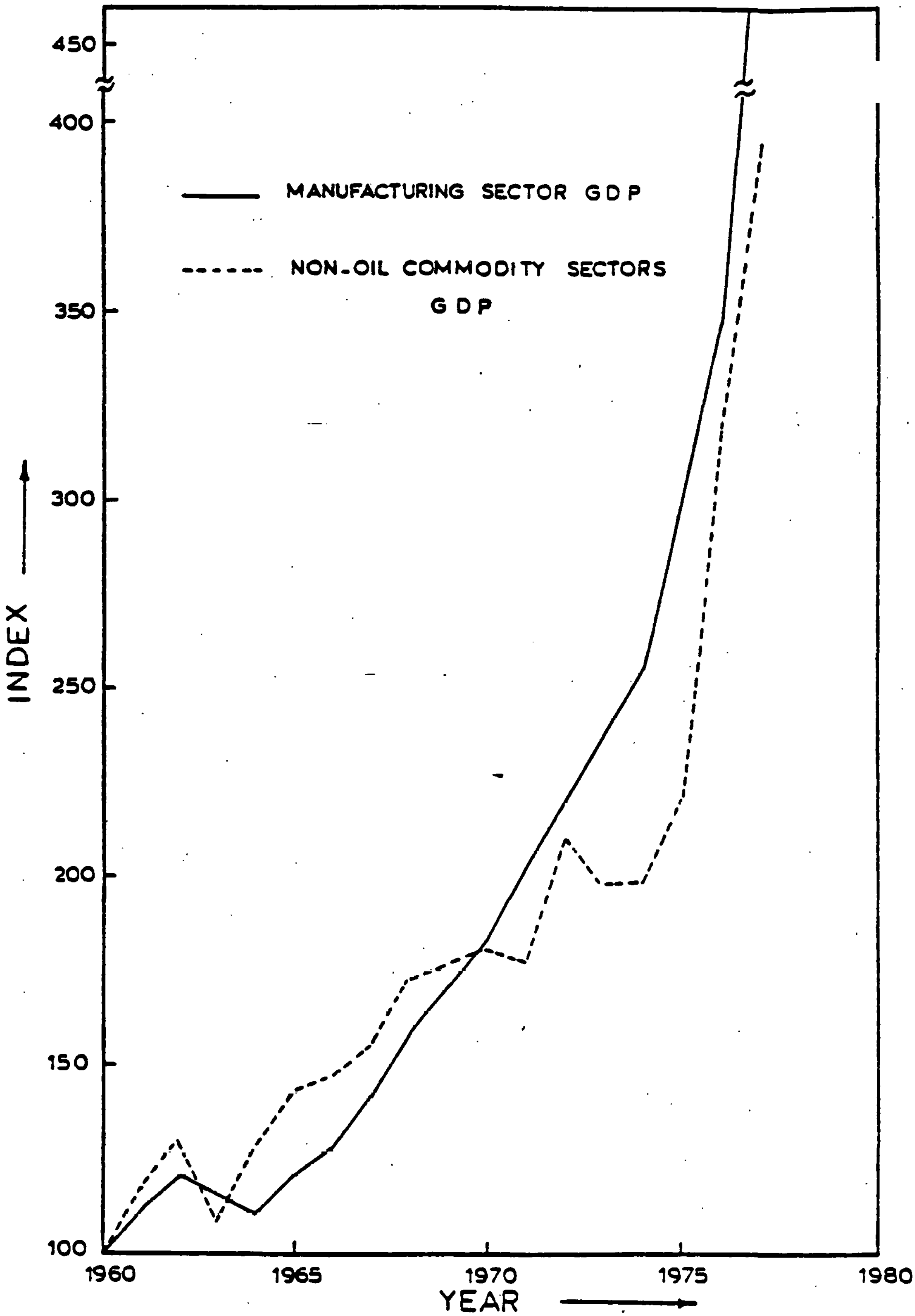
last two years 1976 and 1977 in view of the heavy investment incurred in this sector, which was made possible by the oil sector.

In 1964, the large private industries with capital more than ID 70,000, banks, and insurance companies were nationized. This nationalization had a less adverse impact on the manufacturing sector than the agricultural reform had on the agricultural sector. During 1963 and 1964, the output of the manufacturing sector declined. After 1964, it recovered its positive rate of growth but at a slower pace. While the annual rate of growth before 1963 was 10 percent per annum, the annual rate of growth after 1964 was 8.9 percent per annum during the period 1964-70. Much of this growth was credited to the public sector which grew at a high rate of 14.2 percent per annum. Due to the uncertainty subsequent to the 1964 nationalization, private investment was discouraged, and the output of the private manufacturing sector grew at a low rate of 5.6 percent per annum during the 1964-70 period (see Table 10).

However, private investors, during the 1970s gained confidence again. This was, in part, due to the relative political stability in the country. In part, it was due to government policies towards promoting industrialization such as tax exemption and protection, although such policies have always been hindered by the heavy hand of bureaucracy. Between 1970-77, the output of the private manufacturing sector grew at an average annual rate of 10.3 percent, almost double the rate between 1964-70. The public sector made a remarkable rate of growth of 17.9 percent per annum during the same period. The total manufacturing sector GDP made an average growth rate of 14 percent per annum during 1970-77.

e. Labor and Human Capital

Accurate and reliable time series data on the sectoral distribution of



GROWTH PATTERN OF MANUFACTURING SECTOR GDP AND NON-OIL COMMODITY SECTORS GDP (1960 = 100) the labor force in Iraq, from which we can draw some meaningful conclusions, are not available. All we could obtain is an estimate for the period 1960-77 shown in Table 3. Although this time series is not completely reliable, it serves the purpose of giving an order of magnitude and trends for the distribution of employment among the different sectors of the economy.

Table 3 indicates that in 1977 the total labor force was 3,572.6 thousand or about 30 percent of the total population in that year. About 52 percent of the labor force in that year was engaged in agriculture, 19 percent in services, and 8 percent in manufacturing. Throughout the period 1960-1977, the agricultural sector was the largest employer claiming about 50 percent of the labor force. This is one of the important indicators of underdevelopment of the economy.

The labor force has increased from 1,600.5 thousand in 1960 to 3,572.6 thousand in 1977, with an average annual growth rate of 4.8 percent. This is higher than the average annual population growth rate of 3.3 for the same period. This is probably due to the continued increase in the labor participation rate. Assuming the working age starts from age 10 years and above, the labor participation rate increased from 28.23 in 1960[30] to 40.78 perdent in 1977, with an average increase of 2.2 percent annually (see Table 4).

This rate is still very low compared with the advanced countries. In the United States in 1977, the participation rate was 61.8 percent.[31] The reason for the low participation rate in Iraq is due in part to the traditional structure of the Iraqi family, but more importantly due to the very low participation of Iraqi women.

In 1960, the participation rate of the Iraqi female was only 3.25 percent and increased to 14.58 percent in 1977, with an average growth rate of 9.2 percent per year. This is a great improvement but still low compared with advanced countries. The American female participation rate in 1977 was 47.4 percent,more than threefold that of the Iraqi female.[32] The reason for the low participation of the Iraqi female is the restrictive social attitude towards working women, and the disdain, especially for manual work.

Ironically, female participation in Iraq is stronger among the rural than urban population. The percentage of female participation in the agricultural workforce was 37 percent in 1977, while this percentage in the manufacturing workforce, which is predominantly in the urban centers, was only 17 percent (see Table 4).[33] The reason for the relatively high female participation rate among the rural population is that the agricultural sector is very labor intensive, and family members are expected to work on the farms on equal footing regardless of sex.

The Iraqi male does not seem to be doing so badly with regard to labor participation rates. This rate was 53.11 percent in 1960, and increased to 65.54 percent in 1977. This rate is comparable with the American male participation rate of 78 percent in 1977, taking into consideration the traditional structure of the Iraqi family and the continued expansion of elementary and secondary schooling in Iraq, which is bound to absorb, in the short term, a good part of the work force.

Since Iraq is undergoing a demographic transition at the present time, the proportion of the population below age 15 is very high compared with the developed countries whose population growth rate is stable.

In 1975, this proportion was 47 percent compared with 24 percent in France, 25 percent in Japan, and 25 percent in the United States.[34] The effect of this high proportion is to increase the dependency burden on the one hand and reduce the supply side of the economically active labor force on the other hand.

Iraq, at present, is engaged in a very ambitious economic development plan. Shortage of manpower, quantitative and qualitative, proved to be a very serious bottleneck facing this plan. To increase the quantitative labor supply,the participation rate of the Iraqi worker in general, and the female in particular, much be increased. To increase the qualitative labor supply, Iraq has adopted crash programs for extensive and intensive workforce education and training. Both objectives are to be achieved consistent with the requirements for skilled and unskilled labor commensurate with the calculated demands of the economic development plan.

Illiteracy in Iraq has always been dominant but has persistently declined. The illiteracy rate in 1957 was 82 percent and declined to 53 percent in 1977. It is more prevalent in rural than in urban populations, and more in females than in males. In 1977, about 41.3 percent of the urban population was illiterate as compared with 74.8 percent of the rural population. Illiteracy among males was 25.9 percent of the urban male population. Illiteracy among females was 58 percent of the urban female population as compared with 93.1 percent of the rural female population.[35]

These statistics indicate that efforts for reducing illiteracy should be directed more towards females and the rural population. Although government policy, in the past, with respect to reducing illiteracy has not been commensurate with the developmental aspirations, this policy has undergone a dramatic change within the past few years. In 1976, a law was promulgated which made primary schooling mandatory for all children; this law was to become effective in 1978/1979. Besides, the present political leadership has mobilized all possible national capabilities towards abolishing illiteracy among the older population, men and women, with a goal of achieving universal literacy in the country.

The goal of abolishing illiteracy, if achieved soon, will have far-reaching positive effects on the process of economic development. Literacy is characterized by tremendous external economies. It does not only enhance the supply of skilled labor, but it also helps in creating profound changes in the values of people and their attitude towards work and production.

5. Public Policy and Economic Planning

a. Public Policy

Since 1950 numerous economic development plans have been introduced, amended, and revised. All of these plans declared two broad objectives. First, the attainment of an appreciably higher standard of living through an increase in the size of national income and an improvement in its distribution. Second, the reduction of the economy's dependence on oil revenues as a source of foreign exchange and income. These twin objectives are to be pursued by means of a policy of diversification of the sources of income, employment, and foreign exchange earnings.

The policy of economic diversification is advocated in order to ensure the economic future of the country when the oil wells run dry. By then the government expects to create a permanent industrial base premised on the relatively abundant natural resources other than oil, and on the development of human resources. Iraq enjoys a "medium" size population of about 14 million in 1981, increasing at about 3.3 percent annually. The country possesses important natural resources other than oil, natural and associated gas. These include relatively abundant agricultural resources, arable land, water, and significant mineral resources including phosphate, sulfur, iron ore, copper, lead, and gypsum. A fairly sophisticated industrial base can therefore be established provided there are efficient economic management capabilities and a political and social environment conducive to economic growth and progress. Unfortunately, these crucial elements have been and are still lacking despite the stupendous increase in financial resources from oil exports available to the government. Nevertheless, important economic progress has been attained in the past 30 years and the pace appears to be quickening since the early 1970s. It must be emphasized, however, that what has been achieved falls far behind the potential of the country.

In the 1950s and under the monarchy, development policy stressed infrastructural development; i.e., roads, railways, telecommunications, power, and especially dams and flood control. Industrial development received little attention and the regime uncritically accepted the thesis that Iraq's fortune lies primarily in agriculture. Development planning in this period had been a failure for various reasons including a low implementation rate despite the availability of financial resources, the absence of coordination among the various projects included in the plans, misplaced emphasis on long-term agricultural projects that yielded hardly any visible return within 10 years or so, the neglect of the critical agricultural problems, namely the urgent need for institutional reform, soil salinity, and obsolete and primitive techniques of production, neglect of industrial development, and neglect of the development of technical skills and of human resources development in general.

The Planning Board and the Ministry of Planning tried to rectify some of these defects. While considerable resources continued to be devoted to infrastructural development, industry emerged for the first time as a major recipient of planned capital expenditures. And the government attempted to change the semi-feudal institutional framework of agriculture by promulgating and implementing a comprehensive agricultural reform legislation. Unfortunately, the performance record again was rather poor with actual expenditures falling far behind planned investment. The government lacked the economic management capabilities, did not plan comprehensively, permitted the diversion of an increasing percentage of oil revenues to the current budget, and could not provide a stable political environment conducive to economic progress. As a result, neither the public sector could not assume effective leadership in spearheading the growth process and the private sector was not permitted to prosper and flourish. In the early 1970s, the Iraqi economy was still characterized by a narrow industrial base consisting mostly of food-processing industries and textile. Agriculture showed little increase in output despite the enormous rise in the demand for food and fiber. In addition, success in other areas such as the physical and social infrastructure was rather modest. In short, extreme political instability rendered effective planning and implementation a futile exercise. The rather respectable growth rate of 6 percent achieved in this period must be attributed largely to the sheer magnitude of oil revenues and their infusion into the economic system, but emphatically not to their proper utilization or wise allocation.

Oil receipts started their steep climb in 1974 and it may be said that this period has presented Iraq with tremendous opportunities as well as acute problems. The government is pursuing a big push strategy on all fronts. With revenues increasing from year to year by leaps and bounds, planning has been pushed to the background and development is largely being conceived and implemented by the executive ministries. Diversification of the sources of income and employment is still the key vehicle to rectify the economic structural imbalance and to eventually wean the economy from its excessive dependence on oil. It remains to be seen whether this objective can now be realized within a reasonable time span.

In the industrial sector, priority is accorded to energy-intensive industries and petrochemicals. The crude refining capacity is to be expanded to 710,000 barrels per day by 1990, a goal which is indeed modest in view of the anticipated sharp rise in Iraq's oil production capacity. The use of associated gas domestically

The government, in 1950, created the Development Board. This board was an autonomous body which was entrusted with the task of formulating a general economic plan with the aim of developing the indigenous economy and implementing such plans by means of utilizing the oil revenues which were wholly allocated to the development effort.[36]

The Development Board prepared two plans in their final form after many amendments based on recommendations put forward by the International Bank for Reconstruction and Development (IBRD) and other experts[37] These two plans covered the periods 1951/52 - 1956/57 and 1955/56 - 1960/61.

The Development Board allocated ID 155 million for the first plan and ID 500 million for the second plan. Agriculture obtained the lions share in both plans accounting for 34.4 percent and 33.6 percent of the total allocations for the first and second plans respectively as against allocations for industry of only 19.9 and 13.4 percent.

The agricultural sector, at the time, was the largest sector accounting for 30 percent of the national income and 70 percent of employment.[38] It was also, and still is, the most traditional and primitive sector of the economy. The general belief was, therefore, that the soundest development policy was to invest in this largest and neediest sector, and this will insure further development of the economy.

However, a comprehensive and coherent program that aimed at a general agricultural improvement was not advocated. The plans instead concentrated on water control and storage projects.[39] Despite the emphasis given to agriculture over other sectors, the Development Board's policy to improve this vital sector was unsuccessful as Hashim's statement below might indicate.

> However, the effort to lift up the agricultural sector itself seems to have been only a partial and half-hearted one. Some flood control and irrigation projects were all that was started. These projects, no doubt necessary in the first instance, would hardly cure the ills of the agricultural sector, in the absence of land reforms, better farming practices, provision of necessary inputs like fertilizers, farm machinery, and proper marketing facilities and pricing policies. No attention seems to have been paid to these aspects. The benefits which could accrue as a result of the infrastructural projects would take a long time to materialize, and in the absence of land reforms, would largely benefit the big landlords.[40]

The Development Board had not only failed to stimulate the agricultural sector in particular, but had failed, in general, to draw up comprehensive development plans whose projects should have been evaluated on the basis of economic and technical feasibility studies and of their impact on each other and on the economy at large. In this respect Dr. Hashim continues to say

> Thus, the whole of the developmental program during the period 1951-1959 seems to be merely a list of a number of unrelated infrastructural projects with little or no support from the effects at improving the economic environment as a whole. Even in respect of these projects, their selection was on an ad-hoc basis following rule of thumb criterion. No cost-benefit studies, investment criteria, or project evaluation methods were applied.[41]

One should remember, however, that planning at the time was conditioned by an unpopular government largely dependent on a feudal system which resisted the adoption of any meaningful agricultural policy. On the other hand, this was the first Iraqi attempt at conscious developmental planning. With regard to the general framework of the plans and project selection, therefore, it would be premature to expect the use of sophisticated planning and project evaluation techniques in the absence of experienced planners and reliable statistical data.

After the revolution of July 14, 1958, the Development Board was abolished and the Planning Board and the Ministry of Planning were instituted in 1959. In this post-revolutionary environment, economic development began to be understood as essentially a social process. The Agrarian Reform Law was promulgated and more attention was devoted to the human element in the form of increased health services, education, and housing.[42]

During this planning period the following development plans were adopted:

(a) The Provisional Economic Plan (1959/60 - 1962/63). This plan was adopted for the purpose of completing the projects already started. Expenditures on this plan started in January of 1960 and ended in December of 1961.[43] The total allocations to this plan were ID 392.2 million. From these allocations agriculture received 12.2 percent, industry received 12.4 percent, transport and communication received 25.7 percent, while social investments in health, education, and housing received a total of 48.6 percent.

(b) The Detailed Economic Plan (1961/62 - 1965/66). This plan was adopted almost two years after the adoption of the Provisional Economic Plan to cover the period 1961/62 - 1965/66. Expenditures allocated to this plan were ID 556.3 million.[44] From these allocations agriculture received 20.3 percent, industry received 30 percent, transport and communication received 24.5 percent, and buildings and housing received 25.2 percent.

The Detailed Economic Plan emphasized industry for the first time, in contrast to earlier plans. This plan can also be considered as in improvement on the previous plans since it specified a target rate of growth with the intention of doubling the national income in 10 years. Hence, on the basis of this target rate of growth and a choice of an arbitrary capital output ratio, an overall investment requirement was estimated.[45]

Due to political upheavals in 1963 this plan was terminated and replaced by transitional annual plans for the years 1963, 1964, and 1965. During these years, investment declined drastically and some of the projects were suspended.[46]

(c) The Five-Year Economic Plan (1965/66 - 1969/70). This plan was introduced in 1965 with economic and social targets. These targets were to achieve an annual rate of growth in the national income of not less than 8 percent, reduce dependence on oil through increasing the share of nonoil commodity sectors in the national income, especially agriculture and industry which were to achieve annual rates of growth of 7.5 percent and 12 percent, respectively, during the plan period, and improve productivity through increased investment in health and education. This plan also sought economic integration and economic unity with other Arab countries.[47]

Financial allocations to this plan were ID 821 million from which agriculture received 19.1 percent, industry received 26.2 percent, transport and communication received 14.5 percent, while building, housing and social services received 32.1 percent.

Although the Five-Year Economic Plan seemed to be well formulated in comparison to the previous plans it had many shortcomings. The capital output ratio of 3.6 on which the overall investment requirement was estimated was arbitrary; the annual rate of growth of 7.5 percent envisaged for agriculture was overambitious and not justified by past rates of growth which were almost zero; and the preparation of the plan, in general, did not make adequate use of sufficient statistical information and proper project evaluation techniques.[48]

The period 1969-1980 marked an improvement over the past two periods in planning and execution of the plans, due mainly to accumulation of experience and better vision of the objectives to be attained. In this regard, Hashim, who was himself twice the Minister of Planning during the period, stated

> This period which began after 1968/69, had to be, no doubt, in parts a continuation of the earlier programs and projects, and had to proceed with technical and statistical foundations already available, yet it marked a basic qualitative departure from the past. For the first time, a clear vision of the society to be attained was kept in view, and was considered to be the main foundation of plan objectives and economic targets. There was now a clearer understanding of the meaning of 'development' which should encompass not only material progress but social and cultural evolution leading towards an advanced social system. The implication of these were: a more alive concern with the improvements in the living standards of the masses; a fair and equitable income distribution and social justice; and more investments in human resources.[49]

During this planning period, the following development plans were adopted:

(a) The National Development Plan (1969-1974). This plan was introduced in 1970 and incorporated the last part of the earlier plan. It was more detailed than the previous plan with a main objective of achieving an annual growth of 7.1 percent in the national income in order to increase per capita income at the rate of 3.6 percent per annum over the plan period. Among other objectives were balanced growth, price stability, increase in the level of consumption, diversification of exports, encouragement of private investment, balanced regional development, and economic integration and cooperation with other Arab countries.[50]

A total of ID 1,072.39 million was allocated to the plan with agriculture and industry receiving each about 20 percent of the total allocations. However, as oil revenues increased in 1973-1974, the allocation for the last year of the plan was revised drastically upwards and increased to ID 1,169 million.[51]

(b) The Investment Program (1975). Prior to 1975, the government of Iraq followed a fiscal year which started on the first of April and ended on March 31 of the following year. In 1975, the government decided to follow a normal calendar year for its fiscal planning. As the National Development Plan ended on March 31, 1975, an interim investment program was adopted for the nine months remaining in 1975, on the basis that the forthcoming national development plan would begin at the completion of this investment program, using calendar years.

The main objectives of this program were to concentrate on the strategic projects and solve the bottleneck problems of supply of construction and raw materials. The allocations for this program were ID 1,076 million with industry and agriculture receiving 41.6 percent and 19.3 percent respectively.

The main feature of this program was the size of its allocations. It was the largest investment program witnessed by the country given the short period it covered. Emphasis in this program had been shifted to industry which received about 42 percent of the total allocations. This was very large by the standard of industrial investments of the previous programs.

(c) The National Development Plan (1976-1980). This plan was introduced according to Law No. 89 in June of 1977. It aimed to achieve not less than the following annual rates of growth during the plan period in constant 1975 prices: 16.8 percent in national income; 13.3 percent in per capita income; 32.9 percent in industry; and 7.1 percent in agriculture.

In addition to the above objectives the plan also aimed to increase the share of the public sector and insure its leading role in the economy, continue building the basic infrastructure for the national economy, expand social services in the areas of education, health, and human improvement, and pay special attention to the service of the provinces and rural areas such as housing, water supplies, and rural electrification.[52]

Apart from the broad outlines of the plan, nothing official had been released concerning the sectoral allocations of the plan; financial and economic information have become more confidential and difficult to obtain since 1976. The overall financial allocations to the plan were about ID 13,455 million with ID 12,255 million going to the public sector.[53]

The target rates of growth specified by the plan were not attained. During the period 1975-1977, the average annual rates of growth of the manufacturing sector and total GDP were 23.1 and 14.6 percent, respectively in 1975 prices, as against target growth rates of 32.9 percent and 16.8 percent, respectively. As usual, the target rate of growth of 7.1 percent annually set by the planners for agriculture was overly ambitious and not commensurate with past growth experience. The agricultural sector grew in 1976 by 5.5 percent while its growth was negative in 1977, in constant 1975 prices; the overall agricultural growth rate was only 2.3 percent during the period 1975-1977 in constant 1975 prices.

The Five-Year Plan (1981-1985) calls for expenditures up to $75 billion. The plan calls for high levels of expenditures for social overhead capital. During the plan period 350,000 homes are to be built of the 3.4 million planned by the Housing and Construction Ministry over the next 20 years. High levels of spending will be incurred for water supply, sewerage, communications, and electricity. Transportation will also be rapidly developed under the plan. Work on the 600-kilometer Baghdad expressway from Baghdad north to Zakhr on the ;kish border will require over $1 billion in expenditures. A contract for $586 million was awarded for construction of the Basra airport.

as a source of energy and as a feedstock is to expand and a modest beginning has already been made in that direction with the completion of the gas sweetening projects in Al Taji and Kirkuk and the petrochemical complex in Basra. Further expansion and development of the petrochemical industry is also envisaged. Moreover, iron ore processing utilizing gas as a reducing agent and aluminum smelting are planned. Other industries receiving special attention include the production of phosphate fertilizer, sulfur from the natural sulfur deposits at Meshraq, cement and building materials industries and the assembly of cars, buses, agricultural implements and electrical appliances. The remaining industries, i.e., food processing, textile, paper and pharmacuticals would also have to expand to meet the higher demands for their products.

The government has recently been paying considerable attention to agriculture. Saddam Hussein started the 1980s by announcing that "agriculture is permanent oil." The old and refractory problem of land salinity is being addressed with the ongoing construction of an extensive sewerage network. Various technical and institutional innovations are also being introduced in an effort to increase agricultural productivity. It is hoped that the cumulative result of these measures would initially arrest and later reverse the alarming trend of increasing food imports ($1.5 billion for 1980 alone) that started in the 1960s. In fact, the government expects the country not only to attain self sufficiency in food but also to export surplus production to the Gulf area by the turn of the century.

This enormous rise in development and current government expenditures has created numerous stresses, strains, and acute bottlenecks in the economy. The most visible problems relate to transportation and port congestion and the general scarcity of labor, especially skilled labor. Despite the presence of perhaps 1.5 million expatriate workers in Iraq, labor availability is still a bottleneck. The government recently initiated a program of pecuniary incentives to increase the birth rate but it is doubtful that this policy would yield any positive results even in the long term because fertility levels are already near the biological maximum to start with. These difficulties have given the government second thoughts about the advisability of initiating new projects. Thus it appears that for the coming five years, emphasis is going to be placed on consolidating the progress already attained, finishing projects in the process of completion, and repairing the war damages rather than starting new and large projects.

b. **Development Planning**

From the beginning when Iraq started receiving oil revenues in the form of royalties in the 1930s, this income was treated as a budgetary surplus to be used for financing various capital projects. The disposition of these revenues, however, was not subject to conscious planning until 1950.

In this section we attempt to review briefly the efforts of Iraq to utilize oil revenues for economic development through investment. Our aim here is to throw the light on the nature of development planning in Iraq since 1950, and on the evolution of the capacity of Iraq to absorb the financial allocations to the development plans.

Planned developmental effort on the part of the Iraqi government began in 1950. Such effort was stimulated by increasing oil revenues due to increased oil production on the one hand and increased royalty from 4 shillings to 6 schillings per ton in that year on the other hand.

One of the major goals of the new five-year plan is self sufficiency for agriculture by 1985. The Iraqis have been relying on a high level of food imports using up a substantial portion of their foreign exchange reserves. They plan to meet this goal by increasing the production capacity of irrigated land and by expanding the land area under irrigation. The State Organization for Land Reclamation plans to install drainage throughout the Euphrates' 6 million acres. This area is one of the most productive agricultural areas in the entire Middle East.

A major problem in implementing the new five-year plan, as in past Iraqi development efforts, is the shortage of managers and skilled labor. Indeed the problem will be exacerbated under the new plan by the importation of highly sophisticated machinery and equipment calling for skilled operators and maintenance workers. Fulfillment of the plan will require expanded programs for education and training and continued reliance on expatriate labor.

Many contracts require training of an indigenous labor force. For example, 160 Iraqis will receive an average three months training from Danish, Dutch, British, and Swiss subscontractors at the Al-Qasim phosphate fertilizer project.

Despite the fact that the Iraqis have the largest population in the eastern Arab world--13 million--there is a shortage of unskilled workers. The massive expenditures for construction have virtually used up the available supply of construction workers. Foreign firms contracting for construction work are forced to supply their own labor force. As a result contractors from the United States, West Europe, and Japan are in a less favorable position to compete for contracts than firms from Southeast Asia and India.

The agricultural sector continues to be plagued by a shortage of labor. As the population has drifted from the countryside to the city the agricultural labor force and output have fallen. The Iraqis have turned to expatriate labor to supply their labor needs in agriculture. Egyptian farmers have been encouraged to settle on Iraqi farms. Moroccan farmers have been offered a house, land, tools, and equipment to settle at the Dalmuj Agricultural Project. The Greater Mussoib irrigation scheme suffered so badly from poor management and labor that the Iraqis had to invite foreign consultants in to reevaluate the scheme.

Inadequate supplies of managerial personnel and skilled workers are especially evident in the health and education sectors. But the area where shortages of human capital have the greatest impact is the government sector. There unqualified individuals are given responsibility for decisions involving major financial commitments. They either refuse to make decisions or refer decisions to committees which involves delays and waste of limited resources.

In the final analysis the success of Iraqi development plans is tied to their ability to restore stable relations with their neighbors. Despite Iraqi offers to end the war with Iran the prospects for an early cessation to the war are not good. The Iraqis have built roads in the area captured by the Iranian army and linked up towns in the region to their postal system. The Iranians have not responded to the peace offerings of President Hussein and appear to be settling into a long war of attrition.

Iraq's relations with the other Gulf states appear to have improved considerably. After a long period of tension with Syria the Iraqis seem to be establishing normal ties which will permit them to utilize the Syrian pipeline to full capacity. They have strong support from other countries including Jordan, Kuwait, and Saudi Arabia. President Hussein is confident that this power base will permit the Iraqis to continue their ambitious development efforts.

A statement by Mr. Sabah Qajahji, advisor for industrial planning in Iraq, on 5 December 1981 noted that planning for economic development is as important an objective as winning the war against Iran. The greatest emphasis in planning has been placed on agricultural and rural development; the goal is to make Iraq self-sufficent in food requirements. Estimates from other sources in Baghdad indicate that economic activity is almost at a normal level in the capital and that Iraq has concluded contracts for various economic projects during the first six months of 1981 valued at $15 billion (a value which is greater than that of all contacts concluded in 1980). The cost of the war has been estimated at about $11 billion for the first year of the conflict. By contrast oil revenues totaled only $5 billion during the same time span. The foreign reserves of Iraq have been estimated to reach $14 billion by September 1981 (as compared to $35 billion a year earlier). With reference to the current level of oil exports, the Iraqi Minister of Petroleum Mr. Abdulkarim Tayeh put it at 1 million b/d with plans to increase it by 400,000 b/d as a result of the expansion of exports through pipelines running through Syria by early 1982.[54]

Political instability in Iraq will make oil production and exports highly uncertain in the short-run. At the time this report was written the Kurdish rebels had blown up the major oil pipeline to the Mediterranean through the port of Dortyol. Iraqi oil exports were reduced by two-thirds to about 300,000 barrels a day. While the Iraqis were expected to repair the pipeline within a week and resume exports of 900,000 barrels per day, there is a high probability that such disruption in production and exports will reoccur in the near future.

In this sense the Iraqis appear to be more vulnerable than the Iranians to disruptions in their oil operations. Since their access to the Gulf has been closed by the war with Iran the Iraqis must rely on pipelines to export their oil. Those pipelines are exposed to several sources of political instability and hence to disruption in oil exports in addition to the Kurdish rebellions in Turkey. The pipeline through Lebanon to the port of Tripoli has been the scene of political turmoil fighting, and sabotage that has interrupted the modest oil shipments from Iraq. Political tensions between Iraq and Syria have prevented oil shipments over the Syrian pipeline from expanding much above 300,000 barrels a day. These political problems added to the long drawn out conflict with Iran, makes any projections of oil production and exports from Iraq highly uncertain. The longer these problems persist the less likely are the chances of Iraq's recovering the level of oil production and exports that existed before the war with Iran.

6. Social Cultural and Political Change

Alignments Within the Arab World. Iraq has historically called for one Arab nation and the Ba'athist party's ideology attaches great significance to this issue. Within the "Arab nation" Iraq would like to assume a predominant role of leadership and its conflict with Iran might be construed as a step in that direction.

The likely successes in the pursuit of Arab leadership by Iraq are, at the least, uncertain at this point in time. The Arab world is still divided, as it has been for years. The conflict with Iran brought further divisions in the Arab world, with Syria and Libya siding with Iran and Saudi Arabia, Kuwait and Jordan with Iraq. To what extent these opposing forces will diminish in the future is not easy to predict, but the chances are very slim. Add to this, the Saudi quest for Arab leadership and its attempt to be seen as the sole defender of the Arab cause. In summary, Iraq's quest for one strong and united nation will not likely materialize. Alignment within the Arab world is hard to achieve except for short periods of time, as in the case of war with a common enemy such as Israel. Iraq's bid for Arab leadership will continue in the future.

Position and Leeway for Compromise on the Arab-Israeli Conflict. Until recently Iraq used to espouse radical positions with respect to the Arab-Israeli conflict. But Iraqi positions and demands on this issue, in view of distance from Israel at least, are largely rhetorical and are designed to bolster the country's claim to leadership in the Arab world.

Recently, however, and as a result of the Saudi-Iraqi "rapprochement" which is dictated basically by sectarian and geopolitical reasons, Iraq at the Baghdad Conference adopted concilatory and moderate views on the Palestinian issue similar to those of Saudi Arabia.

United Nations and the Arab League. Iraq has consistently maintained a radical stand at the United Nations particularly towards Middle Eastern politics. It has made no attempt to compromise with the "Zionist" state, as the Iraqi government refers to it. However, Iraq more recently has accepted in principle a peaceful solution of the Arab-Israel dispute. This stand was made public in the Baghdad conference in the throes of the Camp David Accord. On other issues, it tends to side with the non-aligned world.

Iraq's role within the Arab League is also consistent. It has attempted to strive towards Arab unity and one Arab nation at the lead. The recent war with Iran clearly indicates that Iraq is far from achieving goals of Arab unity, when Syria and Libya, for example, fail to support them against Iran. Some observers indicate privately that even after Israel bombed the Iraqi nuclear reactor, some Arab nations privately, were not as angry as was led to believe by the official public reaction. Iraq's quest towards achieving its goal of Arab leadership is not likely to happen in the near future and the quest for such leadership in the long term appears highly uncertain.

Relations with the United States. Relations between Iraq and the United States are better now than they have been in a long time despite the political rhetoric. We outlined in the beginning of the paper some of the reasons why Iraq is moving closer to the West and particularly to the United States. The close ties with the Eastern bloc have not benefitted Iraq, especially on the technological front. Privately, Iraq is willing to open its doors to some

United States participation in the oil sector of its economy and eventually in others too. The bombing of its nuclear reactor highlighted the importance Iraq places on its relations with the United States, since it failed to put the finger on the United States as some observers expected it to.

The near term will see a definite improvement of Iraqi-United States relations provided the United States continues its present posture towards the Iran-Iraq was. Iraq is badly in need of United States technology and would undoubtedly work towards that end even if it means openly expressing its friendship with the United States.

Relations with Other Countries. Iraq has particularly good relations with a number of western powers, especially France. The bulk of its oil goes to Europe and Japan and France has built the Osark nuclear reactor for Iraq. These ties will be strengthened in the near future simply because the country has enjoyed a healthy and economically rewarding relationship with these powers.

The Soviet Union did occupy a special place in Iraq's foreign relations for quite some time, but that position is being slowly eroded. Militarily, the Soviet Union is still the number one supplier of heavy armaments and fighters planes to Iraq. However, France is quickly moving in to fill some gaps in the military demands of Iraq. Recently, the brother of Saddam Hussein who controls the intelligence services of the country openly criticized Russian moves to gain control of the Gulf waters. This is clearly a sign that Iraq is not likely to subject itself to any superpower and particularly not to the Soviet Union, despite the close ties that the two countries enjoyed in past years. These ties will be de-emphasized in the short term to the benefit of the United States and European countries. We are not likely to see a break of Iraqi Soviet relations, but a definite toning down of their importance in the long run, as Iraq engages in developing its economy with the aid of western technology.

Relations with Moslem countries have, in general, been good and are characterized by generous aid by Iraq, even though the country is by no means a surplus fund one. Iraq does not have the finances to back its stand and its positions among the Third World countries, whether Moslem or not. Its opposition to the Camp David accords does not stop it from maintaining relations with those who sided with Egypt. Its relations are perhaps warmer with the anti-Camp David group but that is hard to determine.

It is also expected that Iraq will strengthen its existing economic ties and good neighborly relations with Turkey for at least two reasons: the headwaters of the Tigris and Euphrates lie in Turkey and the two countries are interested in containing the Kurds who inhabit the contigious areas of northeastern Iraq and southeastern Turkey. Also, despite Iraqi enimity toward the Syrian regime, relations between the two countries will be maintained for obvious economic reasons including water and transit rights.

A guiding principle behind its drive in foreign policy is perhaps the Arab cause. Officially, Iraq is always looking for areas of mutual interests and benefit in its dealings with most countries, regardless of whether they happen to be Moslem or not. Moves have been made to bring some of the African nations closer to the Iraqi point of view as it relates to Arab politics and Middle Eastern security.

Security Alternatives. The first security alternative we must consider is the reliance on a superpower. Even though Iraq gets most of its arms from the Soviet Union, it does not necessarily rely on it completely, even less so recently. As pointed out earlier in this report, relations with Russia are being de-emphasized by the Iraqis and closer ties with the West, in general, are favored. This does not mean that Iraq wishes to tilt toward either superpower, since the ultimate goal is one strong Arab nation. However, if closer ties with the West or with the United States will serve the benefits of its economy or the security of the regime, the government of Iraq will not hesitate to pursue that goal.

While Iraq did rely on the Soviet Union for the supply of military armaments, and to some extent is, and will continue to rely on the latter for a number of years to come, this does not necessarily put it in a quasi-Soviet orbit. Iraq values its independence and its leadership role in the Arab world too much to let itself slip into that sort of relation. As long as it is endowed with oil, the country will continue to use that resource to extract supply agreements from any country, be it the Soviet Union or the United States.

The second security alternative we must consider is the "neutralist" posture. There is no evidence that Iraq seeks a neutralist posture between the two superpowers since, for a long time, it came to be identified with the Soviet Union. The guiding principle behind the shaping of its foreign policy is the pursuit of its self interest. In light of what has been advanced, a neutralist posture might be pursued in the extreme if it benefits Iraq. However, given the discussion on Iraq and its quest for the Arab leadership, maintaining a neutralist posture would seem to be secondary to assuring the continuity of the present regime in power and gaining esteem and respect by the rest of the Arab world.

The Arab-Oriented Security System may be said to be the eventual goal of the Iraqis if their push for one Arab nation is realized, which is far from likely. In the short term, getting closer to that regional security system is also unlikely to materialize, given the historical divisions existing between Iraq and Syria. Finally, such an Arab-oriented security system is not incompatible with Iraqi foreign policy but for all purposes, such a security system is not to be foreseen for a very long time.

Nonetheless, a tacit alliance between Saudi Arabia and Iraq and between the latter and Jordan already exists and it is not unlikely in the event the Iraqi regime is subjected to serious threats from the inside or the outside that this alliance will be strenghthened and perhaps even formalized.

The middle powers ties in the west has already been discussed. It was argued that France, in particular, may increase its share of military sales to Iraq with the long-run effect of eventually displacing the Soviet Union as the predominant arms supplier. These ties will continue as long as they are beneficial to Iraq's interests and all indications are that they will be in the near term.

These ties are not welcomed by the Russians who undoubtedly would prefer to be the sole supplier of armaments, if only for financial reasons. The diversification of its customers is an indication by Iraq that it is not overly concerned about appeasing Moscow and seems to be consistent in pursuing whatever line of policy that serves it best.

Internal Subversion Threat. The PLO capacity to mount a significant challenge to the Iraqi regime can be said to be very minimal at the very best. Furthermore, the power structure in Iraq is not consistently against the PLO for the latter to devise a consistent plan to overthrow it. In any case, Iraq's support in principle for the Palestinian is not to be questioned, even though that support has oscillated between total support to even condemnation. Another case where Iraq chose not to intervene on the side of the PLO happened in the 1970-1971 civil war in Jordan when the PLO was fighting King Hussein's army. At that time, some Iraqi forces were stationed in Jordan but chose not to intervene and remained in their barracks.

Another interesting element is the fact Iraq supports a segment of the PLO, namely the PFLP, and this only since the October War of 1973. A factor that complicates relationships between Iraq and the PLO relates to differences that exist between the Iraqis and their fellow Ba'athists in Syria. It is also true that the PLO places greater importance on the Syrian Be'athists which does not help relations with Iraq and the Palestinians.

Thus, in the long run, relations between Iraq and the PLO may be tenuous but this is not to be translated into a PLO plan to overthrow the Iraqi regime. Were the PLO willing to do just that, it is doubtful that they have the capacity to mount such a significant challenge to the Iraqi regime.

An internal problem that is particularly relevant to Iraq concerns the Kurds, who have demanded autonomy. Prior to the Algiers treaty of 1975, the Shah of Iran was actively supporting the Kurds in an attempt to destablize the Iraqi regime with which it had border problems for quite some time. After the treaty, Iraq mounted a significant attack on the Kurds leading to the eventual exile of their leader to the United States. The Kurdish problem has diminished in importance, mainly because of the lack of outside support, but the dangers are still there.

The threats arising from schisms in Iraq are always present, especially when that sect represents some 75 percent of the non-Kurdish Iraqi population. The Iraqi government, however, is in control and has at its disposition a vast network of internal security system. The Sunni sect contains most of the political and army elite in Iraq and a break in the status quo hinges to a considerable degree on the outcome of the Iran-Iraq war as was outlined earlier.

Political Succession. Iraq's political structure is probably one of the less stable in the whole Arab world. Numerous coup d'etat took place in the past few years, followed by a number of executions each time. There is little known on Iraqi politics, but the issue of political succession has so far been resolved by force. Governments have been changed, not by popular vote, but by military force.

Saddam Hussein's regime is relatively young and to make predictions on the future outcome of Iraqi politics is almost impossible given the frequency at which governments change. However, the fate the Hussein's regime, at least for the near term seems to be tied to the outcome of the war with Iran. If the war is resolved to the benefit of Iraq, then one could assume that the regime of Hussein may survive the next five years. If the war is not ended on Iraqi terms, then the dangers of Hussein's downfall might become apparent.

A long-term outlook on Iraqi politics is hard to spell out, but the Iraqis continue to put the survival of the regime before everthing else. If the regime weathers the current storm of the war, then its long-term survival will hinge on its economic success and its ability to coop dissident groups and eventually abandon its sectarian and divisive character. Of course, events in the region as well as on the world scene are bound to effect the regime's survival chances and its ability and willingness to adopt rational and stability enhancing policies. It is more likely that the survival of the regime would be enhanced if Hussein is removed from power by a Ba'athist group for then the new leadership could easily blame the excesses and failures on Hussein alone while trying to forge national cohesion and constructive policies. But it may also be true that Hussein's removal would precipitate chaos and power struggle until a new "Hussein" emerges. Unfortunately, this cycle has characterized Iraqi politics in the past.

The possibility of the coming to power of a more representative and democratic government upon the collapse of the present regime appears remote though, of course, cannot be entirely ruled out. It may be that in this case outside events and interference would be the decisive factor.

B. Absorptive Capacity and Economic Development in Iraq

1. Traditional Constraints on Absorptive Capacity.

One definition of absorptive capacity is that volume of investment or rate of capital formation relative to GDP, that could be achieved at competitive rates of return. Since government investment expenditures dominate total Iraqi investment we can explore this approach to absorptive capacity in terms of government investment spending.

Table 21 shows annual allocations and expenditures for the period 1951-77. This table shows that total planned investments for the periods 1951-59, 1960-69, and 1970-77 were ID 575.7, 1,222.0 and 5,697.1 million respectively, while actual investments for the same periods were ID 274.8, 586.8, and 3,451.5 million respectively. The levels of financial execution, therefore, for these periods were 47.7, 48.0 and 60.6 percent, respectively.

Although plan execution performance has improved slightly over the years, its level remains very low. The factors behind such disappointing performance are directly related to the constraints of absorptive capacity of the Iraqi economy.

In trying to expose the reasons for the low expenditures performance for the period 1951-69, Hashim vaguely attributed this to the "lack of absorptive capacity" when he stated:

> This shortfall in actual expenditure, in spite of available resources, is most of the time described by a term "lack of absorptive capacity." But this term by itself does not reveal much. However, the reasons for this problem are not far to seek. Developmental planning in the initial stages, was understood only as a provision for a certain amount of investment funds, and little attention was paid to create conditions, manpower and technical and organizational competence which could help implement those investment programs.[55]

The Ministry of Planning in appraising the developmental period 1951-69 have enumerated some of the factors which contributed to the low level of execution of the plans, and they were:

(1) Weakness, and sometimes total absence, of economic and technical studies of the proposed development projects.

(2) Lack of experienced managerial and technical cadre for the efficient management and execution of the plans.

(3) Domination of the complicated government routine which contributed a great deal to the confusion and delay of plan execution.

(4) Lack of statistical data and relevant information essential to the planning process.

(5) Lack of coordination between the various branches of government responsible for execution of the plans.

(6) Lack of coordination between government fiscal, monetary and investment policies.

These factors are characteristic constraints of absorptive capacity in Iraq as well as other developing countries. To these factors must be added government instability. This was an important factor behind the low performance level in the early years of the 1960s. During the period 1960-64 which was characterized by political unrest, actual investment declined to 43.9 percent of planned investment as against 53.3 percent for the period 1965-69.

During the period 1970-74, when the first National Development Plan was introduced and implemented, total actual investment rose to 70.4 percent of total planned investment, the highest execution level in the period 1951-77. This boost in the performance level can be attributed to better formulation of the plan as a result of accumulation of two decades of planning experience and political stability during that period. However, this performance level was by no means perfect. Most of the problems which constrained absorptive capacity in the past remained unsolved as Penrose & Penrose commented

> In spite of the planners' expertise, however, nothing effective was done to grapple with the really important problems: How to implement any plan, given the real shortages of effective managers, supervisors, office workers, and skilled factory workers; how to overcome the social, organizational, and other institutional barriers in the way of rapid increases in productivity; and how to mobilize the enthusiastic commitment of the people. These fundamental weaknesses remained. The gap between the ability to plan and the ability to implement was still wide.[56]

Execution performance during the three years 1975-77, in terms of planned actual investment deteriorated relative to the period 1970-74. Actual investment declined to 57.8 percent of planned investment during 1975-77. This does not mean that absorptive capacity itself had deteriorated; on the contrary, it had improved in absolute terms. The real reason for the lower level of execution was the advent of excessive oil revenues during this period which stimulated the planners to allocate unrealistically huge amounts of money for investment, without matching these allocations, on the other side, by a careful supply of labor, material, and other cooperant factors. This period was, therefore, characterized by acute physical bottlenecks and a high rate of inflation.

In terms of absolute value, absorptive capacity had improved considerably during the period 1951-77. During the period 1960-69, actual investment expenditures increased to about twice that of the period 1951-59; and actual investment expenditures during 1970-77 increased to about 6 times that of the period 1960-69. However, these expenditures are in current prices and ought to be adjusted for rising prices of goods and services if appraisal is to be in real terms.

b. New Internal Constraints on Domestic Absorptive Capacity

In addition to the constraints of domestic absorptive capacity which were previously mentioned in this report, there are other constraints which can be branded as unconventional. These can be considered as the effects of inflation, urbanization, income distribution, etc.

Although these constraints and their effects can be inferred from what has already been mentioned in this report, we prefer, for the sake of emphasis, to specify these constraints mentioning their impacts, if any, on the domestic absorptive capacity of Iraq.

Inflation. Prices in Iraq have been continuously increasing. Below are time series for consumer and wholesale price indexes and the GDP implicit price deflator (1975 = 100).

Year	Consumer Price Index	Wholesale Price Index	GDP Price Deflator
1960	58.7	63.4	0.35
1961	59.3	63.0	0.36
1962	60.1	61.5	0.37
1963	62.5	66.4	0.37
1964	62.4	67.7	0.39
1965	62.1	65.6	0.40
1966	63.4	65.3	0.41
1967	65.4	70.1	0.43
1968	66.9	66.8	0.42
1969	70.7	68.6	0.43
1970	73.8	75.2	0.44
1971	76.4	80.1	0.49
1972	80.4	76.9	0.51
1973	84.3	80.5	0.51
1974	91.3	90.5	0.99
1975	100.0	100.0	1.00
1976	110.3	111.2	1.05
1977	119.7	120.8	1.06

The consumer price index more than doubled over the period 1960-77 with an average annual rate of about 4.3 percent. The wholesale price index nearly doubled during the period 1960-77 with an average annual rate of about 3.9 percent. The index which is most representative of inflation is the GDP implicit price deflator which tripled over the period 1960-77 with an average annual rate of about 6.7 percent.

The inflation rate was not even during the years. While inflation was slow during the sixties it accelerated during the seventies, especially after 1973. The annual average inflation rate during the period 1960-73 was only about 3 percent. The average inflation rate, however, increased drastically after 1973 to about 20 over the period 1973-77. This high inflation rate was mainly due to the drastic increase in government expenditure, although imported inflation has contributed a little bit towards that direction.

The government of Iraq has never been explicit about the level of tolerable domestic inflation. In explaining the target of the National Development Plan 1976-80, the Ministry of Planning advocated government interference "in a way that secures equilibrium and stability of purchasing power...". One way of achieving this goal is the price control of basic consumer goods and necessities which are usually consumed by the lower income wages. The government has also pursued a policy subsidizing the basic purchases of low-income families.

Indeed, the level of domestic inflation in Iraq has been very moderate and lower than that in neighboring countries. The means followed by the government of Iraq in controlling inflation is through direct interference in price controls and subsidies rather than curtailment of government domestic expenditures. This policy has the effect of increasing domestic absorptive capacity through government expenditures on subsidies and the resulting increased consumption which would have otherwise been checked by higher prices.

With regard to giving a tolerable level of inflation which has never been spelled out by the Iraqi authorities, we can say that a level of 10 percent annual inflation is acceptable in Iraq. The abrupt fluctuations of the GDP implicit price deflator over the period 1973-77 may not support this figure, but if we turn to the consumer and wholesale price indexes we can see that these indexes have been roughly increasing at about 10 percent per year which may indicate the willingness of the authorities to accept such level of inflation to accompany the government spending levels.

Urbanization. Urbanization has been lightly dwelled upon at the beginning of this report when discussing urban and rural population of Iraq. The table below shows the percentage share of the urban and rural population of Iraq in census years 1947, 1957, 1965, and 1977.

Year	% Urban	% Rural
1947	36.0	64.0
1957	38.8	61.2
1965	51.1	48.9
1977	63.7	36.3

As we can see from this table, the population of Iraq was predominantly rural until the mid-1960s. The share of the rural population, however, has been persistently declining since the 1940s. The share of the urban population increased from 36 percent in 1947 to 38.8 percent in 1957 with an average growth rate of 0.75 percent; this share increased from 38.8 percent in 1957 to 51.1 percent in 1965 with an average annual growth rate of 3.5 percent; finally it increased from 51.1 percent in 1965 to 63.7 percent in 1977 with an average annual growth rate of 1.85 percent.

The causes of migration from the rural areas to the cities can be attributed to push factors and pull factors.[57] The push factors are rural population pressures, land tenure system, and continuous deterioration of the quality of the agricultural land. The pull factors are the increased economic opportunities in the cities where significant numbers of migrants are absorbed in the army, police force, and the construction and services sectors.

The economic effect of migration to the urban centers are depressed wages and rising unemployment. As argued before, this process of migration cannot considerably increase the labor supply in the short run since the labor requirements of the modern seetors of the economy are more qualitative than quantitative while the migrants are almost totally unskilled and illiterate This process, on the other hand, did not relieve the agricultural sector of its chronic under employment, and the labor force in this sector has been continuously increasing.

The beneficial social effects of migration to the urban centers are increased mobility, changing values and attitudes towards work and production while the adverse effects are social dislocations, loss of security, and creation of slum dwellings on the outskirts of the cities.[58]

Migration is beneficial in the long run. Iraq is undertaking broad and ambitious development plans. Projects undertaken will need manpower whether for construction or for operation. The Iraqi authorities realized the need for skilled manpower and embarked on extensive training programs through specialized training centers, techical schools, on-the-job training, or requiring the contracting firm to train the personnel for operation of the project after its completion.

The migrants, who are mainly in the working ages, meet a large portion of the manpower requirements either directly or indirectly through substituting more able workers who other wise would have to be engaged with the army, police force, and construction and services sectors. The rate of migration, however, becomes intolerable when it becomes higher than the rate of industrialization. In this case the migrants become a burden in the cities contributing to depressed wages, rising unemployment, and, increased slum dwelling on the outskirts of the cities.

The migration rate got out of hand during the 1950s and mid-1960s. During this period, the urban population increased by unprecendented rate of 3.5 percent per year. The reason for this wave of migration was mainly due to the wretched and severe conditions under which the farming population were living, especially in the south. This high rate of migration was also partly encouraged by the short-run objectives of the military government which came to power in 1958, by initiating large housing programs for the migrants in order to gain immediate support of the masses.

The high rate of migration was contained after 1968 when the present regime came to power. During the period 1965-77 the annual average growth rate of the urban population dropped from 3.5 percent to 1.85 percent. This reduction came as a result of the government's efforts using legislation, exhortation, and sometimes force. This effort has culminated in "reverse migration" on a small scale during the early 1970s where some migrants were returned to farms with the government bearing the cost of transportation and providing the migrants with shelter and land. From this action of the government we can infer that a 3.5 percent annual increase in the urban population and perhaps even the 1.85 percent which prevailed during 1965-77 is intolerable to the government. Perhaps a rate of 1 to 1.5 percent annual increase in the urban population is acceptable to the government when the rate of growth of the urban population is consistent with the growth in urban demand for labor, then the process of migration has the effect of increasing the absorptive capacity of the country. This can be justified the following reasons: a) The migrants need increased expenditures on services such as education, health, transportation, housing, etc. b) The migrants increase the labor supply hence alleviating the labor constraint on absorptive capacity. Besides, the migrants compete for employment thus lowering wages and rendering projects more profitable and encouraging investment especially in the private sector. c) The process of migration cannot have adverse effects on the Iraqi agricultural sector since this sector is overpopulated leading to under-employment and low productivity. The problem of the agricultural sector can be cured through better farming practices and mechanization rather than increasing the illiterate and sick agricultural labor force. d) The ills of migration should not be over emphasized when the rate of migration is not higher than the rate of industrialization of the country. These ills should be considered as a social cost of economic development. e) Migration as it increases urbanization, reduces income inequality as the case will be discussed below for Iraq, this is turn increases absorptive capacity through increased consumption.

Income Distribution. There are no data available on the income distribution of Iraq. The only information we could find was a chapter in a doctoral thesis from which this section is extracted.[59]

The following three indexes have been measured to calculate the degree of income inequality in Iraq.

1. The Gini index for the entire economy = 0.3761

2. The Gini index for the urban areas = 0.3416

3. The Gini index for the rural areas = 0.4047

where 0 would indicate perfect equality in income distribution or equalitarian society.

The Gini index for the entire economy, 0.376, could be considered as being relatively low, as compared to the indexes of many developing countries. It is in the range of indexes which were computed for Denmark (0.37) in 1966, New Zealand (0.36) in 1971, and Sweden (0.37) in 1954. As compared to the indexes computed for some developing countries, the Iraqi index is among the lowest.

The rather unexpected result indicated by these indexes is that inequality is higher in rural than in urban areas. The unexpected gap of inequality between rural and urban areas may be ascribed to one or more of the following factors.

(1) The expansion of the public sector in non-agricultural activities has made possible the success of fiscal policies, especially in the payment policy aspect, to maintain reasonable equity in wages and salaries paid to government employees.

(2) The existing progressive taxation system which applies only to non-agricultural income may account for the relatively high inequality of incomes in rural areas.

(3) The income distribution in rural areas prior to 1958 initially might have been highly unequal to the extent that even the radical land redistribution programs have not been successful in reducing the inequalities more than to the extent indicated.

(4) The pricing policy which has been followed, especially since 1958 and on a wide scale since 1968, with respect to agricultural commodities, has been essentially designed to protect the consumer more than the producer. This is likely to lead to an alteration of the terms of trade against agricultural commodities. Upper limits were set to agricultural commodities,

especially vegetables, which constitute the major source of income for the lower income groups in the farming sector.

(5) In spite of the various amendments to the land reform laws in the direction of reducing the upper limit of land ownership, the old landlords have actually retained the most productive plots. Consequently, what actually had been left to be distributed among landless farmers was the less productive portion of the land.

The gap between the inequality of income distribution between the rural and urban areas can be ascertained by looking at the following figures: the poorest 20 percent of rural families receive only 6 percent of the income, whereas their counterparts in urban areas receive 13 percent. The richest 20 percent of rural families receive 47 percent of the income and their counterpart in urban areas receive 45 percent. The richest 5 percent of rural families receives about 21 percent while their urban counterpart receives 12 percent. The middle 60 percent of the rural families receive 47 percent while their counterpart in urban areas receives 42 percent.

For the total country, the poorest 20 percent of families receive about 9 percent of the income. The upper 20 percent receives 51 percent whereas the remaining 60 percent, who constitute the middle clan, receive 40 percent.

All economic development plans adopted by Iraq advocate industrialization. This in turn leads to urbanization. According to the figures mentioned above concerning income distribution, greater urbanization leads to a more equitable income distribution. Hence, the issue of income distribution does not pose a constraint on investment and absorptive capacity. On the contrary, income distribution towards the poor will increase the propensity to consume and absorptive capacity. It might be argued that saving and investment will decline, but this is a controversial issue, and we cannot consider it as very true in an oil-exporting country such as Iraq where most of the savings (oil revenues) and investment are undertaken by the government.

Furthermore, the Iraqi authorities have always stressed the objective of achieving more equitable income distribution in the economic development plans in a way which leads to more government expenditures and thus higher absorptive capacity. In order to reach this goal, it is intended in the present national development plan to increase the social services by 8.5 percent per year. Such services would directly benefit the poor and include free services in the areas of health, education, and the family. It also includes reducing the gap between rural and urban areas by providing the rural areas with drinking water, electricity, rural housing, and modern villages. Besides the plan also calls for government subsidies for basic consumer goods in order to protect their prices from inflation and prevent the erosion of the purchasing power of the low income groups.

Pollution. Because Iraq is a developing country, the concept of fighting pollution is more general and encompasses the establishment of drinking water systems throughout the country, sewage drainage, and garbage disposal as well as minimizing the undesirable pollutants of industry.

The policy of Iraq with regard to the problem of pollution is spelled out in the national development plan (1976-80) and can be summarized in the following points:

1) The development and expansion of drinking water and sewage drainage systems.

2) Organizing the operation of garbage disposal in the cities and the treatment of such disposal in a way as to over come its harmful effects to the environment.

3) Taking the necessary measures to minimize the pollutants disposed by factories.

4) Promulgating laws and regulations that are necessary to organize and regulate the methods of overcoming pollution.

5) Using various means to educate the population to the dangers of pollution and the importance of environmental protection.

The above points are very general and serve to outline the policy of Iraq towards the problem of pollution. Nothing quantitative has been indicated as to the amount of expenditures to be allocated to fight pollution. Points 1 and 2 above are part of the social services to be empahsized by the plan. However, point 3 is a step in a new direction since Iraq can be considered as relatively virgin with regard to industrial pollution and environmental protection in this sense has never been addressed before.

We can say that the effect of minimizing the amount of pollutants disposed by factories is to increase the cost of these factories and in turn increase investment expenditures and absorptive capacity. On the other hand, there is a view that increasing project cost is likely to reduce the prospective rate of return of the venture and hence reduce absorptive capacity. Although this is a generally valid argument, we do not think it is likely to have a great impact on the thinking of the planners with an effect of reducing investment. The major investor in Iraq is the government and government investment is mainly socially inspired in the sense that planning for investment is more driven by the need for economic development and less by economic profitability.

<u>Structural Imbalances</u>. The developing countries are generally characterized by structural imbalances which stand as a serious constraint to absorptiv capacity. This problem became more apparent and intense in OPEC countries

as a result of the investment boom now taking place.

Iraq is a typical country where structural imbalances are playing a serious role in limiting its absorptive capacity although Iraq is better off in this sense than many other OPEC states. Mention has already been made of the troubles of the agricultural sector and its low growth which is not at all commensurate with the growing demand for agricultural products arising from high population growth rate and rising income.

The most serious bottleneck, however, is the distribution sector, specifically transport, communication and storage. This seriousness arises from the fact that while food can be imported to relieve the imbalance of the agricultural sector, infrastructure cannot be imported. Iraq's supply and growth in the areas of transportation, communication, roads, ports and storage facilities is not commensurate with that necessitated by the investment boom or desired by the national development plans.

The annual average growth rate of the distribution sector was 8.7 percent in constant 1969 prices during the period 1960-77. This growth rate seems satisfactory when compared with the growth of the non-oil commodity sectors, for which this sector mainly caters, of 8.4 percent per annum over the periods 1960-77. However, the performance of this sector becomes totally unsatisfactory when examined after the drastic increase in oil revenues and the ensuring investment boom. The average growth rate of the distribution sector over the two years 1976 and 1977, was only 10.3 percent in constant 1969 prices while the corresponding growth rate of the non-oil commodity sectors was 33.6 percent. This growth rate did not even reach the level desired for the distribution sector by the national development plan of 16.9 percent per year over the plan period 1976-80.

Iraq has exerted tremendous efforts to accomodate the great influx of goods needed by the national development plan. It concluded agreements to use the ports of Kuwait, Jordan, Syria, Lebanon, and Turkey in order not to depend on the only seaport it has, namely Basrah. Although these agreements have ameliorated the situation, Iraq still faces a serious bottleneck and constraint to its absorptive capacity through the imbalance of the distribution sector.

Political Leadership. Institutional, cultural, and social constraints are widespread at the national level and affect absorptive capacity and the economy as a whole in the developing countries.

One of these constraints is political leadership. Mismanagement of the countries resources, lack of government stability, inability to maintain law and order, riots, banditry, government corruption, all these limit absorptive capacity and inhibit growth.

It is extremely difficult to quantify any of these constraints but it is possible to give an example of their effects based on recent Iraqi experience. Most of the decade of the 1960s has been characterized by lax leadership and political upheavals. During this period, investment fell drastically and plan execution became very poor. For example, during the period 1960-61 which is the worst part of the decade with regard to political unrest, actual investment declined to 43.9 percent of planned investment as compared to 53.3 percent during the period 1965-69 which noticed a slight improvement in political stability. The performance level rose and reached its peak during 1970-74 when actual investment reached 70.4 percent of planned investment. This period was characterized by firm and farsighted political leadership which succeeded in mobilizing the enthusiastic commitment of the people.

C. New External Constraints

The Iranian Revolution brought about fundamental changes in the geopolitics of the Middle East region. The weakening of the Iranian army and the deterioration of Iranian relations with the West tempted Iraq to reclaim the territorial and water rights it surrendered according to the 1975 Algiers Accord, and to renew its bid for leadership in the Gulf. More importantly perhaps, the Sunni Iraqi government wanted to humiliate and eventually oust Khomeni from power because it felt leery of and apprehensive about the appeal the new Iranian regime may have for the Iraqi Shi'ite who constitute the majority of the Iraqi population. Saddam Hussein has counted on a "blitzkreig" with Iran but to his dismay the outcome of the conflict is still in doubt and the immediate impact has been to annihilate both combatants militarily and economically. A protracted conflict poses considerable danger especially for the Iraqi regime which enjoys very little genuine popular support. If the war is lost or the present war of attrition continues unabated, the political future of Hussein's regime may be seriously jeopardized. A victory for Iraq seems so far to have been rather elusive.

Economically, the war has dealt serious blows to the Iraqi development efforts. Many industrial facilities have sustained significant damages that would require time, effort, and resources to rectify. Also, the country is diverting considerable resources to the army and in the future the rebuilding of the armed forces may prove difficult, time consuming, and very expensive. Furthermore, the cessation of trade including oil exports via the Gulf resulted both in significant reduction in oil revenues and logistic difficulties as Iraqi imports had to rely on land routes and foreign ports, especially the Jordian Aqabe Port on the Red Sea. To some extent, the revenue problem is intigated by the recent hike in oil prices and the financial aid Iraq received from her Arab neighbors, particularly from Saudi Arabia and Kuwait.

As we indicated earlier, prior to the war, Iraq was intent on increasing her oil production capabilities to finance, among other things her economic development efforts, but with the war, this will take even longer to achi

and would undoubtedly delay the completion of planned projects.

The long term effects of the war are especially worrisome. It appears that short of the installation of a government in Iraq that enjoys the support of Tehran, no matter who comes eventually to power in Iran, Iran would strike at Iraq whenever the Iranians consider the cirsumstances propitious. In other words, it is unlikely that the Iraqi decision to attack Iran would soon be forgotten in Tehran regardless of who eventually maintains power in Iran. This undoubtedly is bound to increase weapons acquisition and military preparedness throughout the region, thus heightening the degree of tension and political instability.

Conclusion

If capital absorptive capacity is defined as that volume of investment or rate of capital formation relative to GDP, that could be achieved at competitive rates of return, then it becomes quite evident that such capacity is indeed very constrained in Iraq. These absorptive capacity constraints mirror the state of underdevelopment or backwardness of the economy. But for policy analysis, such rigorous economic definition of capital absorptive capacity is unnecessary and misleading. We must, in order to understand prospective government oil policies, focus on what the government perceives its needs for foreign exchange will be regardless of how efficient or for that matter where these revenues are spent. On the domestic economic scene, capital absorptive capacity is primarily a function of time provided the government succeeds in gradually removing the critical constraints inhibiting greater capital absorption in the Iraqi economy such as infrastructural bottlenecks, the upgrading of human resources and enhancing its own management capabilities. We are however not optimistic regarding the possibility of speedy and assured success. The reason for this assessment lies in the rigidity and divisive character of the political system which lacks broad popular support and appeal. This should by itself not lessen the need for additional financial resources. On the contrary, the current political system may need greater financial resources for cooperation and for further Arab and foreign adventures that could possibly divert domestic pressures toward the outside thereby increasing the security of the regime. We conclude that absorptive capacity should pose no problem as far as expansion of oil production is concerned both in the short run as well as the long term.

We have stressed that the nature of the political system, its domestic regional and international objectives are extremely important in assessing the country's needs for financial resources derived from the production and export of crude oil. The Iranian Revolution has conspiciously shown the truth of this conclusion. An ambitious political regime with aims extending beyond its borders needs far more financial resources than an inward-looking system. Such a regime is also generally more susceptible to regional and global politics. Iraq's drive to increase its production of crude must be understood, as we indicated above, at least in part, as motivated by its quest for greater leverage within OPEC as well as internationally. Similarly, the recent moderation on the oil price issue must be interpreted within the broader framework of cooperation between Iraq and Saudi Arabia, a country that has consistently advocated restraint on the oil price issue. The close present Saudi Iraqi ties were not born overnight; they can be traced to the gradual but decisive shift of Iraqi policy westward since the settlement of the dispute with the IPC and the subsequent phenomenal increase in oil revenues in 1974 and thereafter. This development has freed the country economically thus permitting it to pursue a more independent course politically.

The desire to acquire Kuwaiti territory on the Gulf must be understood in these terms: The country needs to establish port facilities, which its present coastal line does not permit, to be able to expand its oil exports and to service its rapidly rising import trade. We have also concluded that both economic and political considerations, but especially the latter, speak for a continuation of Iraq's role as a moderate member of OPEC on price-related issues.

This discussion makes amply clear that Iraq would upon the cessation of the war move speedily to regain its production capacity of 3.7 million barrels per day and strive to expand this capacity to perhaps 5 to 6 million barrels per day by 1990.

Oil production will be on the rise for the next ten years, if only to finance the development projects and also to recover from the costly war with Iran. Iraq also has long been working to increase its production levels, and this is made even more pressing at the present. This is conditional on the willingness of the West and particularly the United States to help Iraq with the technology to increase its sustainable oil production capacity. On the pricing front, Iraq will be expected to keep a moderate stand within OPEC for primarily political and to a minor extent economic reasons. Politically, Iraq will probably attempt to harmonize its position with that of its major ally, Saudi Arabia. Economically, it considers itself a high reserves country for which excessive prices in the short run may not serve its long-term interest of maximizing the return to its oil resources. In other words, Iraq may well be like Saudi Arabia in its concern for the outside world. It is more likely however that Iraq will stop short of accumulating substantial financial reserves in the West and instead opt for increasing its domestic and regional investments. Its long-term pricing policy will continue to be dictated primarily by market conditions as well as prevailing political considerations.

FOOTNOTES

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[17] Government of Iraq, Ministry of Oil, Oil of Iraq: Facts and Lights on the Issues of Royalty Expensing and Levels of Production (Baghdad, Iraq: Ministry of Oil, 1970), p. 43. (In Arabic.)

[18] M. S. Al-Otaiba, OPEC and the Petroleum Industry (New York, John Wiley and Son, Inc., 1975), pp. 116-228.

[19] Albert O. Hirschman, The Strategy of Economic Development (New York: W. W. Norton and Co., Inc., 1978), p. 100.

[20] Ibid., p. 106.

[21] Charles Issawi and M. Yegandh, op. cit., p. 79. W. G. Harriss, "The Impact of the Petroleum Industry on the Pattern of Venezuelan Economic Development" in Raymond F. Mikesell, op. cit., p. 142.

[22] ID = Iraqi Dinar.

[23] It is worth mentioning here that due to severe annual fluctuations in agricultural production, any presentation of trends is likely to be misleading. For example, the 6.4 percent growth rate for agriculture will prove to be high if compared with a growth rate calculated on the basis of a moving average rather than end-of-year basis.

[24] Hashim, 1975, op. cit., p. 16.

[25] Edith Penrose and E. F. Penrose, Iraq: International Relations and National Development (Boulder, Colorado: Westview Press, 1978), p. 454.

[26]Ibid., p. 453.

[27]Ibid., p. 455.

[28]1 meshara = approximately 1 donum.

[29]Edith Penrose and E. F. Penrose, op. cit., p. 458.

[30]Hashim, et. al., Evaluation of Economic Development in Iraq, 1950-1970 vol. 1, "The Experience of Planning" (Baghdad, Iraq: Ministry of Planning, 1970), p. 219. (In Arabic.)

[31]United States, Bureau of the Census, Statistical Abstracts of the United States (Washington, D.C.: United States Department of Commerce, 1978), p. 398.

[32]Ibid., p. 398.

[33]Notice the discrepency between the data for 1977 in table which is an estimate and table which is a result of the 1977 census. For example, the estimate in table for the workforce in the agricultural sector is very upward biased while the estimate for the workforce in the service sector is very downward biased.

[34]World Bank, op. cit., p. 103.

[35]Government of Iraq, Ministry of Planning, Central Statistical Organization, Annual Abstract of Statistics, 1978, p. 35.

[36]Due to the increase in oil revenues and the needs of the Ordinary Budget, the portion of oil revenues allocated to economic development was reduced to 70 percent in 1952, and again to 50 percent in 1959.

[37]Hashim, Development Planning in Iraq: Historical Perspective and New Direction, op. cit., p. 50.

[38]Edith Penrose and E. F. Penrose, op. cit., p. 177.

[39]Ibid., p. 175.

[40]Hashim, Development Planning in Iraq: Historical Perspective and New Direction, op. cit., pp. 51-52.

[41]Ibid., p. 52.

[42]Ibid., p. 53.

[43]Central Bank of Iraq, Annual Report, 1965, p. 56.

[44]Ibid., p. 57.

[45]Abbas Alnasrawi, Financing Economic Development in Iraq: The Role of Oil in the Middle Eastern Economy (New York: Fredrick A. Praeger, 1967), p. 61.

[46]Hashim, Development Planning in Iraq: Historical Perspective and New Direction, op. cit., p. 57.

[47]Central Bank of Iraq, Annual Report, 1965, pp. 87-88.

[48]Hashim, Development Planning in Iraq: Historical Perspective and New Direction, op. cit., pp. 60-61.

[49]Ibid., p. 62.

[50]Ibid., pp. 64-65.

[51]Central Bank of Iraq, Bulletin, New Series, April-September 1975, p. 29.

[52]Government of Iraq, Ministry of Planning, National Development Plan for the Years 1976-1980 (Baghdad, Iraq: Ministry of Planning, 1977).

[53]Ibid., p. 97.

[54]Asharq Al-Awsat (London), November 27, 1981 and December 5, 1981 (in Arabic).

[55]Hashim, Development Planning in Iraq: Historical Perspective and New Direction, op. cit., p. 73.

[56]Edith Penrose and E. F. Penrose, op. cit., p. 479.

[57]Misshen Kadhim, The Strategy of Economic Development Planning and the Absorptive Capacity of the Economy: A Case Study of Iraq (Boulder, Colorado: University of Colorado, unpublished Ph.D. Thesis, 1974), p. 132.

[58]Ibid., p. 136.

[59]Hummadi, Economic Growth and Structural Changes in the Iraqi Economy with Emphasis on Agriculture, 1953-1975 (Boulder, Colorado: University of Colorado, unpublished Ph.D. Thesis, 1978).

APPENDIX

STATISTICAL TABLES

TABLE 1

Population of Iraq 1/: 1927-1977
(1000 persons)

Year	Male	Female	Total
1927	1,512	1,456	2,968
1934	1,688	1,692	3,380
1947	2,257	2,559	4,816
1957	3,155	3,144	6,299
1965	4,102	3,945	8,047
1977	6,183	5,817	12,000

1/ Excluding Iraqis abroad.

Source: Central Statistical Organization (C.S.O.), 1978, Annual Abstracts of Statistics, p. 25.

Table 2 .

Urban and Rural Populations for the Period 1947-77
(1,000 persons)

Year	Urban	Rural	Total	% Urban	% Rura
1947	1,733.8	3,082.4	4,816.2	36.0	64.0
1957	2,445.2	3,853.8	6,299.0	38.8	61.2
1965	4,111.8	3,935.6	8,047.4	51.1	48.9
1977	7,646.1	4,354.4	12,000.5	63.7	36.3

Source: C.S.O., 1972, Statistical Pocket Book, for the Years 1947, 1957, 1965, p. 31; C.S.O., 1978, Annual Abstract of Statistics, for 1977, p. 27.

Table 3

Estimate of the Sectoral Distribution of the Labor Force
(1,000 persons)

Year	Agri-culture	Mining and Quarrying	Manu-facturing	Electricity, Water and Gas	Construction
1960	733.9	11.0	99.4	11.8	58.0
1961	780.5	11.5	103.4	11.9	58.0
1962	827.0	12.0	107.0	12.0	50.0
1963	873.5	12.5	111.9	12.0	43.1
1964	920.1	13.0	115.3	12.0	47.2
1965	1,009.6	13.5	121.4	12.2	61.0
1966	1,103.1	14.0	123.2	12.4	70.0
1967	1,177.4	14.5	134.9	12.6	59.1
1968	1,253.6	15.0	136.3	12.8	66.0
1969	1,306.4	15.5	144.6	12.9	67.0
1970	1,385.7	16.0	156.8	13.0	67.0
1971	1,434.7	16.5	169.0	13.4	69.0
1972	1,486.2	17.5	191.3	13.9	71.0
1973	1,540.4	18.5	204.1	14.3	73.0
1974	1,596.6	19.2	212.0	14.6	75.0
1975	1,654.4	20.0	220.9	15.0	77.0
1976	1,745.4	20.8	232.8	15.3	79.0
1977	1,841.4	21.7	272.9	16.5	81.0

Table 3 (continued)

Year	Wholesale & Retail Trade	Transport, Communication & Storage	Services	Unemployed	Total
1960	100.0	110.0	445.0	31.4	1,600.5
1961	105.0	114.0	460.0	63.6	1,707.9
1962	110.0	117.0	470.0	109.8	1,814.8
1963	115.0	121.0	480.0	154.1	1,923.1
1964	120.0	125.0	485.0	192.3	2,029.9
1965	125.0	129.0	500.0	162.7	2,134.4
1966	130.0	133.0	505.0	142.8	2,233.5
1967	135.0	137.0	525.0	154.1	2,349.6
1968	140.0	140.0	550.0	134.7	2,448.4
1969	145.0	143.0	565.0	158.7	2,558.1
1970	150.0	150.0	575.0	158.2	2,671.7
1971	155.0	154.0	590.0	166.5	2,768.1
1972	160.0	158.0	605.0	181.4	2,884.3
1973	164.0	162.0	620.0	200.1	2,996.4
1974	167.0	166.0	635.0	218.9	3,104.3
1975	170.0	170.0	650.0	240.1	3,217.4
1976	176.0	175.0	666.3	257.5	3,368.1
1977	182.2	180.1	683.0	293.8	3,572.6

Source: Republic of Iraq, Ministry of Planning, Manpower Planning Section, written communication.

Table 4

Distribution of Economically Active Population, Age 10 Years Over (1977)

Sector	Male	Female	Total
Agriculture	589,623	352,454	942,077
Mining & Quarrying	34,691	2,112	36,803
Manufacturing	234,936	48,361	283,297
Electricity, Water & Gas	22,241	947	23,188
Construction	315,914	5,128	321,042
Wholesale & Retail Trade	207,707	16,148	223,855
Transport, Communication and Storage	172,759	4,983	177,742
Services 1/	897,467	91,118	988,585
Unknown	46,110	11,925	58,035
Unemployed	64,278	10,447	74,725
Total	2,585,726	543,623	3,129,349
Total Population 10 Years and Over	3,945,268	3,727,542	7,672,810
Labor Participation Rate	65.54%	14.58%	40,78%

1/ Services include finance, insurance, real estate, and business, community, social, and personal services.

Source: C.S.O., 1978, Annual Abstract of Statistics, Table (2/4) pp. 28-29, and Table (2/9), pp. 36-39.

Table 5

GDP by Sectors, at Current Prices
(million Iraqi Dinars)

Year	Agriculture	Mining & Quarrying	Manufacturing	Construction
1960	97.8	209.0	54.4	23.1
1961	117.0	211.2	59.5	23.9
1962	140.4	212.1	65.1	19.5
1963	109.3	244.4	64.2	20.3
1964	133.3	275.1	63.7	26.7
1965	153.2	285.9	69.4	30.5
1966	163.4	304.2	74.7	34.5
1967	187.8	270.6	83.4	32.8
1968	196.0	341.0	94.6	36.8
1969	191.0	343.2	103.0	38.5
1970	206.9	370.5	116.0	40.6
1971	212.5	512.9	118.5	43.6
1972	269.4	407.3	140.0	45.2
1973	225.9	574.3	157.6	57.6
1974	232.1	2,030.7	176.1	69.1
1975	297.3	2,287.7	238.5	91.3
1976	348.7	2,475.1	324.5	355.1
1977	373.9	3,133.2	389.4	426.2

1/ Distribution sectors include: Transport, communication, and storage sector, wholesale & retail trade sector, and banking, insurance and real estate agents sector.

2/ Services sectors include: Ownership of dwellings sectors, public administration and defence sector, and services sector.

Table 5 (continued)

Year	Electricity, Water and Gas	Total Commodity Sectors	Distribution Sectors 1/	Services Sectors 2/	Total GDP
1960	3.6	388.7	81.0	95.7	565.4
1961	5.0	416.6	93.6	105.0	615.2
1962	5.5	442.7	97.0	118.7	658.4
1963	5.2	443.4	97.5	129.7	670.6
1964	11.1	509.9	115.6	168.2	793.7
1965	12.0	551.0	137.5	179.1	867.6
1966	12.6	589.4	150.3	198.3	938.0
1967	12.8	587.4	156.0	198.5	941.9
1968	14.9	683.3	165.8	217.9	1,067.0
1969	16.8	692.5	174.7	242.5	1,109.7
1970	17.8	751.8	188.4	262.2	1,202.4
1971	11.9	899.4	194.7	280.9	1,375.0
1972	13.7	875.6	208.5	304.7	1,388.8
1973	16.0	1,031.4	224.2	331.9	1,587.5
1974	13.7	2,521.7	337.2	488.8	3,347.7
1975	17.7	2,932.5	412.7	625.3	3,970.5
1976	22.5	3,525.9	504.5	552.4	4,582.8
1977	29.2	4,351.9	596.8	644.7	5,593.4

Source: C.S.O. Special Fund Project, Table 4, for the years 1960-63; C.S.O., National Income in Iraq for the years 1964-71, 1963, pp. 31-32, for the years 1964-70; C.S.O., Annual Abstract of Statistics, 1976, p. 178, for the years 1971-75, and C.S.O., Department of National Accounts, for the years 1976-77.

Table 6

GDP by Sectors at Constant 1969 Prices
(million Iraqi Dinars)

Year	Agriculture	Mining & Quarrying	Manufacturing	Construction
1960	108.3	232.1	60.2	25.5
1961	132.8	239.7	67.5	27.1
1962	156.9	237.4	72.8	22.0
1963	118.3	264.6	69.5	22.0
1964	144.0	282.3	66.4	31.6
1965	162.7	293.3	72.7	35.7
1966	161.9	312.2	77.5	38.9
1967	174.8	275.3	85.4	35.3
1968	192.6	341.2	95.6	38.4
1969	191.0	343.2	103.0	38.5
1970	190.6	360.0	110.6	39.2
1971	179.7	382.7	122.5	40.0
1972	228.6	333.0	132.6	42.3
1973	180.5	457.8	143.5	51.1
1974	166.0	443.4	153.7	52.7
1975	163.5	515.4	182.4	69.2
1976	172.5	557.6	208.5	226.1
1977	171.0	688.4	276.5	299.9

Table 6 (continued)

Year	Electricity, Water and Gas	Total Commodity Sectors	Distribution Sectors 1/	Services Sectors 2/	Total GDP
1960	4.0	430.1	89.6	105.9	625.6
1961	5.6	472.7	106.2	119.1	698.0
1962	6.2	495.3	108.5	132.9	736.7
1963	5.6	480.0	105.6	140.4	726.0
1964	11.1	535.4	122.0	178.3	835.7
1965	12.0	576.4	148.3	189.9	914.6
1966	12.6	603.1	161.6	201.1	965.8
1967	12.8	583.6	159.7	209.0	952.3
1968	14.9	682.7	170.9	224.2	1,077.8
1969	16.8	692.5	174.7	242.5	1,109.7
1970	17.8	718.2	180.6	256.3	1,155.1
1971	11.9	736.8	181.5	273.6	1,191.9
1972	13.7	750.2	183.5	296.8	1,230.5
1973	16.0	848.9	187.9	323.2	1,360.0
1974	18.6	834.4	258.4	406.3	1,499.1
1975	23.4	953.9	302.7	517.9	1,774.5
1976	25.0	1,189.7	338.4	418.8	1,946.9
1977	35.8	1,471.6	368.2	490.9	2,330.7

Source: C.S.O. Special Fund Project, Table 6, in 1966 prices, adjusted to 1969 prices for 1960-63; C.S.O., National Income in Iraq for the years 1964-71, 1973, Table 2 in 1964 prices adjusted to 1969 prices, for the years 1964-70; C.S.O., Annual Abstract of Statistics, 1976, Table (6/5), p. 179, for the years 1971-75; Table A5.6 for the years 1976-77 adjusted for 1969 constant prices.

Table 7

Index Numbers for Total Production, Net Cultivated Area, and Average Yield per Meshara for all Crops (1975=100)

Year	Production	Cultivated Area	Average Yield Per Meshara 1/
1961	82.1	91.6	89.6
1962	94.9	103.7	91.5
1963	82.7	110.2	75.0
1964	99.8	104.7	95.3
1965	112.3	108.2	103.8
1966	107.1	108.7	98.6
1967	129.9	118.5	109.6
1968	145.9	131.0	111.4
1969	132.2	127.5	103.7
1970	128.2	123.9	103.5
1971	127.0	79.5	159.7
1972	181.8	134.3	135.4
1973	112.7	87.7	128.5
1974	114.7	106.5	107.7
1975	100.0	100.0	100.0
1976	132.1	106.5	124.0
1977	117.0	78.4	149.2
1978	124.8	121.2	103.0

1/ 1 meshara = approximately 1 donum = 0.612 acre

Table 8

Index Numbers for GDP Sectors at Constant 1969 Prices
(1960=100)

Year	Agriculture	Mining & Quarrying	Manufacturing	Construction
1960	100.0	100.0	100.0	100.0
1961	122.6	103.3	112.1	106.3
1962	144.9	102.3	120.9	86.3
1963	109.2	114.0	115.4	86.3
1964	133.0	121.6	110.3	123.9
1965	150.2	126.4	120.8	140.0
1966	149.5	134.5	128.7	152.5
1967	161.4	118.6	141.9	138.4
1968	177.8	147.0	158.8	150.6
1969	176.4	147.9	171.1	151.0
1970	176.0	155.1	183.7	153.7
1971	165.9	164.9	203.5	156.9
1972	211.1	143.5	220.3	165.9
1973	166.7	197.2	238.4	200.4
1974	153.3	191.0	255.3	206.7
1975	151.0	222.1	303.0	271.4
1976	159.3	240.2	346.3	886.7
1977	157.9	296.6	459.3	1,172.5

Table 8 (continued)

Year	Electricity Water & Gas	Commodity Sectors	Distribution Sectors	Services Sectors	Total GDP
1960	100.0	100.0	100.0	100.0	100.0
1961	140.0	109.9	118.5	112.5	111.6
1962	155.0	115.2	121.1	125.5	117.8
1963	140.0	111.6	117.9	132.6	116.0
1964	277.5	124.5	136.2	168.4	133.6
1965	300.0	134.0	165.5	179.3	146.2
1966	315.0	140.2	180.4	189.9	154.4
1967	320.0	135.7	178.2	197.4	152.2
1968	372.5	158.7	190.7	211.7	172.3
1969	420.0	161.0	195.0	229.0	177.4
1970	445.0	167.0	201.6	242.0	184.6
1971	297.5	171.3	202.6	258.4	190.5
1972	342.5	174.4	204.8	280.3	196.7
1973	400.0	197.4	209.7	305.2	217.4
1974	465.0	194.0	288.4	383.7	239.6
1975	585.0	221.8	337.8	489.0	283.6
1976	625.0	276.6	377.7	395.5	311.2
1977	895.0	342.2	410.9	463.6	372.6

Source: Table A5.6.

Table 9

GDP, Non-Oil GDP, and Non-Oil Commodity Sectors and Index at Constant 1969 Prices (million Iraqi Dinars) (1960=100)

Year	Non-Oil Commodity Sectors	Index	Non-Oil GDP	Index	Total GDP	Index
1960	198	100.0	393.5	100.0	625.6	100.0
1961	233	117.7	458.3	116.5	698.0	111.6
1962	257.9	130.3	499.3	126.9	736.7	117.8
1963	215.4	108.8	461.4	117.3	726.0	116.0
1964	253.1	127.8	553.4	140.6	835.7	133.6
1965	283.1	143.0	621.3	157.9	914.6	146.2
1966	290.9	146.9	653.6	166.1	965.8	154.4
1967	308.3	155.7	677.0	172.0	952.3	152.2
1968	341.5	172.5	736.6	187.2	1,077.8	172.3
1969	349.3	176.4	766.5	194.8	1,109.7	177.4
1970	358.2	180.9	791.1	201.0	1,155.1	184.6
1971	354.1	178.8	809.2	205.6	1,191.9	190.5
1972	417.2	210.7	897.5	228.1	1,230.5	196.7
1973	391.1	197.5	902.2	229.3	1,360.0	217.4
1974	391.0	197.5	1,055.7	268.3	1,499.1	239.6
1975	438.5	221.5	1,259.1	320.0	1,774.5	283.6
1976	632.1	319.2	1,389.3	353.1	1,946.9	311.2
1977	783.2	395.6	1,642.3	417.4	2,330.7	372.6

Source: Table A5.6

Table 10

Distribution of Manufacturing Sector GDP Between Public and Private Sectors for the Period 1964-77 in Constant 1969 Prices (million Iraqi Dinars)

Year	Public Sector	Private Sector	Total
1964	21.7	44.9	66.4
1965	27.4	45.3	72.7
1966	30.8	46.7	77.5
1967	31.7	53.7	85.4
1968	39.7	55.9	95.6
1969	40.3	62.7	103.0
1970	48.2	62.4	110.6
1975	101.8	80.6	182.4
1976	106.5	102.0	208.5
1977	152.4	124.1	276.5

Source: C.S.O., 1973, National Income in Iraq for the years 1964-71, Table (4) pp. 36-43, for the years 1964-70; and C.S.O., Dept. of National Accounts for the years 1975-77. All figures adjusted for constant 1969 prices.

Table 11

Production of Crude Oil in Iraq (1960-1977)
(thousand barrels)

Year	Average Daily	Annual Total
1960	953	347,915
1961	984	359,339
1962	987	360,381
1963	1,162	424,090
1964	1,255	459,403
1965	1,313	479,099
1966	1,392	508,141
1967	1,228	448,239
1968	1,503	550,208
1969	1,521	555,241
1970	1,546	564,308
1971	1,694	618,375
1972	1,470	536,502
1973	2,018	736,588
1974	1,976	719,275
1975	2,262	825,533
1976	2,422	884,030
1977	2,348	857,020
1978	2,562	935,130
1979	3,477	1,269,105
1980	2,646	965,790

Source: C.S.O., 1972, Statistical Pocket Book 1960-1970, for the years 1960-62, p. 145; C.S.O., 1974, Statistical Pocket Book 1974, for the years 1963-64, p. 63; C.S.O., 1977, Annual Statistical Abstracts 1976, for the years 1965-76, p. 171; Petroleum Economist, January 1979, for the years 1977-1980 OPEC Annual Report 1980

Table 12

Oil Revenues of Iraq (1960-1977)
(millions of dollars)

Year	Current Prices	Constant 1969 Price
1960	266	294
1961	265	301
1962	266	298
1963	308	333
1964	353	362
1965	375	385
1966	394	404
1967	362	368
1968	476	476
1969	483	483
1970	521	506
1971	840	627
1972	575	470
1973	1,843	1,469
1974	5,700	1,245
1975	7,500	1,690
1976	8,500	1,915
1977	9,600	2,109
1978	9,800	

Source: OPEC, Annual Statistical Bulletin 1976 and 1978, Table 01) for the years 1960-75; Petroleum Economist, July 1978, p. 285, for the period 1976-77. Oil revenues at constant 1969 prices were obtained by adjusting oil revenues at current prices using the implicit price deflator of the mining and quarrying GDP.

Table 13.

Index of Oil Production and Revenues at Current Prices
(1960-100)

Year	Oil Production	Oil Revenues
1960	100.0	100.0
1961	103.3	99.6
1962	103.6	100.0
1963	121.9	115.8
1964	132.0	132.7
1965	137.7	141.0
1966	146.1	148.1
1967	128.8	136.1
1968	158.1	178.9
1969	159.6	181.6
1970	162.2	195.9
1971	177.7	315.8
1972	154.2	216.2
1973	211.7	692.9
1974	206.7	2,142.9
1975	237.3	2,819.5
1976	254.1	3,195.5
1977	246.3	3,609.0
1978	268.8	3,684.2
1979	364.8	-
1980	277.6	-

Source: Tables A5.11 and A5.12.

Table 14

Iraqi Crude Oil Transactions, Retained Value, and Other Exports for the Years 1969-75
(million Iraqi Dinars)

	1969	1970	1971	1972	1973	1974	1975
Transaction of Oil Section							
Exports and Re-exports (f.o.b.)	347.4	367.7	526.2	331.0	625.5	1943.0	1820.0
Imports (c.i.f.)	- 1.3	- 2.2	- 2.6	- 1.3	- 7.3	- 8.2	- 7.6
Investment income	-160.9	-171.5	-221.2	-142.3	-97.2	-283.6	-163.7
Employees remittances	- 0.2	- 0.1	- 0.2	- 0.1	--	--	--
Capital movements (including oil producing companies) and (net errors and omissions)	0.2	5.5	-43.8	18.7	7.6	-182.0	--
Foreign Exchange Receipts (net)	185.2	199.4	258.4	206.0	528.6	1469.2	1648.7
(Iraqi Govt. share of profits)	(160.9)	(172.7)	(270.3)	(251.6)	(519.3)	(1589.9)	(1965.0)
(Expenditures in Iraq)	(17.7)	(16.3)	(30.8)	(12.3)	(9.3)	(9.8)	(1.7)
(Net credit from IPC)	(6.6)	(10.4)	(-42.7)	(-57.9)	--	(-130.5)	(-3.0)
Ratio of Retained value to Exports and Re-exports (f.o.b.)	53%	54%	49%	62%	85%	76%	91%
Other Exports and Re-exports (f.o.b.)	25.9	24.7	23.2	30.9	32.8	34.4	42.8
Total Exports and Re-exports (f.o.b.)	373.3	392.4	549.4	361.9	658.3	1977.4	1862.8
Ratio of Oil Exports and Re-exports to Total Exports and Re-export	93%	94%	96%	91%	95%	98%	98%

urce: Central Bank of Iraq Bulletin, April-September 1975, Table (38), p. 71 for the years 1969-70; and April-June, 1977, Table (38), pp. 70-71, for the years 1972-75.

Table 15

Investment Allocations of the Development Plans for the Period 1951/52-1960/61
(million Iraqi Dinars)

Sector	First Plan 1951/52-1956/57 Allocation	Percent	Second Plan 1955/56-1960/61 Allocation	Percent
Agriculture	53.4	34.4	168.1	33.6
Industry	31.0	19.9	67.1	13.4
Transport & Communication	26.8	17.2	124.4	24.9
Building & Housing	18.0	11.6	123.2	24.6
Other Activities	26.2	16.9	17.3	3.5
Total	155.4	100.0	500.1	100.0

Source: Hashim, J., 1975, Development Planning in Iraq, Historical Perspective and New Directions, Table 1, p. 51.

Table . 16 .

Investment Allocations of the Provisional
Economic Plan (1959/60-1962/63)
(million Iraqi Dinars)

Sector	Allocation	Percent
Agriculture	47.9	12.2
Industry	48.7	12.4
Transport & Communications	100.8	25.7
Housing & Summer Resorts	76.4	19.5
Public Buildings	50.5	12.9
Public Health	24.6	6.3
Public Culture	39.2	10.0
Miscellaneous Projects	4.0	1.0
Total	392.1	100.0

Source: Alnasrawi, A., 1967, Financing Economic Development in Iraq, the Role of Oil in a Middle Eastern Economy: New York, Fredrich A. Praeger.

Table 17

Investment Allocations of the Detailed Economic Plan (1961/62-1965/66) (million Iraqi Dinars)

Sector	Allocation	Percent
Agriculture	112.9	20.3
Industry	166.8	30.0
Transport & Communication	136.5	24.5
Buildings & Housing	140.1	25.2
Total	556.3	100.0

Source: Central Bank of Iraq, 1963, Annual Report, Table (45), p. 208.

Table 18

Investment Allocations of the Five-Year Economic Plan
(1965/66-1969/70)
(million Iraqi Dinars)

Sector	Allocation	Percent
Agriculture	157	19.1
Industry	215	26.2
Transport and Communication	119	14.5
Building, Housing & Social Services	263.53	32.1
Trade and Services	4.00	0.5
International Liabilities and Debts	25.00	3.0
Planning, Statistics, and Follow-up	2.47	0.3
Productive Projects of the Ministry of Defense	35.00	4.3
Total	821.00	100.0

Source: Central Bank of Iraq, 1965, Annual Report, Table (50) p. 283.

Table 19

Investment Allocations of the National Development Plan
(1969-1974)
(million Iraqi Dinars)

Sector	Allocation	Percent
Agriculture	211.00	19.7
Industry	212.55	19.8
Mining & Quarrying	154.55	14.4
Electricity	26.90	2.5
Transport & Communications	149.29	13.9
Trade & Banking	32.50	3.0
Housing	160.25	15.0
Services	111.75	10.4
Other Activities	13.60	1.3
Total	1,072.39	100.0

Source: Hashim, 1975, Table 5, p. 67.

Table .20

Allocations of the Investment Program (1975)
(million Iraqi Dinars)

Sector	Allocation	Percent
Agriculture	207.500	19.3
Industry	448.000	41.6
Transport & Communications	166.000	15.4
Construction & Social Services	188.000	17.5
Planning & Follow-up	6.274	0.6
Loans to Government	9.650	0.9
International Obligations	8.600	0.8
Other Investment Expenditures	41.976	3.9
	1,076.000	100.0

Source: Central Bank of Iraq, Bulletin, 1975, p. 28.

Table 21

Sectoral Allocations, Actual Expenditures, and Rates of Financial Execution in the Central Governmental Sector (1951-1977)
(million Iraqi Dinars)

	Agriculture			Industry		
Year	Allocations	Actual Expenditures	Financial Execution %	Allocations	Actual Expenditures	Financial Execution %
1951	3.5	1.0	28.6	--	--	--
1952	8.6	2.8	32.6	3.0	0.1	3.3
1953	13.1	6.2	47.3	5.0	0.5	10.0
1954	14.5	9.7	66.9	6.0	2.0	33.3
1955	15.2	12.7	83.6	4.1	2.9	70.7
1956	28.7	13.3	46.3	17.0	5.0	29.4
1957	31.1	14.1	45.3	16.0	8.6	53.8
1958	30.7	13.3	43.3	11.0	11.9	108.2
1959	47.3	10.8	22.8	18.8	4.9	26.1
1951-59	192.7	83.9	43.5	80.9	35.9	44.4
1960	18.1	10.8	59.7	12.6	5.7	45.2
1961	31.2	11.3	36.2	24.9	7.2	28.9
1962	20.2	6.3	31.2	24.7	10.3	41.7
1963	22.8	4.5	19.7	39.6	9.5	24.0
1964	27.7	6.7	24.2	43.0	16.5	38.4
1965	25.1	6.0	23.9	32.1	15.1	47.0
1966	29.6	8.5	28.7	42.6	29.3	68.8
1967	29.7	11.0	37.0	39.8	23.7	59.5
1968	40.0	13.2	33.0	39.5	18.2	46.1
1969	22.0	17.5	79.5	21.0	17.6	83.8
1960-69	266.4	95.8	36.0	319.8	153.1	47.9
1970	28.0	14.0	50.0	28.0	21.1	75.4
1971	60.0	49.3	82.2	50.0	35.9	71.8
1972	23.3	29.3	125.8	28.0	22.2	79.3
1973	65.0	37.8	58.2	60.0	66.4	110.7
1974	190.0	78.0	41.1	225.0	184.1	81.8
1975	207.5	99.9	48.1	448.0	290.5	64.8
1976	268.0	140.8	52.5	709.0	465.8	65.7
1977	389.9	202.7	52.0	966.0	526.9	54.5
1970-77	1,231.7	651.8	52.9	2,514.0	1,612.9	64.2

	Transport & Communications			Construction and Social Services		
Year	Allocations	Actual Expenditure	Financial Execution %	Allocation	Actual Expenditure	Financial Execution %
1951	2.6	0.9	34.6	3.0	1.1	36.7
1952	4.8	2.3	47.9	3.7	2.4	64.9
1953	5.4	2.2	40.7	4.3	3.1	72.1
1954	6.0	4.9	81.7	4.5	3.9	86.7
1955	16.1	9.9	61.5	8.2	5.8	70.7
1956	20.3	11.1	54.7	15.3	13.0	85.0
1957	29.3	14.2	48.5	24.4	19.9	81.6
1958	34.2	9.6	28.1	22.9	16.7	72.9
1959	44.6	13.7	30.7	52.5	20.2	38.7
1951-59	163.3	68.8	42.1	138.8	86.2	62.1
1960	36.2	8.1	22.4	70.0	23.0	32.9
1961	51.1	14.2	27.8	89.6	34.0	37.9
1962	32.4	15.8	48.8	30.8	26.4	85.7
1963	29.8	18.3	61.4	25.5	21.2	83.1
1964	27.9	18.9	67.7	24.0	30.6	127.5
1965	26.6	12.4	46.6	29.6	16.2	54.7
1966	23.6	15.1	64.0	23.8	12.0	50.4
1967	21.0	13.6	64.8	22.7	13.3	58.6
1968	20.7	9.9	47.8	23.5	13.0	55.3
1969	12.0	10.1	84.2	15.0	11.8	78.7
1960-69	281.3	136.4	48.5	354.5	201.5	56.8
1970	15.2	7.4	48.7	13.0	9.9	76.2
1971	28.0	17.0	60.7	28.0	17.6	62.9
1972	16.0	19.9	124.4	22.0	16.7	75.9
1973	40.0	27.6	69.0	45.0	36.5	81.1
1974	120.0	105.6	88.0	175.0	90.6	51.8
1975	166.0	138.0	83.1	188.0	101.1	53.8
1976	242.5	160.5	66.2	213.2	118.1	55.4
1977	351.6	193.5	55.0	288.2	127.1	44.1
1970-77	979.3	669.5	68.4	972.4	517.6	53.2

Table 21 (continued)

Year	Total: Allocation	Total: Actual Expenditure	Total: Financial Execution %
1951	9.1	3.0	33.0
1952	20.1	7.6	37.8
1953	27.8	12.0	43.2
1954	31.0	20.5	66.1
1955	43.6	31.3	71.8
1956	81.3	42.4	52.2
1957	100.8	56.8	56.3
1958	98.8	51.5	52.1
1959	163.2	49.7	30.5
1951-59	575.7	274.8	47.7
1960	136.9	47.6	34.8
1961	196.8	66.7	33.9
1962	108.1	58.8	54.4
1963	117.7	53.5	45.5
1964	122.6	72.7	59.3
1965	113.4	49.7	43.8
1966	119.6	64.9	54.3
1967	113.2	61.6	54.4
1968	123.7	54.3	43.9
1969	70.0	57.0	81.4
1960-69	1,222.0	586.8	48.0
1970	84.2	52.4	62.2
1971	166.0	119.8	72.2
1972	89.3	88.1	98.7
1973	210.0	168.3	80.1
1974	710.0	458.3	64.5
1975	1,009.2	629.2	62.3
1976	1,432.7	885.2	61.8
1977	1,995.7	1,050.2	52.6
1970-77	5,697.1	3,451.5	60.6

Source: Hashim, 1975, pp. 75-80 for the years 1951-69; Economic Department, Ministr, of Planning, 1979, for the years 1970-77.

TABLE 22

IRAQI OIL PRICES
(U.S. dollars)

Date	Iraq Basrah 35	Iraq Kirkuk 34
August 1970	1.720	2.210
June 1971	2.259	2.210
January 1972	2.451	3.402[a]
August 1973	3.031	4.223
January 1974	11.672	N.A.
October 1975	12.400	11.740[b]
July 1977	12.600[b]	11.740[b]
July 1978	12.600[c]	12.820[c]
October 1979	19.960[c]	12.820[c]
May 1980	29.960[c]	31.390[c]
June 1981	36.710[b]	36.930[b]

[a] Additional changes made in intervening periods.

[b] Official selling price.

[c] *Petroleum Intelligence Weekly* estimate.

Source: *Petroleum Intelligence Weekly*, various issues.

[42]Ibid., p. 53.

[43]Central Bank of Iraq, Annual Report, 1965, p. 56.

[44]Ibid., p. 57.

[45]Abbas Alnasrawi, Financing Economic Development in Iraq: The Role of Oil in the Middle Eastern Economy (New York: Fredrick A. Praeger, 1967), p. 61.

[46]Hashim, Development Planning in Iraq: Historical Perspective and New Direction, op. cit., p. 57.

[47]Central Bank of Iraq, Annual Report, 1965, pp. 87-88.

[48]Hashim, Development Planning in Iraq: Historical Perspective and New Direction, op. cit., pp. 60-61.

[49]Ibid., p. 62.

[50]Ibid., pp. 64-65.

[51]Central Bank of Iraq, Bulletin, New Series, April-September 1975, p. 29.

[52]Government of Iraq, Ministry of Planning, National Development Plan for the Years 1976-1980 (Baghdad, Iraq: Ministry of Planning, 1977).

[53]Ibid., p. 97.

[54]Hashim, Development Planning in Iraq: Historical Perspective and New Direction, op. cit., p. 73.

[55]Edith Penrose and E. F. Penrose, op. cit., p. 479.

[56]Misshen Kadhim, The Strategy of Economic Development Planning and the Absorptive Capacity of the Economy: A Case Study of Iraq (Boulder, Colorado: University of Colorado, unpublished Ph.D. Thesis, 1974), p. 132.

[57]Ibid., p. 136.

[58]Hummadi, Economic Growth and Structural Changes in the Iraqi Economy with Emphasis on Agriculture, 1953-1975 (Boulder, Colorado: University of Colorado, unpublished Ph.D. Thesis, 1978).

ECONOMETRIC MODEL: IRAQ

I. Introduction

The Iraqi government has chosen to attempt to fulfill the ambitious targets set in the five year plan (1980-1985) despite the disruptions resulting from war with Iran. The plan calls for high levels of government spending for social overhead capital, human resource development, industrialization, and development of natural resources. A major goal of that plan is diversification which would permit the Iraqis to exploit their potential in agriculture, manufacturing, and minerals, in addition to petroleum.

If the Iraqis are to fulfill these ambitious goals it is imperative that they restore petroleum production and exports to generate the revenues needed to finance development projects. It is in this context that econometric modeling of absorptive capacity of the Iraqi economy is particularly relevant. Before the outbreak of war with Iran the Iraqis were producing levels of oil output and exports far beyond their needs for domestic economic development. Our work suggests that the amount of oil revenue required to finance development expenditures in the 1970s was about half of the actual revenue generated. The remainder was used to accumulate foreign assets, and to provide aid to other nations. In the 1980s the Iraqis have generated oil revenues far below that required to finance development expenditures. They have been forced to rely on borrowing from Kuwait and Saudi Arabia to finance development projects. Their objective is to restore oil production and exports to levels that will provide the foreign exchange needed to finance development expenditures. In this period, absorptive capacity will dictate the level of oil production and export in a way that it did not in the 1970s.

This analysis assumes that the Iraqis will be successful in lifting and marketing a level of oil commensurate with the absorptive capacity for domestic spending. We are aware of the obstacles to Iraqi success in this regard. At other points in this study we explore the prospects for success in the Iraqi goal to establish peace with Iran and to ease tensions with neighbors such as Syria. In this econometric analysis we assume that these preconditions are met and that Iraqi oil production and exports will be determined by their domestic absorptive capacity.

This portion of the study develops a macro-economic model of the absorptive capacity of the Iraqi economy. The model is based upon the Keynesian theory of aggregate demand, supply, and income determination. Using national income statistics for the period 1961-1977, a set of structural equations were estimated and combined with economic identities to constitute a simultaneous system. Then different scenarios were used to project the endogeneous variables over the forecast period 1978-1990. These scenarios were based upon different assumptions regarding exogenous variables as they affected absorptive capacity based upon an analysis of the five-year plan.

II. Data

As with any study involving macromodeling of developing countries, the paucity and reliability of data is a major constraint. Iraq is no exception in this regard. The Ministry of Planning and its Central Statistical Organization have only recently begun compiling data concerning the economy on the national level. Some of the data are inconsistent and others, such as employment figures, are only estimates.

One area in which data problems are particularly a problem is in the estimation production functions for the different sectors of the Iraqi economy. Estimates of employment by sector provided by the Ministry of Planning, Manpower Planning Section are probably subject to a wide range of error. Estimates of the capital stock by sector are nonexistent. We were forced to generate a capital stock series for each sector based upon rather unreliable historical time series for annual rates of capital formation extending back to 1941. Any data for the period prior to 1960 are subject to considerable margins of error.

Despite these data limitations we were able to fit Cobb-Douglas-type production functions to estimate output by sector in the Iraqi economy. The primary sources of data for the model were from official Iraqi publications. In addition to the Annual Abstract of Statistics published by the Central Statistical Organization we utilized data from the Ministry of Planning, the Central Bank of Iraq, and the Ministry of Finance. Other sources of information included the OPEC Annual Statistical Bulletin, Petroleum Economist, Oil and Gas Journal. For data on international transactions we relied on International Financial Statistics published by the International Monetary Fund. The data from World Tables, published by the World Bank, was used to supplement the data from official Iraqi publications.

In the final model there are a total of 42 variables--32 endogenous variables and 10 exogenous variables. A summary of these variables and their shorthand symbols is shown in table 1.

III. Specification of the Model

The traditional definition of absorptive capacity is all expenditures on productive tangible and intangible investment which can be absorbed by the country during a particular time period. Several studies have adopted this narrow definition of absorptive capacity to forecast expected levels of oil production and export.

TABLE 1

LIST OF VARIABLES

OILD	Quantity of oil used domesticly
BOP	Balance of payments (X - M)
CG	Government consumption
CLPS	Commercial bank claims on the private sector
CP	Private consumption
GDA	Gross domestic absorption (measure of the absorptive capacity of Iraq
FA	Foreign assets of the central bank
GDP	Gross domestic product
GDPN	Nonoil gross domestic product
GDPO	Oil gross domestic product
GR	Government revenue (total)
IG	Government investment
IP	Private investment
M	Imports
MONY	Money defined as currency plus demand, time, and saving deposits
NGJ	Net government injection
NDLX	Value of nonoil exports
OILQ	Petroleum output (oil production)
OILX	Value of oil exports
P	Price level (consumer price index, 1972 = 100)
RNDL	Government nonoil revenue

TABLE 1 (continued)

LIST OF VARIABLES

ROIL	Government oil revenue
VAAG	Value added in agriculture
VAMA	Value added in manufacturing
VACO	Value added in construction
VASD	Value added in services
LVAA	Log value added in agriculture
LVAM	Log value added in manufacturing
LVAC	Log value added in construction
LVAS	Log value added in services
X	Exports
EMAG	Employment in agriculture
EMMA	Employment in manufacturing
EMCO	Employment in construction
CSAG	Capital stock in agriculture
CSMA	Capital stock in manufacturing
CSCO	Capital stock in construction
CSSD	Capital stock in services
OILP	Index of crude oil prices
IMPP	Price of imports
GOEX	Total government expenditures

Government consumption (CG) is assumed to be a linear function of oil revenue (ROIL).

$$CG = b_0 + b_1(ROIL) \tag{3}$$

In stock adjustment models investment spending is assumed to be a function of the stock of capital and past investment expenditures. The absence of any private capital stock series precluded an estimation of a stock adjustment model for investment expenditures in Iraq. We estimated private investment spending (IP) as a function of last year's gross domestic product and private investment expenditure.

$$IP = c_0 + c_1(GDP)_{-1} + c_2(IP)_{-1} \tag{4}$$

The Iraqi government sets its level of investment spending to meet target rates of economic growth as envisioned in the five-year plan. If we view government investment as the residual level of investment required to meet growth targets this means that government investment expenditures are a function of the change in the capital stock (DCS) and the level of private investment expenditure (IP). We also incorporate a variable to reflect a 5 percent rate of depreciation of the total capital stock (TCS).

$$IG = 0.05(TCS)_{-1} + DCS - IP \tag{5}$$

B. Foreign Trade

The quantity of oil exported (OIQX) is by definition equal to the quantity of oil produced (OILQ) minus the quantity of oil used domesticly (OILD).

$$OIQX = OILQ - OILD \tag{6}$$

Since the price of oil is specified as an index (OILP), the value of oil exports (OILX) cannot be determined by a simple price times quantity relation. Instead, the quantity of oil exported and the oil price index are included as regressors in determining the value of oil exported.

$$OILX = e_0 + e_1(OILP) + e_2(OIQX) \tag{7}$$

Most of Iraq's nonoil exports are agricultural products. Therefore, nonoil exports (NOLX) are assumed to depend on value added in the agricultural sector (VAAG).

$$NOLX = f_0 + f_1(VAAG) \tag{8}$$

The total value of exports for Iraq (X) is given by the identity:

$$X = OILX + NOLX. \tag{9}$$

Imports into Iraq (M) are a function of gross domestic absorption:

$$M = g_0 + g_1(GDA). \tag{10}$$

The balance of trade (BOT) is simply the difference between exports and imports.

$$BOT = X - M \tag{11}$$

C. <u>Government Sector</u>

Total government spending (GOEX) is the sum of government consumption and government investment expenditures.

$$GOEX = IG + CG \qquad)$$

Government oil revenue (ROIL) is a linear function of the value added in the oil sector (GDPO).

$$ROIL = h_0 + h_1(GDPO) \tag{13}$$

Similarly, nonoil revenue (RNOL) is a linear function of the value added in the nonoil sectors (GDPN).

$$RNOL = i_0 + i_1(GDPN) \tag{14}$$

Total government revenue (GR) is the sum of these two sources of revenue.

$$GR = ROIL + RNOL \tag{15}$$

Net government injection (NGJ) is defined as government expenditures minus government revenue from the nonoil sectors.

$$NGJ = GOEX - RNOL \tag{16}$$

D. Monetary Sector

The Iraqi money supply is dominated by net government injections. Government expenditures inject new reserves into the monetary system leading to an expansion in the money supply. Nonoil government revenues withdraw reserves from the monetary system leading to a contraction of the money supply. Thus the money supply (MONY) is expressed as a function of net government injections.

$$MONY = j_0 + j_1(NGJ) \tag{17}$$

The price level in Iraq is a function of changes in the money supply. ven the high level of imported goods and services it is hypothesized that the domestic price level is strongly influenced by the price of imported goods.

Therefore we express the price level (P) as a function of money (MONY) and the price of imported goods (IMPP).

$$P = k_0 + k_1(\text{MONY}) + k_2(\text{IMPP}) \tag{18}$$

E. Oil Output

The unique feature of this model is that value added in the oil sector (GDPO) is derived as a residual equal to the difference between gross domestic product and gross domestic product in the nonoil sector.

$$\text{GDPO} = \text{GDP} - \text{GDPN} \tag{19}$$

Since the price of oil is given as an index we cannot determine the quantity of oil produced as a simple identity. The quantity of oil produced (OILQ) is expressed as a linear function of the value added in the oil sector divided by the price index for oil.

$$\text{OILQ} = l_o + l_1\left(\frac{\text{GDPO}}{\text{OILP}}\right) \tag{20}$$

The quantity of oil consumed domestically (OILD) is expressed as a function of value added in the manufacturing sector (VAMA) because that sector accounts for most of the oil consumed in Iraq.

$$\text{OILD} = m_0 + m_1(\text{VAMA}) \tag{21}$$

In the past the capital stock in the oil sector (CSOL) was a relatively constant ratio of the value added in oil and we assume that the relationship will hold in the future.

$$\text{CSOL} = 0.1(\text{GDPO})$$

F. Nonoil Output

The flow of goods and services in the nonoil sector is equal to the sum of value added in the four major sectors; thus gross domestic product in the nonoil sector (GDPN) is equal to the sum of value added in agriculture (VAAG), manufacturing (VAMA), construction (VACO), and services (VASD).

$$\text{GDPN} = \text{VAAG} + \text{VAMA} + \text{VACO} + \text{VASD} \tag{23}$$

In estimating value added in each of the nonoil sectors we utilized a Cobb Douglas production function. In the service sector this specification did not yield good results so we were forced to rely on Leontief/Harrod-Domar production functions with value added expressed as a function of the capital stock. These equations are expressed in log form in the following equations with the antilog immediately following.

$$\ln(\text{VAAG}) = n_0 + n_1\left[\ln(\text{EMAG})\right] + n_2\left[\ln(\text{CSAG})\right] \tag{24}$$

$$\text{VAAG} = e^{\ln(\text{VAAG})} \tag{25}$$

$$\ln(\text{VAMA}) = o_0 + o_1\left[\ln(\text{EMMA})\right] + o_2\left[\ln(\text{CSMA})\right] \tag{26}$$

$$\text{VAMA} = e^{\ln(\text{VAMA})} \tag{27}$$

$$\ln(\text{VACO}) = p_0 + p_1\left[\ln(\text{EMCO})\right] + p_2\left[\ln(\text{CSCO})\right] \tag{28}$$

$$\text{VACO} = e^{\ln(\text{VACO})} \tag{29}$$

$$\ln(\text{VASD}) = q_0 + q_1\left[\ln(\text{CSSD})\right] \tag{30}$$

$$\text{VASD} = e^{\ln(\text{VASD})} \tag{31}$$

G. Other Identities

To complete the specification of the model for Iraq we include the following identities. Gross domestic product (GDP) is equal to the sum of gross domestic absorption (GDA) plus the balance of payments (BOP).

$$GDP = GDA + BOP \tag{32}$$

The total capital stock (TCS) is the sum of capital stock in the individual sectors: agriculture (CSAG), manufacturing (CSMA), construction (CSCO), services (CSSD), and oil (CSOL).

$$TCS = CSAG + CSMA + CSCO + CSSD + CSOL \tag{33}$$

The change in the capital stock (DCS) is by definition:

$$DCS = TCS_1 - TCS_{-1}. \tag{34}$$

The complete model for the Iraqi economy is given in the following set of equations.

A. Gross Domestic Absorption

$$GDA = CP + CG + IP + IG \tag{1}$$

$$CP = a_0 + a_1(GDPN + NGJ) \tag{2}$$

$$CG = b_0 + b_1(ROIL) \tag{3}$$

$$IP = c_0 + c_1(GDP)_{-1} + c_2(IP)_{-1} \tag{4}$$

$$IG = 0.05(TCS_{-1}) + DCS - IP$$

B. Foreign Trade

$$OIQX = OILQ - OILD \tag{6}$$

$$OILX = e_0 + e_1(OILP) + e_2(OIQX) \tag{7}$$

$$NOLX = f_0 + f_1(VAAG) \tag{8}$$

$$X = OILX + NOLX \tag{9}$$

$$M = g_0 + g_1(GDA) \tag{10}$$

$$BOP = X - M \tag{11}$$

C. Government Sector

$$GOEX = IG + CG \tag{12}$$

$$ROIL = h_0 + h_1(GDPO) \tag{13}$$

$$RNOL = i_0 + i_1(GDPN) \tag{14}$$

$$GR = ROIL + RNOL \tag{15}$$

$$NGJ = GOEX - RNOL \tag{16}$$

D. Monetary Sector

$$MONY = j_0 + j_1(NGJ) \tag{17}$$

$$P = k_0 + k_1(MONY) + k_2(IMPP) \tag{18}$$

E. Oil Output

$$GDPO = GDP - GDPN \tag{19}$$

$$OILQ = l_0 + l_1\left(\frac{GDPO}{OILP}\right) \tag{20}$$

$$OILD = m_0 + m_1(VAMA) \tag{21}$$

$$CSOL = 0.1(GDPO) \tag{22}$$

F. Nonoil Output

$$GDPN = VAAG + VAMA + VACO + VASD \tag{23}$$

$$\ln(VAAG) = n_0 + n_1\left[\ln(EMAG)\right] + n_2\left[\ln(CSAG)\right] \tag{24}$$

$$VAAG = e^{\ln(VAAG)} \tag{25}$$

$$\ln(VAMA) = o_0 + o_1\left[\ln(EMMA)\right] + o_2\left[\ln(CSMA)\right] \tag{26}$$

$$VAMA = e^{\ln(VAMA)} \tag{27}$$

$$\ln(VACO) = p_0 + p_1\left[\ln(EMCO)\right] + p_2\left[\ln(CSCO)\right] \tag{28}$$

$$VACO = e^{\ln(VACO)} \tag{29}$$

$$\ln(VASD) = q_0 + q_1\left[\ln(CSSD)\right] \tag{30}$$

$$VASD = e^{\ln(VASD)} \tag{31}$$

G. Other Identities

$$GDP = GDA + BOP$$

$$TCS = CSAG + CSMA + CSCO + CSSD + CSOL \tag{33}$$

$$DCS = TCS_1 - TCS_{-1} \tag{34}$$

IV. Estimation Results

The stochastic equations of the model were estimated to attain a system of equations for forecasting purposes. This forecasting model is presented in the following table. In evaluating these results note that: (i) t-values are given in parenthesis; (ii) DW* denotes that the Cochrane Orcutt correction procedure was used; and (iii) a '*' to the left of the equation indicates that the equation is part of a simultaneous block estimated using two-stage least squares regression techniques.

The forecasting model consists of 34 equations made up of 16 stochastic equations and 18 identities. Since some of the equations are related they must be estimated simultaneously rather than as simple equation estimates. The following equations were estimated in a simultaneous block using two-stage least squares regression techniques.

$$BOP = X - M$$

$$CG = 287.5 + 0.3623(ROIL)$$

$$CP = -80.22 + 0.7071(GDPN + NGJ)$$

$$GDA = CP + CG + IP + IG$$

$$GDP = GDA + BOP$$

$$GDPO = GDP - GDPN$$

$$GOEX = IG + CG$$

$$IG = 0.05(TCS_{-1}) + DCS - IP$$

$$M = -76.36 + 0.2821(GDA)$$

TABLE 2

ESTIMATION RESULTS FOR IRAQ

A. Gross Domestic Absorption

$$GDA = CP + CG + IP + IG \qquad (1)$$

$$*CP = \underset{(-3.05)}{-80.22} + \underset{(46.87)}{0.7071}(GDPN + NGJ) \qquad (2)$$

$R^2 = 0.9929$
$DW = 1.9116$
$F = 2243.04$

$$*CG = \underset{(3.51)}{284.5} + \underset{(14.35)}{0.3623}(ROIL) \qquad (3)$$

$R^2 = 0.9924$
$*DW = 2.8199$
$F = 1954.68$

$$IP = \underset{(1.67)}{12.97} + \underset{(6.84)}{0.03814}(GDP_{-1}) + \underset{(2.12)}{0.3159}(IP_{-1}) \qquad (4)$$

$R^2 = 0.9569$
$DW = 2.0984$
$F_{(2,14)} = 155.265$

$$IG = 0.05(TCS_{-1}) + DCS - IP \qquad (5)$$

B. Foreign Trade

$$OIQX = OILQ - OILD \qquad (6)$$

$$*OILX = \underset{(-2.16)}{-265.6} + \underset{(22.35)}{23.42}(OILP) + \underset{(1.32)}{0.3714}(OIQX) \qquad (7)$$

$R^2 = 0.9934$
$DW = 1.7253$
$F_{(2,15)} = 1133.78$

$$NOLX = \underset{(1.66)}{3.693} + \underset{(10.84)}{0.1113}(VAAG) \qquad (8)$$

$R^2 = 0.8801$
$DW = 1.6083$
$F_{(1,16)} = 117.483$

$$X = OILX + NOLX \qquad (9)$$

TABLE 2 (continued)

ESTIMATION RESULTS FOR IRAQ

B. Foreign Trade (continued)

$$*M = -76.36 + 0.2821(GDA) \quad (10)$$
$$(-2.08) \quad (17.35)$$
$R^2 = 0.9505$
$DW = 2.0197$
$F_{(1,16)} = 307.281$

$$BOP = X - M \quad (11)$$

C. Government Sector

$$GOEX = IG + CG \quad (12)$$

$$*ROIL = -140.6 + 0.9899(GDPO) \quad (13)$$
$$(-4.93) \quad (42.79)$$
$R^2 = 0.9915$
$DW = 2.5302$
$F_{(1,16)} = 1857.92$

$$RNOL = -72.05 + 0.3498(GDPN) \quad (14)$$
$$(-7.57) \quad (39.78)$$
$R^2 = 0.9846$
$*DW = 1.9846$
$F_{(1,15)} = 958.214$

$$GR = ROIL + RNOL \quad (15)$$

$$NGJ - GOEX - RNOL \quad (16)$$

D. Monetary Sector

$$MONY = 997.0 + 0.2027(NGJ) \quad (17)$$
$$(2.92) \quad (3.89)$$
$R^2 = 0.9692$
$*DW = 0.8685$
$F_{(1,15)} = 471.736$

TABLE 2 (continued)

ESTIMATION RESULTS FOR IRAQ

D. Monetary Sector (continued)

$$P = \underset{(1.73)}{23.67} + \underset{(0.88)}{0.02281}(MONY) + \underset{(2.18)}{0.421}(IMPP) \qquad (18)$$

$R^2 = 0.9788$
DW = 0.6869
$F_{(2,15)} = 345.682$

E. Oil Output

$$GDPO = GDP - GNPN \qquad (19)$$

$$*OILQ = \underset{(1.11)}{83.79} + \underset{(4.92)}{18.58}(RGDPO) + \underset{(1.87)}{115.7}(D1974) + \underset{(2.61)}{7.774}(RGD02) + 119.5 + 26.36\left(\frac{GDP}{OIL}\right.$$

$R^2 = 0.9352$ (20)
DW = 2.5610
$F_{(3,14)} = 67.3611$

$$OILD = \underset{(9.10)}{12.32} + \underset{(17.14)}{0.1485}(VAMA) + \underset{(7.49)}{26.26}(D5) \qquad (21)$$

$R^2 = 0.9681$
DW = 2.3141
$F_{(2,15)} = 227.826$

$$CSOL = 0.1(GDPO) \qquad (22)$$

F. Nonoil Output

$$GDPN = VAAG + VAMA + VACO + VASD \qquad (23)$$

$$\ln(VAAG) = \underset{(-2.28)}{-1.970} + \underset{(3.85)}{0.7755}\ln(EMAG) + \underset{(2.63)}{0.3300}\ln(CSAG) \qquad (24)$$

$R^2 = 0.9511$
DW = 2.2472
$F_{(2,15)} = 145.945$

$$VAAG = e^{\ln(VAAG)} \qquad (25)$$

TABLE 2 (continued)

ESTIMATION RESULTS FOR IRAQ

F. Nonoil Output (continued)

$$\ln(VAMA) = \underset{(-2.16)}{-2.424} + \underset{(2.95)}{0.9688}\ln(EMMA) + \underset{(3.29)}{0.4112}\ln(CSMA) \tag{26}$$

$R^2 = 0.9854$
*DW = 2.1164
$F_{(2,14)} = 473.997$

$$VAMA = e^{\ln(VAMA)} \tag{27}$$

$$\ln(VACO) = \underset{(-2.85)}{-1.932} + \underset{(4.13)}{0.7977}\ln(EMCO) + \underset{(8.68)}{0.6761}\ln(CSCO) + \underset{(10.11)}{1.053}(D1975) \tag{28}$$

$R^2 = 0.9942$
*DW = 1.8899
$F_{(3,13)} = 738.820$

$$VACO = e^{\ln(VACO)} \tag{29}$$

$$\ln(VASD) = \underset{(-1.46)}{-0.7461} + \underset{(13.72)}{1.005}\ln(CSSD) \tag{30}$$

$R^2 = 0.9782$
*DW = 1.6041
$F_{(1,15)} = 674.167$

$$VASD = e^{\ln(VASD)} \tag{31}$$

G. Other Identities

$$GDP = GDA + BOP \tag{32}$$

$$TCS = CSAG + CSMA + CSCO + CSSD + CSOL \tag{33}$$

$$DCS = TCS_1 - TCS_{-1} \tag{34}$$

$$TCS = CSAG + CSMA + CSCO + CSSD + CSOL$$

$$DCS = TCS - TCS_{-1}$$

$$NGJ = GOEX - RNOL$$

$$OILQ = 199.5 + 26.36\ (GDPO/OILP)$$

$$OILX = -265.6 + 23.42\ (OILP) + .3714\ (OIQX)$$

$$OIQX = OILQ - OILD$$

$$ROIL = -140.6 + .9899\ (GDPO)$$

$$X = OILX + NOLX$$

$$CSOL = .184\ (GDPO)$$

As in other macro modeling studies utilizing time series data, we encountered autocorrelation in estimating several of the equations. The Durbin Watson statistics for these equations indicate positively auto-correlated errors. To correct for this, the Cochrane Orcutt iterative procedure was used, as indicated by a star beside the Durbin Watsen value in the table summary.

A major problem in this study, as in other macro models for developing countries, is the small sample size. Reliable data is available only for the period since 1961, therefore seventeen years (1961-1977) was the largest sample period that could be constructed. During this time period the Iraqi economy experienced significant structure change. The most important of these changes resulted from the sharp jump in oil prices in 1973/74. To adjust for that structural change dummy variables were introduced into several equations including the oil output sector, and the instruction sector.

Despite those adjustments in the equations a number of them have large residuals in the more recent years. This heteroscedasticity problem is acknowledged but we were not able to eliminate the problem due to the data limitations. Heteroscedasticity may introduce some inefficiency in the regression estimates, but it does not bias the regression coefficients in the model. Therefore we were able to obtain useful simulation results despite the existence of this problem.

V. Structural Analysis of the Model

The structural equations of the model capture several important characteristics of the Iraqi economy. The private consumption function yields a marginal propensity to consume that is high relative to that estimated for other major oil producing countries in the region. This is not surprising because Iraq is considered a high absorber country with significant needs for expenditure in the domestic economy. The mass of the Iraqi people are relatively poor compared to people in other energy-producing countries. Almost all of the oil revenue generated in Iraq over the sample period was plowed back into the domestic economy, in contrast to other oil producing countries in the region that were using oil revenue to accumulate foreign assets or to finance bilateral aid to other countries. Over the sample period the Iraqis invested very little abroad and provided little in the way of foreign aid. The Iraqis have modified their policies in recent years, especially to allocate more revenue for foreign aid, however they continue to be a high absorber country with a high marginal propensity to consume in the domestic economy.

Private investment is determined as a distributed lag response to changes in gross domestic product. The Iraqis do not have a wealthy group of private investors like other Gulf countries. As a result private investment expenditures are modest and private foreign investment is almost non-existant. Government investment, as noted earlier, is determined as a residual from the change in the capital stock and private investment expenditures. Thus the Iraqi government sets investment expenditures so as to reach target goals for economic growth, depending on the level of private investment expenditure. Since oil revenues flow to the government, the government dominates total investment expenditures in Iraq. As we would expect government consumption expenditures are determined by the level of oil revenues flowing to the government.

As noted in the previous sector non-oil exports are dominated by agricultural production. The equation for imports suggests a lower propensity for the exogenous variables. SIM B is then used to simulate different scenarios based upon alternative assumptions regarding the exogenous variables.

The forecasting model for the Iraqi economy contains 34 equations in 34 endogenous variables. The model is consistent in the sense that it can be solved for all endogenous variables. There are 10 exogenous variables, the values of which are supplied in order to simulate the model over the forecast period. Although the model is forecast annually from 1978 to 1990, only the estimates for 1980, 1985, and 1990, are reported.

As a basis for comparing simulations under alternative assumptions regarding exogenous variables we chose a control scenario as a benchmark. We then compared this control scenario with other scenarios involving different assumptions regarding an exogenous variable in order to determine what impact that variable has on the projected endogenous variables. The basic assumptions in the control scenario are:

(a) the structure of the model holds true in the future such that there are no additional absorptive capacity constraints other than those incorporated in the structure equation of the model. Note that dummy variables do not affect the model over the forecast period.

(b) For the first three years of the simulation period (1978-1980) we use the actual price of oil in those years. It should be noted that the price of oil increased very rapidly over that period, 42.76 percent for 1978 to 1979, and 66.02 percent from 1979 to 1980. In the control scenario we assume that the real price of oil increases 5 percent per year in the 1980s. Given the assumption of an increase in the general price level of 11.19 percent, this means that the nominal price of oil increases 16.19 percent per year in the control scenario.

Different assumptions were made regarding the price of oil as a basis for alternative simulations. One assumption is that the real price of oil will not increase at all; this means that the nominal price of oil increases at to import compared to that for other oil-producing countries in the region. This reflects the fact that the Iraqis are more self sufficient in meeting their own needs for foodstuff and other consumer goods, but it also reflects the greater control over consumption spending by a parsimonious Iraqi government. Imports are strictly controlled by the Iraqi government so as to maintain desired levels of reserves in hard currencies.

The estimation of the money equations shows that net injections of government spending have a significant effect on the money supply. This captures the expansionary effects of government spending on the money supply in recent years. Money in turn influences the price levels as revealed in the price equation. However, that equation also captures the significant impact of the price of imports on the domestic price level. Despite extensive government controls over prices and subsidies to foodstuffs and other commodities the Iraqis have experienced inflationary expansion in the money supply, as have other major energy producers in the region. The price level is not introduced directly into the other equations in the model and hance does not influence absorptive capacity. The price variable is crucial in the simulation of the model over the 1980s, as discussed in the following section.

VI. Simulation

Using the SIMULATE program developed at the University of Wisconsin, the forecasting model was used in simulation studies for the Iraqi economy. The forecasting model was used to simulate the endogenous variables in the model through the forecast horizon 1990. The simulation program contains two parts: SIM A and SIM B. SIM A evaluates the structure of the system and determines the order in which the equations are solved. SIM B uses this order system to solve for the endogenous variables based upon projected values the same rate as the general price level 11.19 percent per year. Finally we assume that the nominal price of oil increases about twice the rate of increase in the general price level i.e., 22.5 percent per year, which results in real price increases of 11.31 percent per year.

c) One of the most difficult variables to project for Iraq is the growth of the labor force. Estimates of the labor force in Iraq are notoriously unreliable. Our control scenario utilizes the historical growth rate of the labor force in each sector to project labor for that sector over the forecast period. In alternative scenarios we assume that the labor force will grow over the forecast period at the rates projected in the Five-Year Plan. These alternative scenarios incorporate the government desired growth of the labor force by sector in the Iraqi economy reflecting government policies including policies to attract labor into some sectors such as agriculture and industry; policies to limit the growth of labor in major urban centers; and policies limiting the growth of the expatriate labor force.

d) The control scenario utilizes estimates of the historical growth rate of the capital stock to project capital stock over the forecast period. As a base for comparison with this control solution we assumed that the capital stock in each sector would grow at the rate required to achieve the governments target rate of growth in output for that sector. In order to generate this capital stock series we utilized the production functions estimated for each sector. For example the production function estimated for the manufacturing sector is:

$$\ln VAMA: - 2.424 + .9688 (\ln EMMA) + .4112 (\ln CSMA)$$

The Five Year Plan projects the employment growth of the manufacturing sector at 17.9 percent per year. The target rate of growth for manufacturing output is 33 percent per year. The rate of growth of the capital stock required to achieve that rate of growth in output is given by

$$\ln CSM = \frac{\ln VAMA + 2.4236 - 0.9688 \ln EMMA}{0.4112}$$

or

$$\frac{d \ln CSM = d \ln VAMA - 0.9688 \, d \ln EMMA}{0.4112} : 0.304$$

e) all other exogenous variables are assumed to grow at the historical growth rates in all scenarios.

Given these assumptions the model was simulated and the results presented in the following table. The control scenario is A, with the price of oil increasing 16.19 percent annually, and the employment and capital stock series growing at their historical growth rates over the forecast period. Gross domestic absorption increases at a rapid pace roughly doubling every five years to 1990. This is what we would expect if the rate of growth of the factor inputs increase at the rapid pace experienced in the 1970s. Gross domestic product and gross domestic product in the non-oil sector both increase at about the same rate as gross domestic absorption.

In the control scenario both exports and imports increase more rapidly than the rate of growth in gross domestic product. Exports outstrip imports resulting in a significant balance of payments surplus. particularly toward the latter part of the forecast period.

As we would expect from the dominant role of the government in Iraq, both government revenue and government spending increase at about the same rate as gross domestic product. Revenue from the oil sector which accounts for the bulk of total government revenue doubles every five years over the period. Monetary expansion results in a rapid increase in inflation over the forecast period, although prices increase at a somewhat lower pace than gross domestic product.

The rapid growth in exports is explained by the rapid growth in oil exports which account for almost all of Iraqi exports. However, rising oil exports are a result of rising oil prices. The quantity of oil exported actually declines roughly 20 percent in this control scenario. Oil output declines slightly to 1985 and then rises about 8 percent to 1990. This means that a larger share of Iraqi oil will be consumed within the domestic economy which is consistent with the Iraqi policy of rapid industrialization and low cost energy available for domestic industries and consumers.

Scenario A_2 simulates the model under the assumption that employment and capital stock increase at the more rapid rate envisioned in the Iraqi Five-Year Plan. Gross domestic absorption increases much more rapidly under these assumptions, particularly toward the end of the forecast period. Gross domestic product and gross domestic product in the non-oil sector also increased more rapidly under these assumptions than in the control scenario. These results suggest either that the Iraqi economy will be growing much more rapidly in the 1980s than in the 1970s; or that the optimistic assumptions regarding the growth of labor and capital incorporated in the Five-Year Plan will not be fulfilled. The recent performance of the Iraqi economy in the 1980s suggest that the latter interpretation is most likely the correct one.

On the other hand exports increase at a slower rate in this scenario. This is due to a lower rate of growth in oil exports. However, oil output increases more rapidly in scenario A_2. The rapid growth in gross domestic absorption increases demand for oil in the domestic economy which more than offsets the slower rate of growth in oil exports.

Secnario B_1 simulates the model assuming no increase in the real price of petroleum, and historical growth rates for employment and capital. Compared to the control scenario this results in a much slower growth in gross domestic absorption and gross domestic product. The non-oil sector grows at the same rate in both scenarios.

Trade expands at a slower pace in scenario B_1 compared to the control scenario. The lower rate of increase in gross domestic products results in lower levels of imports. The more modest increase in oil prices results in slower growth in oil exports and a decrease in total exports. The quantity of oil exported and produced is high in this scenario. In order to generate the desired level of oil revenue the government must produce and export larger quantities of oil when the real price of oil is not rising.

Scenario B_2 shows that the higher rates of growth in employment and capital have a similar impact when oil prices are not increasing as in scenario A_2 when oil prices are increasing.

Scenario C_1 and C_2 simulate the model with nominal increases in oil prices of 22.5 percent. These assumptions result in even more rapid growth in gross domestic absorption and gross domestic product. Trade also increases more rapidly than in the control scenario. While oil exports and total exports increase at a more rapid pace, the quantity of oil produced and exported is lower than in the control scenario. Again the implication is that higher prices for oil will generate the oil revenue required by the Iraqi government to fulfill development plans, with lower rates of growth in oil production and exports.

(in thousands of U.S. $)

Scenario	Year	B.O.P.	G.D.A.	G.D.P.	G.D.P.N.	G.R.	M	Oil Q
A_1	1980	3,480.8	12,557.0	16,038.0	3,638.4	13,334.0	3,465.9	1,342.8
Oil P 16.19%	1985	7,573.4	24,473.0	32,046.0	6,656.8	27,249.0	6,827.4	1,305.0
EM & CS His	1990	14,201.0	57,117.0	71,317.0	12,318.0	62,499.0	16,036.0	1,412.7
A_2	1980	3,165.6	13,658.0	16,824.0	4,082.9	13,828.0	3,776.7	1,374.3
Oil P 16.19%	1985	5,650.5	30,901.0	36,551.0	9,890.2	29,639.0	8,640.7	1,360.4
EM & CS Plan	1990	3,846.0	91,683.0	95,529.0	27,546.0	76,719.0	25,787.0	1,597.4
B_1	1980	3,480.8	12,557.0	16,038.0	3,638.4	13,334.0	3,465.9	1,342.8
Oil P 11.19%	1985	5,715.5	21,122.0	26,838.0	6,656.8	22,093.0	5,882.2	1,294.4
EM &CS His	1990	6,956.6	44,994.0	51,950.0	12,318.0	43,328.0	12,616.0	1,464.7
B_2	1980	3,165.6	13,658.0	16,824.0	4,082.9	13,828.0	3,776.7	1,374.3
Oil P 11.19%	1985	3,796.0	27,556.0	31,352.0	9,890.2	24,492.0	7,697.3	1,363.9
EM & CS His	1990	-3,372.5	79,606.0	76,234.0	27,546.0	57,619.0	22,381.0	1,753.8
C_1	1980	3,480.8	12,557.0	16,038.0	3,638.4	13,334.0	3,465.9	1,342.8
Oil P 22.5%	1985	10,391.0	29,713.0	40,104.0	6,656.8	35.225.0	8,305.6	1,317.5
EM & CS His	1990	28,250.0	81,449.0	100,970.0	12,318.0	100,490.0	22,900.0	1,379.5
C_2	1980	3,165.6	13,658.0	16,824.0	4,082.9	13,828.0	3,776.7	1,374.3
Oil P 22.5%	1985	8,464.9	36,135.0	44,600.0	9,890.2	37,606.0	10,117.0	1,359.7
EM & CS Plan	1990	17,876.0	115,980.0	133,860.0	27,546.0	114,660.0	32,642.0	1,487.7
D_1	1980	3,480.8	12,557.0	16,038.0	3,638.4	13,334.0	3,465.9	1,342.8
Oil P 22.5 & 16.19%	1985	9,916.6	28,002.0	37,918.0	6,656.8	33,062.0	7,822.9	1,301.2
EM & CS His	1990	19,094.0	64,821.0	83,916.0	12,318.0	74,971.0	18,210.0	1,391.0
D_2	1980	3,165.6	13,658.0	16,824.0	4,082.9	13,828.0	3,776.7	1,374.3
Oil P 22.5 & 16.19%	1985	7,991.0	34,425.0	42,416.0	9,890.2	35,444.0	9,634.9	1,345.7
EM & CS Plan	1990	8,730.6	94,372.0	108,100.0	27,546.0	89,166.0	27,957.0	1,540.1

P	ROIL	X	OIQX	OILX
172.78	12,133.0	6,946.7	1,244.0	6,891.7
266.59	24,992.0	14,401.0	1,105.5	14,323.0
457.72	58,263.0	30,237.0	995.24	30,126.0
174.42	12,472.0	6,942.3	1,234.2	6,888.1
274.32	26,251.0	14,291.0	818.26	14,216.0
505.43	67,155.0	29,633.0	- 611.76	29,529.0
172.78	12,133.0	6,946.7	1,244.0	6,891.7
258.00	19,836.0	11,598.0	1,094.9	11,520.0
426.99	39,091.0	19,573.0	1,047.2	19,462.0
174.42	12,472.0	6,942.3	1,234.2	6,888.1
265.75	21,105.0	11,493.0	821.78	11,418.0
474.82	48,056.0	19,008.0	- 455.45	18,904.0
172. 78	12,133.0	6,946.7	1,244.0	6,891.7
280.08	32,969.0	18,697.0	1,118.0	18,619.0
519.71	96,257.0	51,150.0	962.02	51,040.0
174.42	12,472.0	6,942.0	1,234.2	6,888.1
287.80	34,218.0	18,582.0	817.56	18,507.0
567.34	105.100.0	50,518.0	- 721.49	50,414.0
172.78	12,133.0	6,946.7	1,244.0	6,891.7
275.45	3,080.5	17,740.0	1,101.6	17,662.0
477.05	70,734.0	37,304.0	973.51	37,193.0
174.42	12,472.0	6,942.3	1,234.2	6,888.1
283.17	32,057.0	17,626.0	803.59	17,551.0
524.72	79,603.0	36,687.0	- 669.12	36,583.0

C. COUNTRY REPORT: KUWAIT

An Overview of the Economy

1. Background Information

Kuwait lies on the northwestern side of the Persian Gulf. It is bounded on the east by the Gulf, on the north and west by Iraq and on the southwest by Saudi Arabia. The country covers an area of about 17,000 square kilometers or 7,000 square miles. The earth surface slopes down gently from west to east and is generally flat, with the exception of a few rocky hills of maximum heights ranging from 180 to 300 meters above sea level. It consists mostly of barren desert with an intensely hot and dry climate and an annual rainfall of four to five inches. Consequently, only about five percent of the land is suitable for agriculture. Most drinking water (75 percent) is obtained by distilling sea water. Temperature ranges are from 0^{o} C in winter to 46^{o} C in summer.

The population in January 1980 was estimated to be 1,318,000; the average annual growth rate of which is 5.9 percent.[1] About 83 percent of the population are Arabs (Palestinians, Jordanians, Egyptians, and Iraqis) and 13 percent are Iranians, Indians, and Pakistanis. The remaining 2 percent are British, Americans, and Western Europeans and others. Kuwaitis are a minority in their own country. According to the 1980 census they consist of only 41.4 percent (preliminary results) of the total population.

The labor force was estimated to be 360,000 in 1978, about 70 percent of which are non-Kuwaiti. Labor unions were first authorized in 1964 and are found mainly in the oil industry, where five percent of the labor force is employed, and among government personnel.

Islam is the main religion in the country; embracing roughly 99 percent of the population.

The main language of Kuwait is Arabic, but English is commonly used. Compared to many developing countries, the literacy rate is relatively high at a little over 60 percent.

Oil is Kuwait's sole mineral deposit that is available in economic quantities. We will explore this topic extensively in the petroleum section of the structural analysis.

2. Recent Economic Performance[2]

a. Economic Growth

Since Kuwait is considered a developing country, the statistics and data compiled about national accounts in general are not thorough. Except for the oil sector, the data concerning gross domestic product do not cover other sectors fully. In addition, the data related to prices and their movements are so insufficient that it is very difficult to work out indications of the real growth in the Kuwaiti economy in general and in non-oil sectors in particular. As a result, statistics of national accounts are to be taken only as indicators of general economic trends. The value of the oil sector contributions to the GDP increased from KD 996.56 million in 1973 to

KD 5,156.80 million in 1980 (table 1). The value of the nonoil sectors' contributions to GDP almost quadrupled from KD 607.58 million ($1.00 = 0.274 KD) in 1973 to KD 2,216.90 million in 1980. However, the ratio of nonoil output to GDP has remained almost unchanged during the period 1976-1978, the reason being the increase in the value of oil production resulting in relative stability in the share of these sectors. Also, from table 1 we see that within the nonoil sectors themselves, the wholesale and retail trade sector, and the sectors of construction and manufacturing continue to rank first in contribution to the GDP.

From table 2 we conclude that GDP growth rate in the period 1973/74-1977/78 reached a maximum of 63.4 percent in the fiscal year 1974/75 due to substantial increases in the growth rate of the oil sector (84 percent) and the nonoil sectors (18.6 percent). Also from table 2, the apparent 17.2 percent increase in oil revenues in 1976/77 was a result of the rise in oil production in the latter half of 1976, as well as in oil prices during the first half of 1977. Softness in worldwide markets in 1977/78 caused an 8.3 percent decrease in production which, in turn, caused a 6.7 percent contraction in oil revenues. In spite of the 10 percent increase in oil prices in January 1977, and the continued increase throughout 1977/78, the deterioration in the U.S. dollar rate of exchange had its effects on the value of oil revenues.

b. Capital Formation

Tables 3, 4, and 5 depict GDP uses at current prices. Overall nominal expenditures by the private and the government sectors increased

TABLE 1

Gross Domestic Product at Current Prices
(million Dinars)

	1970	1971	1972	1973	1974	1975	1976	1977 (1)	1978 (1)	1979 (2)	1980 (3)
1. Oil Sector	618.80	907.83	914.45	996.56	3022.61	2459.00	2524.11	2483.03	2520.10	4433.80	5156.80
2. Non-oil Sectors	407.51	473.96	549.52	607.58	790.34	1025.98	1315.56	1570.20	1674.38	2005.38	2216.90
-Agriculture & Fisheries	2.92	3.17	3.78	4.72	5.92	6.83	10.29	13.10	13.53	16.69	17.50
-Manufacturing	42.78	54.19	65.42	77.81	168.63	195.05	229.82	239.52	256.60	366.30	439.60
-Electricity, Gas & Water	7.22	9.33	10.77	11.77	12.64	13.14	18.76	19.88	22.90	26.20	27.10
-Construction	28.10	33.28	38.43	44.42	62.78	73.67	122.61	158.40	176.10	180.00	185.00
-Wholesale & Retail Trade	81.00	90.00	106.40	112.70	140.40	211.30	288.75	352.40	318.60	350.50	375.50
-Transport, Storage, & Communications	29.29	31.84	34.51	41.75	50.39	60.14	72.44	77.39	90.00	103.40	119.40
-Financial Institutions	20.42	21.81	23.26	24.24	25.94	39.20	56.91	72.80	104.10	135.30	183.50
-Insurance	0.50	1.49	1.99	3.46	3.97	6.00	8.31	11.87	12.00	13.30	15.60
-Others	195.28	228.85	264.96	286.71	319.67	420.65	507.67	624.84	680.55	813.69	853.70
3. GDP (1+2)	1026.31	1381.79	1463.97	1604.14	3812.95	3484.98	3839.67	4053.23	4194.48	6439.18	7373.70

Source: Central Bank of Kuwait, Economic Report 1980, p. 23.

(1) Likely to be revised.
(2) Provisional.
(3) Estimates, Central Bank of Kuwait.

TABLE 2

Annual Growth Rate of GDP
(percent)

	1973/74	1974/75	1975/76	1976/77	1977/78
GDP	+ 35.2	+ 63.4	- 5.0	+ 12.0	+ 5.0
1. Oil Sector	+ 54.5	+ 84.0	- 13.8	+ 17.2	- 6.8
2. Non-oil Sector	+ 6.2	+ 18.6	+ 25.0	- 0.3	+ 37.1

Source: Central Bank of Kuwait, Economic Report for 1978, p. 20.

from KD 566.0 million in 1972/73 to KD 1,723.7 million in 1977/78; i.e., by 25.9 percent because of the 27.9 percent and 24.2 percent increases in government and private sector expenditures, respectively.

Private expenditure rose from KD 287.6 million in 1972/73 to KD 912.1 million in 1977/78, while its share in the GDP increased from 18.4 percent to 23.7 percent. This rise may be partially attributed to the increase in the prices of goods and services and in housing rentals.

Preliminary estimates for 1977/78 indicated an increase in capital formation amounting to 48.2 percent over the previous year. Total capital formation increased from KD 153.3 million in 1972/73 to 682.0 million in 1977/78, and its share in the GDP rose from 9.8 percent in 1972/73 to 17.7 percent in 1977/78.

Increased government capital formation was a result of the expansion in expenditures for purposes of construction and development. In addition, the share of capital goods in total imports have increased during the past two years. This also applies to the private sector, where increased expenditures on the establishment of facilities combined with the rise in the cost of materials have also resulted in increased expenditures by the private sector.

The total value of exports dropped by 5.5 percent in the period 1976/77-1977/78. It is only natural for the total value of exports to change according to changes in the value of oil exports which represent over 90 percent of the total. Oil exports dropped by 6 percent in 1977/78 due to decreased production, but nonoil exports rose slightly as compared to the previous year. It is worth noting here that the total value of exports contributes 71.5 percent of the GDP.

TABLE 3

GDP Uses at Current Prices [1]

(KD million)

	1972/73		1973/74		1974/75		1975/76		1976/77 (2)		1977/78 (2)	
	value	percent	value	percent	value	percent	value	percent	value	percent	value	percent
Total GDP Uses:	566.0	36.2	635.8	30.1	827.8	24.0	1110.4	33.8	1369.1	37.3	1723.7	44.7
Private	287.6	18.4	315.9	15.0	423.0	12.3	591.7	18.0	734.6	20.0	912.1	23.7
Public	278.4	17.8	319.9	15.2	404.8	11.7	518.7	15.8	634.5	17.3	811.6	21.1
Capital Formation	153.3	9.8	146.7	7.0	176.0	5.1	246.4	7.6	460.2	12.5	682.0	17.7
Private	51.7	3.3	53.9	2.6	63.1	1.8	106.7	3.3	132.7	3.6	165.2	4.3
Public	101.6	6.5	92.8	4.4	112.9	3.3	139.7	4.3	327.5	8.9	516.8	13.4
Change in Stocks	+ 1.3		- 1.0	-0.1	+ 6.7	0.2	+ 9.3	0.3	+ 13.3	0.4	+ 16.3	0.4
Exports(FOB)	1107.7	70.9	1655.5	78.4	2992.5	86.7	2650.5	80.8	2914.4	79.4	2755.3	71.5
Imports(CIF)	266.1	17.0	325.5	15.4	552.6	16.0	737.3	22.5	1085.2	29.6	1323.2	34.3
(3) GDP	1562.2	100.0	2111.5	100.0	3450.4	100.0	3279.3	100.0	3671.8	100.0	3853.8	100.0

Source: Central Bank of Kuwait, Economic Report 1978, p. 21.

(1) Fiscal years ending 31 March.
(2) Estimates - Central Bank of Kuwait.
(3) Gross does not equal total because of rounding.

TABLE 4

Annual Growth of GDP Uses
(percent)

	1973/74	1974/75	1975/76	1976/77	1977/78
GDP Uses	12.3	30.2	34.1	23.3	25.9
Private	9.8	33.9	39.9	24.2	24.2
Government	14.9	26.5	28.1	22.3	27.9
Capital Formation	- 4.3	20.0	40.0	86.8	48.2
Private	4.3	17.1	69.1	24.4	24.5
Government	- 8.7	21.7	23.7	134.4	57.8
Change in Stocks	-176.9	670.0	38.8	43.0	22.6
Exports (FOB)	49.5	80.8	-11.4	10.0	- 5.5
Imports (CIF)	22.3	69.8	33.4	47.2	21.9
Total Expenditures on GDP	35.2	63.4	- 5.0	12.0	5.0

TABLE 5

Capital Formation and Savings at Current Prices
(KD million)

	1972/73	1973/74	1974/75	1975/76
GNP	1562.2	2111.5	3450.3	3279.2
Net income from projects abroad	- 336.4	- 342.2	- 280.8	+ 224.0
GDP	1225.8	1769.3	3169.5	3503.2
Total Consumption	566.0	635.8	827.8	1110.4
Savings	659.8	1133.5	2341.7	2392.8
Total Capital Formation	153.3	146.7	176.0	246.4
Savings to GNP (percent)	53.8	64.1	73.9	68.3
Total Capital Formation to GNP (percent)	12.5	8.3	5.6	7.0
Total Capital Formation to Savings (percent)	23.2	12.9	7.5	10.3

Source: Central Bank of Kuwait, Economic Report 1978, p. 23.

The total value of Kuwait's imports in 1977/78 is estimated at KD 1,323.2 million, an increase of 21.9 percent over the previous year. The value of imports, however, has grown at ever increasing rates in the past few years due to a number of factors, principally the high demand for goods in local markets and the rise in the prices of imports.

Table 6 depicts the growth in savings in Kuwait. It averaged 65.3 percent of the GNP in 1975/76. However, local utilization of savings (government and private capital formation) is rather low because of the lack of adequate profitable domestic investment outlets and opportunities from foreign investments. In the period 1972/73 through 1975/76, the ratio of total capital formation to savings averaged 13.5 percent annually. Chart 1 shows the fluctuation of the GDP in relation to changes in the total value of oil exports. Excluding the oil sector, the value of the GDP would show a tendency to increase at accelerated rates.

3. Sectoral Analysis

a. Petroleum

The Kuwait Oil Company (KOC) was established in December 1934. It was formed in London with a capital of £ 200,000. The two partners in this venture were Gulf Oil Corporation and the Anglo-Persian Oil Company (which later became British Petroleum). The ownership of the company was equally divided between the two mentioned companies. The original concession agreement between KOC and the Kuwaiti government was for a period of 75 years; later extended to expire in the year 2026. Oil was discovered in 1938 but because of World War II, the first shipment was not exported until 1946.

the second half will be increased by an average of 6.6 percent over their level in the previous fiscal year in pursuance of OPECs decision in December 1978.

Revenues from oil in 1980/81 are expected to amount to KD 4493.5 million in the form of oil receipts covering around 97 percent of the total state revenues excluding income from investment.

Kuwait joined other OPEC members in raising its oil prices drastically between October 1973 and January 1974. However, in the period from June 1976 to the end of 1977, Kuwait reduced the per-barrel price of its crude 31° API twice; first by 7 cents and then by 5 cents (because of gravity differential between that type of oil and Arab light). The price of Khafji crude was reduced in September 1977 from $12.24 to $12.10 to narrow the gap between that oil and its Saudi counterpart priced at $12.03 per barrel. In OPEC's meeting in Geneva October 1981, it was agreed that Saudi Arabia and other moderates raise their price per barrel to $34.00 dollars on the condition that the 'Hawks' Nigeria, Libya etc. reduce their prices to the above mentioned figure.

TABLE 6

REAL PRICES FOR KUWAIT CRUDE OIL

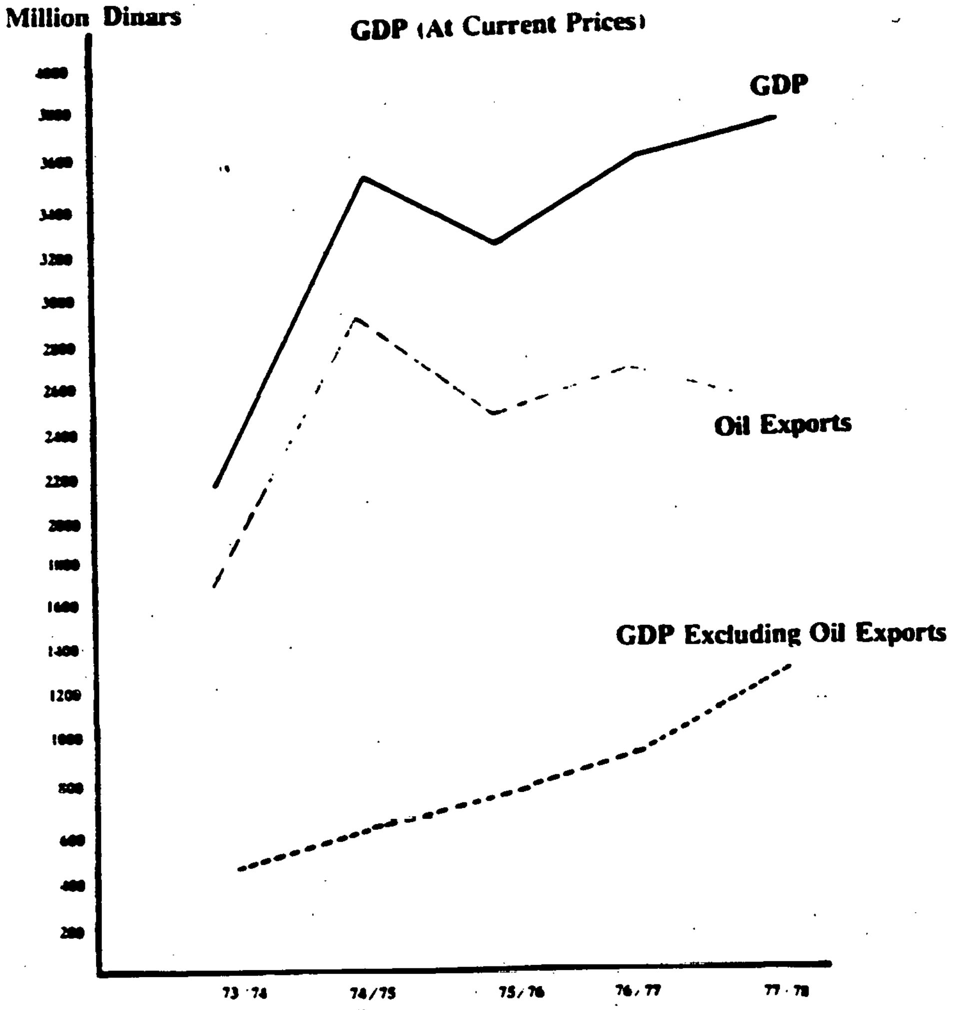
	1975	1976	1977	1978	1979	Jan-Sept 1980
Official price index for Kuwait oil	101.20	107.30	117.89	116.57	176.49	279.02
Real price index for Kuwait oil a/	88.90	98.20	96.70	73.30	98.10	149.80

Source: Central Bank of Kuwait, Economic Report for 1980, pp. 38.

a/ Calculated under the following formula:

$$\frac{\text{(Official) oil price index} \times \text{Actual exchange rate per dollar index}}{\text{Kuwait imports price index} \times \text{Nominal index rates for dollar/dinar}}$$

CHART 1



Source: Central Bank of Kuwait, Economic Report for 1978, p. 22

Prior to 1951, the government was receiving three Indian rupees per English ton of crude oil produced or RS 250,000, whichever was greater. (The applicable exchange rates were: RS 1.00 = \$ 0.60 = KD 0.075.) Prior to 1951, the payments received by the Kuwaiti government were equivalent to \$ 0.082 which were significantly lower than the payments to Iran, Iraq, and Saudi Arabia at the time. In 1951, the 1934 agreement was modified. These modifications included imposing an income tax in addition to the RS 3 per ton royalty. The tax rate was fifty percent on realized profits of KOC and royalty payments were treated as part of government tax revenue.[3] During the period 1952-1954, 935.3 million U.S. barrels were produced by KOC and the corresponding payments to the government were KD 148,367,000. Hence, per barrel government revenue increased to KD 0.159 (then equivalent to U.S. \$ 0.445), i.e., an increase of 442 percent.

The 1955 supplemental agreement introduced the concept of posted prices--merely tax-reference prices which marked the beginning of a more complex era in government-company relationships. Royalty payments became 12.5 percent of the value of crude oil produced at posted prices and were also treated as credit against income tax payments. Income taxes were also fifty percent of net profits calculated at posted prices. In other words, income taxes were one-half of the difference between the value of crude oil at posted prices, on the one hand, and current expenditures, rent, and depreciation on the other hand. To evaluate the impact of this agreement, the period of 1956-1958 can best provide the data. During this period, KOC production totaled 1,325.3 million U.S. barrels while the corresponding payment to the government was KD 338,355,000. Therefore, the per-barrel government take was KD 0.255 (then equivalent to U.S. $ 0.71); i.e., an increase of 60 percent over the period 1951-1954.

Other oil companies were granted concessions after World War II; Aminoil (American Amalgamated Oil Company) in 1948, and the Arabian Oil Company Ltd. (AOC) in 1958. Offshore waters outside the territorial limits were conceded to the Kuwait Shell Petroleum Development Company Ltd. (KSPDC) in 1951.

The original terms of all of these concessions have changed drastically over the years as the governments of the oil-producing countries began to assert more control over their domestic resources. In 1972 the oil-producing countries of the Gulf region reached an agreement with the major oil companies for 25 percent participation in oil production. Under the plan Kuwait was entitled to 25 percent of the oil produced by the Kuwait Oil Company and could sell the oil back to the Kuwait Oil Company at a prearranged price. In January 1974, while the world was feeling the impact of increased oil prices, Kuwait extended its participation in the operation of the KOC to 60 percent.[4]

By December 1975 full participation in the production facilities of the KOC by Kuwait was complete, and in 1977 Aminoil's concession was terminated and the company's assets taken over by the Wafra Kuwait Company (WKC).[5] In April 1978 WKC was dissolved and its operation distributed between the KOC and the Kuwait National Petroleum Company (KNPC).

The KNPC was founded in 1960. It was initially involved in the marketing of refined petroleum products within Kuwait. The KNPC is now assuming local and foreign marketing activities related to Kuwait total refined products. Originally, the Kuwaiti government owned only 60 percent of the company's shares. However, it bought out the private shares to gain full ownership.[6]

The Kuwait Petroleum Corporation now operates the following wholly-owned subsidiaries: the Kuwait Oil Company, oil and gas production; the Kuwait National Petroleum Company, refining distribution and liquefied petroleum gas production; the Kuwait Oil Tankers Company (KOTC), crude oil and product shipping; and the Petrochemical Industries Company (PIC). In addition, Kuwait owns 70 percent of the Kuwait International Petroleum Investments Company (KIPIC). In 1980 Kuwait ranked twelfth among world oil producers, seventh among OPEC countries, fifth among OAPEC countries, and fifth among Middle Eastern countries.

Total exports of crude oil and refined products reached 1.6 million barrels per day in 1980.[7] Kuwait's crude production in 1980 dropped to around 1.6 million barrels per day, or 35 percent below the previous year. This in turn decreased the ratio of Kuwait crude production to the total production in the Middle East, in OPEC, and in the world to 8.8 percent, 6 percent, and 2.7 percent, respectively, after it had been 11.6 percent, 8 percent, and 4 percent in 1979, respectively.

The oil sector continues to play a vital role in the Kuwaiti economy. It contributed 97 percent of public revenues, 93 percent of total export revenues, and around 70 percent of the GDP in 1980. From table 8 we see that local consumption rose from 5.9 million barrels in 1974 to 13.5 million barrels in 1978.

Kuwiat's oil production in 1961 was 1.7 million barrels per day, reaching an all-time high in 1972 of 3.3 million barrels per day. Production declined to 1.6 million barrels per day in 1980 and production in the first half of 1981 was estimated at 1 million barrels per day. Exports of crude and refined products ranged from 1.6 million b/d in 1961 to 3.1 million b/d in 1972. It declined to 1.6 million b/d in 1980.

Precise figures about Kuwait's proven reserves are difficult to derive. Most estimates put reserves at 68 billion barrels. Even this figure could be an underestimate if more oil is found. (Proved plus probable plus undiscovered (recoverable oil) is estimated at 92 billion barrels.) The Oil Ministry is optimistic that exploration in the Burgan field, where two 20,000 foot wells have been drilled and a seismic survey done with Getty Oil in the neutral zone with Saudi Arabia, will produce more reserves.

Under existing circumstances, and with the political instability of the region following the Iranian Revolution, it is a difficult task to predict Kuwait's oil production in the coming years. Government officials insist that Kuwait is determined to cut oil production. Production averaged 2.2 million barrels per day las year; slightly higher than the 2 million barrels per day target. (Production was increased to help compensate for Iran's cutback.) The 1979/80 budget estimate of KD 2,120.5 million (U.S. $ 11,557 million) could rise to KD 4,700 (U.S. $ 17,407 million) if production is not reduced.[8] No official announcement has been made on the level of cutbacks or when they will be made. Various production levels have been suggested, ranging from 13. million to 1.7 million barrels per day with most observers expecting under 1.5 million barrels per day. Sheikh Ali Al-Sabah, the Kuwaiti Oil Minister, says that 1.3 million barrels per day could be a pivotal figure. Revenues jumped, however, during the period 1979/80 to KD 5,940.5 million (over 45 percent above 1978/79 revenues).[9]

After 1973, Kuwait oil revenues followed a steady upward trend following constant increases in crude production up to 1972/73 and the consecutive price rises in 1973/74 and 1974/75. In 1975/76, there was a 12 percent drop in oil revenues resulting from crude production cuts in that year. As a result of a 12 percent rise in production and the 10 percent price increase under OPEC's resolution taken in Doha during the second half of that year, oil revenues resumed their upward trend in 1976/77 and rose by about 16 percent over the previous year. Oil revenues in 1977/78 dropped slightly (1 percent) due to an 8.3 percent cut in production, but this drop was generally offset by the 10 percent price increase applied to 1977/78 and to the last half of 1976/77 only.[10] Table 8 shows the prices for Kuwaiti crude oil). Oil revenues for the fiscal year 1978/79 were estimated by the Ministry of Finance to be around 15 percent below the actual receipts for the previous year. This decline is attributable to the fact that the budget figures: (1) depend on a reserved estimate of crude production by KOC of less than 1.4 million barrels per day, (compared to 1.8 million barrles per day in 1977), and (2) assume that oil prices will maintain their previous level. However, actual production of crude oil in the first half of 1978/79 averaged 2 million barrels per day and was expected to continue the same in the second half. Besides, prices for crude oil in the second half will be increased by an average of 6.6 percent over their level in the previous fiscal year in pursuance of OPEC's decision in December 1978.

Revenues from oil in 1980/81 are expected to amount to KD 4,493.5 million in the form of oil receipts covering around 97 percent of the total state revenues excluding income from investment.

Kuwait joined other OPEC members in raising its oil prices drastically between October 1973 and January 1974. However, in the period from June 1975 to the end of 1977, Kuwait reduced the per-barrel price of its crude 31° API twice; first by 7 cents and then by 5 cents (because of gravity differentials between that type of oil and Arab light). The price of Khafji crude was reduced in September 1977 from \$12.24 to \$12.10 to narrow the gap between that oil and its Saudi counterpart priced at \$12.03 per barrel. In OPEC's meeting in Geneva in October 1981, it was agreed that Saudi Arabia and other moderates raise their price per barrel to \$34.00 dollars on the condition that the "hawks", Nigeria, Libya, etc. reduce their prices to the above mentioned figure.

From tables 7 and 8 we conclude that the year 1980 witnessed the first price rise since the 1974 oil price adjustments (1974 = 100). These figures mean that one unit of return per barrel of oil during the period of 1977-1979 was not adequate to finance one unit of the components of Kuwaiti imports. In 1980, however, the purchasing power of the price per barrel of oil recorded its first rise, i.e., the unit of return per barrel of oil in that year was adequate to finance one unit of imports, the value of which was one and one-half times the per barrel return in 1974.[12]

TABLE 7

REAL PRICES FOR KUWAIT CRUDE OIL
(equivalent to $/barrel)

	1975	1976	1977	1978	1979	Jan-Sept 1980
Official price	10.493	10.600	11.259	12,232	18.519	29,849
Real price	10.493	9.329	10.305	10.152	10.291	15.713

Source: Central Bank of Kuwait, Economic Report for 1980, p. 39

From Tables 7 and ? we conclude that the year 1980 witnessed the first price rise since the 1974 oil price adjustments (1974 = 100). These figures mean that one unit of return per barrel of oil during the period 1987-79 was not adequate to finance one unit of the components of Kuwaiti imports. In 1980, however, the purchasing power of the price per barrel of oil recorded it first rise, i.e. the unit of return per barrel of oil in that year was adequate to finance one unit of imports, the value of which one and one-half time the per barrel return in 1974.*

TABLE 8

Petroleum Movement 1974-1978

	Daily Average					Total of the Year				
	1978	1977	1976	1975	1974	1978	1977	1976	1975	1974
pecification	Barrels					Thousand	Barrels			
rude Petroleum										
roduction	2,129.013	1,967,501	2,151,298	2,084,189	2,546,142	777,090	718,138	785,224	760,729	929,342
efinery Supplies	365,438	354,424	366,682	290,110	333,027	133,385	129,365	133,839	105,890	121,555
xported	1,761,186	1,612,130	1,795,805	1,788,263	2,204,880	642,833	588,427	655,469	652,716	804,781
efined Products										
roduction	357,602	351,321	361,575	289,619	332,088	130,525	128,232	131,795	105,711	121,212
xported	290,145	323,017	358,353	294,816	332,737	105,903	117,901	130,799	92,484	98,410
unkers	42,074	45,665	44,737	41,436	63,121	15,357	16,668	16,329	15,124	23,039
ocal consumption	36,852	33,476	30,534	16,721	16,099	13,451	12,219	11,145	6,103	5,876
iquified gases products	52,789	56,447	54,378	48.342	57,244	19,268	20,603	19,848	17,645	20,894
xport of liquefied gases	37,183	40,036	52,471	47,266	56,227	13,572	14,613	19,152	17,252	20,523
atural gas in million cubic feet										
roduction	1,076	993	1,084	1,044	1,279	392,828	362,623	395,776	381,135	466,939
ocal consumption	660	671	668	615	689	241,248	245,258	243,754	224,348	251,450

Source: Annual Statistical Abstract, Ministry of Planning Central Statistical Office, State of Kuwait 1979, p. 163.

TABLE 9

Government Revenues
(KD million)

Year Ending	1975/76[1]	1976/77	1977/78	1978/79	1979/80	1980/81 (Budget Estimates)
Revenues from:						
Oil	2793.3	2598.2	2575.3	3036.1	5940.5	4493.5
Others (2)	431.1	437.6	518.1	765.6	1027.5	141.3
TOTAL	3224.4	3035.8	3093.4	3801.7	6968.0	4634.8
Oil Revenues as percent of Total	87	86	83	80	85	97

Source: Central Bank of Kuwait, Economic Report 1980, p. 122.

(1) Fifteen months ending 30 June 1976.
(2) Revenues from reserve investment and other revenues.
(3) Excluding income from investment.

TABLE 10

Summary of Government Revenues and Expenditure
(KD million)

Particulars	1977/78	1978/79	1979/80	Budget 1980/81	June-December 1979	June-December 1980
1. Revenues from:	3093.4	3697.7	6968.3	6295.4	3394.0	2916.9
Oil	2575.3	3036.1	5940.5	4493.5	2954.9	2264.3
Investment income	384.2	521.4	880.3	1660.6	383.1	561.4
Taxes:	48.6	51.0	61.8	52.4	25.3	36.0
Customs duties	(45.3)	(46.3)	(53.9)	(47.4)	(22.5)	(32.9)
Non-tax income	85.3	89.3	85.7	88.9	30.7	55.2
2. Public Expenditures (a+b+c+d+e+f)	1959.2	1943.9	2423.7	2919.5	1207.7	1366.6
Domestic Expenditure (a+b+c+d+e)	1745.5	1749.9	2210.7	2668.9	1033.3	1173.0
a) Domestic current expenditure	759.5	881.4	1252.6	1738.0	602.7	712.3
Wages and Salaries	423.0	456.6	621.6	708.2	289.3	328.8
General Expenses	269.8	345.7	462.6	825.3	218.6	236.6
Domestic transfers and unclassified payments	66.7	79.1	168.4	204.5	94.8	146.9
b) Land purchases	188.4	107.4	263.9	200.0	48.2	95.3
c) Development expenditure	493.9	499.0	462.9	730.9	253.9	262.3
d) Local loans	6.3	23.1	13.5	--	- 1.9	13.5
e) participations	297.4	239.0	217.8	--	130.4	89.6
Share of local companies	(186.0)	(56.3)	(91.9)	--	(45.5)	(16.7)
Shares of financial & govt. institutions	(111.4)	(182.8)	(125.9)	--	(84.9)	(72.9)
f) Foreign transfers	213.7	194.0	213.0	250.6	174.4	193.6

(Continued.....)

TABLE 10 (Continued)

Summary of Government Revenues and Expenditure
(KD million)

Particulars	1977/78	1978/79	1979/80	Budget 1980/81	June-December 1979	June-December 1980
3. Gross Surplus	1134.2	1753.8	4544.6	3375.9	2186.3	1550.3
4. Financing	-1134.2	-1753.8	-4544.6	-3375.9	-2186.3	-1550.3
Govt. deposits with CBK	- 67.4	- 53.3	- 96.1		- 22.2	- 148.7
Govt. deposits with commercial banks	- 0.6	+ 17.3	- 94.4		- 80.2	- 10.8
Change in cash balances	+ 1.7	+ 19.8	- 0.6		--	--
Local and foreign reserve funds	-1066.9	-1737.6	-4353.5		-2083.9	-1390.8

Source: Central Bank of Kuwait, Economic Report 1980, p. 42

(1) Estimates.

b. Agriculture

The economic importance of agriculture in Kuwait has so far been very limited. The contribution of this sector to domestic output does not exceed 0.04 percent. Reasons for the marginal role of agriculture in Kuwait are to be found in the deficiencies of soil, scarcity of irrigation water, climate conditions, and the limited supply of manpower trained in agricultural skills.

However, the cultivable areas, as well as the agricultural production, have recently expanded. The total cultivable area in Kuwait is estimated at 18 thousand donums. (A donum is approximatley 1,000 square meters.) Vegetables and crops occupy about 10 thousand donums, and another 1,034 donums are being utilized by orchared and wood trees. The total number of agricultural holdings amount to 524. Three hundred twelve holdings are specialized in vegetable production, 78 in poultry, 36 holdongs for breeding mild cows, 96 private holdings, and the remaining are multipurpose. Local production of vegetables now represent about 46 percent of total domestic consumption, milk 41.0 percent, eggs 18 percent, poultry about 34 percent, and fish 99 percent.[12]

The major crops in Kuwait are tomatoes, radishes, melons,and cucumbers. Clover is grwon on a relatively large scale as animal feed. The number of livestock holdings amounts to 5,941 head. In addition, there are about 1,145,460 chickens. The household sector contributes to agricultural production in general, and to livestock production in particular. Underground water is the main source of irrigation. Water is pumped from deep wells in holdings through water pipes. Salinity of water ranges from 0.3 to 1.1 per

It should be mentioned here that the government of Kuwait provides most of the infrastructure and soft loans for agricultural production. Therefore, the insignificant role which agriculture plays in the nonoil segment of the Kuwait economy could only be explained through the climatic and ecological reasons mentioned before.

A large portion of Kuwait's food requirements is imported. During 1975, for example, 27.5 percent of consumer goods imports consisted of food, live anumals, beverages and tobacco.

The land utilization ratio is very low in Kuwait. Out of its area of 17,818 kilometers, 16,282 kilometers are non-cultivable. This situation has remained almost unchanged since 1973. However, total vegetable production increased from KD 10.3 million in 1974 to 23.6 million in 1978.

The government has been running intensive research programs on advanced cultivation techniques for vegetables and fruits. These programs are conducted in the government's experimental farm which is run in conjunction with the United Nations Food and Agriculture Organization (F.A.O.). Another on-going research project is on hydroponic systems. Kuwait's hydroponics unit was the first in the Gulf and there is now considerable commercial interest in this form of cultivation.

c. Industry

Kuwait's dependence on the revenues from oil necessitates the diversification of its economic base. Agricultural expansion proved to be very difficult, however, industrialization is one of the options left open. Kuwait's policy in the foreseeable future is to let private sector lead in industrial development which has shown interest in light industries. The government's prime concern, on the other hand is in oil-related industries. Ironically, oil-related industries intensify the dependence on oil by emphasizing oil-based industries. In a report on Kuwait, the report of a mission organized by the International Bank for Reconstruction and Development mentioned the following

> ...in most countries, industries have grown naturally from the exploitation of diverse indigenous raw materials or because of a cheap technically competent work force. In Kuwait, however, industrialization must be based on some negative elements, namely lack of alternative opportunities in agriculture and the governments redundant work force, as well as such positive factors as plantiful oil and gas resources and cheap and abundant capital.[13] — See footnote

Kuwait retains around 10 percent of its refined products for local consumption. The remainder is exported. Refined products reached around 130.4 million barrels in 1978. The decreasing production trend was reversed in 1976 after the K.N.P.C. expanded its refinery and the world increased its demand for refined products. Also, local consumption rose from 17,000 bbl./day in 1975 to 37,000 bbl./day in 1978, and from around 13 percent in 1973 to around 18 percent in 1976, and 20 percent for both 1977 and 1978. The increase in the refined products which amounted to 37 percent in 1976 dropped by 1 percent in 1977 due to the one month shutdown of the Shu'Aiba Refinery for improvements, and marketing difficulties. These marketing difficulties continued throughout the first three quarters of 1978. As a result, refined products were reduced by 30 percent. Decreased supplies in world markets, following the absence of Iranian products, increased the exports of refined products in the fourth quarter of 1978 by 31.5 percent. Taking the year as a whole, Kuwaiti exports of refined products increased by around 7.1 percent.[14]

The production of fertilizer in Kuwait is dependent upon developments in production factors on the one hand, and in foreign markets on the other. The 7 percent decline in urea and ammonium sulfate production in 1974 was due to operation conditions. The 20 percent drop in production of both items in 1976 was due to a slackened world demand for fertilizer combined with certain operation difficulties in the plants. Rates of urea production in 1977 and 1978 increased by around 5.8 percent and 21.4 percent respectively.

Kuwait has sought increasing participation in the oceanic transportation of crude and refined oil and gas. Like other downstream operations, however, the country has to face the problem of excess world capacity of oil tankers. The Kuwait Oil Tankers Company (KOTC) is 49 percent government owned and 51 percent privately owned. The fleet has expanded 4 fold since 1968 and by 1978 the Kuwaiti fleet consisted of 12 tankers with a total load capacity of 2.31 million metric tons, which makes Kuwait rank first among OPEC members. Besides operating her oil tankers, the Kuwait Oil Tankers Company now supervises gas tankers and an expanding fleet of refined-oil tankers; of which a recently delivered new tanker is intended to serve the Arab Gulf and other neighboring areas, plus another to provide bunker to ships on the high seas outside the territory of Kuwait. Despite this, the current load capacity is not adequate to take more than 8 percent of Kuwaiti crude and refined exports; a fact indicating the potential opportunity to expand that capacity if the K.O.T.C. fleet is to transport the major portion of Kuwait exports.

d. Labor and Human Capital

70 percent of Kuwait's labor force are expatriates. High immigration accompanied developments in all fields to compensate for shortages in the local labor force. Table11 shows labor force by sex and division of economic activity in census years. The labor force participation rate decreased from 42.1 percent in 1957 to 30.5 percent in 1975. This is probably due to a shift in age composition of the population. In absolute terms, the labor force decreased from 80,288 in 1957 to 304,582 in 1975. From Table 7 we see that the majority of the labor force is employed in the services sector -- 53.7 percent; followed by trade and restaurants -- 13.3 percent; and the construction sector -- 10.8 percent.

The rate of unemployment in 1975 was 2.1 percent of the total labor force as compared to 1.7 percent in 1957. Women accounted for almost 12 percent of the total force in 1975 as compared to 2.6 percent in 1957.[15]

4. Public Policy

a. Monetary and Banking System and Monetary and Fiscal Policy

There is no taxation policy in Kuwait. Thus, fiscal policy is limited to public expenditures aspects which are financed by the government through oil revenues. Oil revenues in the fiscal 1972/73 - 1977/78 period represented 95 percent of State revenues. Hence, the Kuwaiti economy is in definite need of diversifying its

TABLE 11

Labour Force by Sex and Division of Economic Activity in Census Years (1957, 1965, 1970, 1975)

:ons of ɔmic Activity	Sex	Census 1975 Non-Kuwaiti	Census 1975 Kuwaiti	Census 1970 Non-Kuwaiti	Census 1970 Kuwaiti	Census 1965 Non-Kuwaiti	Census 1965 Kuwaiti	Census 1957 Non-Kuwaiti	Census 1957 Kuwaiti
:ulture,Hunting 'ishing	M	3,522	3,970	3,253	798	1,408	566	446	603
	F	9	13	5	4	2	7	--	--
:g & .arrying	M	2,953	1,767	4,828	1,627	5,241	1,337	4,088	1,211
	F	127	12	668	48	402	12	106	--
acturing dustries	M	21,889	2,237	25,876	6,100	16,103	1,823	5,539	1,009
	F	320	21	106	9	14	2	43	20
ruction	M	30,357	1,755	31,418	2,186	27,566	1,262	8,025	378
	F	143	1	66	2	18	2	--	--
ricity,Gas Water	M	5,230	2,029	5,106	2,130	5,341	1,645	--	--
	F	7	5	13	3	5	--	--	--
sale & Retail ade	M	32,364	6,297	25,181	7,261	17,769	5,115	4,058	4,107
	F	868	30	534	37	147	14	15	44
portation & mmunication	M	10,853	4,305	9,640	2,357	7,336	2,612	2,053	1,513
	F	265	262	136	5	76	1	--	--
:es	M	76,751	57,306	54,401	34,919	50,123	24,571	27,697	14,365
	F	25,786	6,959	12,909	1,907	6,892	948	1,522	316
ities not ıately defined	M	--	--	559	236	611	232	3,583	4,803
	F	--	2	21	5	64	17	7	4
Activity	M	183,919	79,666	160,262	57,614	131,498	39,163	55,489	27,989
	F	27,525	7,305	14,458	2,020	7,620	1,003	1,693	384
	T	211,444	86,971	174,720	59,634	139,118	40,166	57,182	28,373
.ve	M	17,206	38,863	17,341	43,123	10,240	25,583	6,180	10,472
	F	86,634	112,812	68,938	96,894	35,580	60,772	10,430	34,903
	M	201,125	118,529	177,603	100,737	141,738	64,746	61,669	38,461
	F	114,159	120,117	83,396	98,914	43,200	61,775	12,123	35,287
	T	315,284	238,646	260,999	199,651	184,938	126,521	73,792	73,748

ource: Annual Statistical Abstract, Ministry of Planning Central tatistical Office, 1979, p. 103.

TABLE 12

Labour Force by Sex and Economic Activity
(Census 1975)

Economic Activity	Total	Non-Kuwaiti T	F	M	Kuwaiti T	F	M
Agriculture and Hunting	6,671	2,814	1	2,813	3,857	13	3,844
Fishing	843	717	8	709	126	--	126
Total Agriculture,Hunting and Fishing	7,514	3,531	9	3,522	3,983	13	3,970
Crude Petroleum & Natural Gas Production	4,476	2,748	127	2,621	1,728	12	1,716
Other mining activities	383	332	--	332	51	--	51
Total Mining and Quarrying	4,859	3,080	127	2,953	1,779	12	1,767
Manufacture of Food,Beverages and Tobacco	4,211	4,043	11	4,032	168	--	168
Textile,Wearing Apparel and Leather	3,900	3,852	157	3,695	48	7	41
Manufacture of Furniture and Industries Fixture	3,291	3,161	7	3,154	130	--	130
Manufacture of Paper and Paper Products	1,941	1,455	32	1,423	486	7	479
Manufacture of Chemical Products	4,533	3,643	87	3,556	890	6	884
Manufacture of Non-metallic Products	3,326	3,057	12	3,045	269	1	268
Metal Industries	3,143	2,879	14	2,865	264	--	264
Other Manufacturing Industries	122	119	--	119	3	--	3
Total Manufacturing Industries	24,467	22,209	320	21,889	2,258	21	2,237
Total Electricity,Gas and Water	7,271	5,237	7	5,230	2,034	5	2,029
Total Construction	32,256	30,500	143	30,357	1,756	1	1,755
Wholesale and Retail Trade	35,401	29,186	738	28,448	6,215	28	6,187
Restaurants and Hotels	4,158	4,046	130	3,916	112	2	110
Total Trade and Restaurants	39,559	33,232	868	32,364	6,327	30	6,297
Transport and Storage	11,822	9,560	265	9,295	2,262	14	2,248

(Continued.....)

TABLE 12 (Continued)
Labour Force by Sex and Economic Activity
(Census 1975)

Economic Activity	Total	Non-Kuwaiti T	F	M	Kuwaiti T	F	M
Communications	3,863	1,558	--	1,558	2,305	248	2,057
Total Transport, Storage and Communication	15,685	11,118	265	10,853	4,567	262	4,305
Financial Institutions	3,527	2,804	402	2,402	723	79	644
Insurance	787	772	68	704	15	--	15
Real Estate and Business Services	2,209	1,570	128	1,442	639	3	636
Total Financial Insitutions, Insurance	6,523	5,146	598	4,548	1,377	82	1,295
Public Administration and Defense	68,887	23,482	478	23,004	45,405	783	44,622
Sanitary Services	4,430	4,144	10	4,134	286	--	286
Social Services	44,061	29,263	12,439	16,824	14,798	5,904	8,894
Recreational Services	2,478	1,483	74	1,409	995	70	925
Personal and Household Services	39,370	38,142	12,064	26,078	1,228	110	1,118
International Bodies	1,053	877	123	754	176	10	166
Total Services	160,279	97,391	25,188	72,203	62,888	6,877	56,011
Not Stated	2	--	--	--	2	2	--
Grand Total	298,415	211,444	27,525	183,919	86,971	7,305	79,666

Source: Ibid., p. 104

TABLE 13

Labour Force by Sex in Census Years
(1957, 1965, 1970, 1975)

Indicator	Total T	F	M	Non-Kuwaiti T	F	M	Kuwaiti T	F	M
						Census 1957			
Employed	78,884	2,071	76,813	54,960	1,687	53,273	23,924	384	23,540
Unemployed	1,404	6	1,398	726	6	720	678	--	678
Total Labour force*	80,288	2,077	78,211	55,686	1,693	53,993	24,602	384	24,218
Population	190,794	69,003	121,791	83,548	16,868	66,680	107,246	52,135	55,111
Percent of Population	42.1	3.0	64.2	66.7	1.0	81.0	22.9	0.7	43.9
						Census 1965			
Employed	179,103	8,615	170,488	138,953	7,613	131,340	40,150	1,002	39,138
Unemployed	5,194	153	5,041	2,326	63	2,263	2,868	90	2,788
Total Labour force*	184,297	8,768	175,529	141,279	7,676	133,603	43,018	1,092	41,926
Population	467,339	131,027	286,312	247,280	73,537	173,743	220,059	107,490	112,569
Percent of Population	39.4	4.8	61.3	57.1	10.4	76.9	19.5	1.0	37.2
						Census 1970			
Employed	234,043	16,464	217,579	174,495	14,447	160,048	59,548	2,017	57,531
Unemployed	8,153	132	8,021	2,332	94	2,238	5,821	38	5,783
Total Labour force*	242,196	16,596	225,600	176,827	14,541	162,286	65,369	2,055	63,314
Population	738,662	318,781	419,881	391,266	146,898	244,268	347,396	171,883	175,513
Percent of Population	32.8	5.2	53.7	45.2	9.9	66.4	18.8	1.2	36.1
						Census 1975			
Employed	298,415	34,830	263,585	211,444	27,525	183,919	86,971	7,305	79,666
Unemployed	6,167	376	5,791	1,294	204	1,090	4,873	172	4,701
Total Labour force**	304,582	35,206	269,376	212,738	27,729	185,009	91,844	7,477	84,367
Population	994,837	451,069	543,768	522,749	215,581	307,168	472,088	235,488	236,600
Percent of Population	30.6	7.8	50.4	40.7	12.9	60.2	19.5	3.2	35.7

Source: Ibid., p. 97.

* Age 12 years and over.

** Age 15 and over including enemployed were engaged in labour;
1375 Kuwaitis, 1365 males and 10 females and 445 Non-Kuwaitis, 395 males and 50 females.

resources.

Government revenues in 1979/80 reached KD 6968.3 million, i.e. an increase of 88.4 percent over the previous year and 80.4 percent over estimates in the general budget. This increase resulted from the doubled oil receipts which increased by around 95.7 percent over the previous year.[16] (

The Reserve Fund for Future Generations was established to meet such reserve build-up pressures. Under Decree Law No. 106 of the year 1976, the Fund was initiated and assigned 5 percent of the State General Reserve. The funds assigned to it were invested in prime shares and bonds, in real estate, and in other assets in different currencies and in various countries. In addition, the law has stipulated the 10 percent of the total government revenues should be transferred annually to the Fund, and that no outlays should be made there for any purpose whatsoever. The truth of the matter is that, without curbing waste and extravagant spending and expanding the income base, the constant provison of the Fund from the annual income will not be sufficient. It is a fact that public expenditure is the moving force behind domestic economic growth.

Income from investment related to the State General Reserve Account and the Fund for Future Generations, representing around 12.6 percent of total revenues, amounted to 880.3 million during the fiscal year 1979/80, i.e. an increase of 68.8 percent over the previous year. On the other hand other tax and non-tax revenues mostly in the form of customs duties and charges for public services rendered by Government ministries and departments, totalled KD 147.5 million in 1979/80 an increase of 4 percent over the year 1978/79.

The State fiscal system is made up of three types of budgets and three extrabudgetary accounts through which the financial transactions of the government section are conducted. (The Independent Account was abolished in 1977/78). Of the three types of budgets, the General Budget is most important, followed by the Attached Budgets (for the Municipality, the National Assembly and Land Acquisition) and the 12 Independent Budgets. The latter two types of budgets are self-financed, their revenues do not meet their increasing expenditures and the deficit is, therefore, covered from the State General Budget. Extra budgetary accounts include the General Account, through which receipts from crude oil sales and royalties, as well as other administrative revenues are transferred. The General Reserve Account is maintained to receive government budget surplusses (i.e. the differential between public revenues and expenditures).

Kuwait imports virtually everything. Therefore, domestic prices are influenced directly by changes in world prices. Other price influencing factors include the rapid growth of the money supply and the limited channels of investment where surplus funds can be absorbed.

The cost of living index in 1980 rose to 7.7 percent from 5.2 percent in the previous year. The increase in the index for the foodstuffs division accompanied by an increase in the household appliances, educational, medical recreational, transport, communication, housing and other related services.

TABLE 14

Cost of Living Index
(1972=100)

Division	Relative Weight	Index						Change Over Preceeding Year (percent)				
		1975	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980
Foodstuffs	37.1	153.7	163.7	175.4	182.6	186.4	206.9	14.5	7.1	4.1	2.1	11.0
Clothing & Cosmetics	14.5	124.4	135.6	151.8	159.8	178.0	188.4	9.0	11.9	5.3	11.4	5.8
Household Appliances	2.6	146.5	149.7	157.2	161.0	164.8	179.8	2.1	5.0	2.4	2.4	9.1
Housing and Related Services	17.7	106.0	122.8	145.8	164.3	174.7	186.4	15.8	18.7	12.7	6.3	6.7
Durable Consumer Goods	14.0	136.8	138.8	150.9	158.7	166.8	169.2	1.4	8.7	5.2	5.1	1.4
Transport and Communication	9.6	120.8	119.2	130.5	141.0	147.0	159.9	1.4	9.4	8.0	4.3	8.8
Educational, Medical and Recreational Services	4.5	118.6	126.0	132.1	144.9	163.5	184.6	7.9	3.2	9.7	12.8	12.9
General Index	100.0	133.7	142.7	156.6	166.4	175.0	188.5	6.7	9.7	6.2	5.2	7.7

Source: Central Bank of Kuwait, Economic Report 1980, p. 86.

Note: Index for housing and related services for 1976 and 1977 has been adjusted to include the recent adjustment in rentals under this division; consequently, totals differed from each other in the said two years. (Ref. Comprehensive Survey by the Central Statistical Office.)

TABLE 15

Balance of Trade
(KD million)

	1974	1975	1976	1977	1978	1979	1980 (provisional)
Exports:	3214.7	2663.0	2874.4	2792.6	2864.1	5088.5	5721.4 (1)
Oil	3097.5	2492.6	2658.9	2557.1	2628.7	4781.5	5314.0 (2)
Non-oil	117.2	170.4	215.5	235.5	235.4	307.0	407.4 (3)
Imports:	455.1	693.2	972.0	1387.1	1263.9	1437.0	1806.7 (3)
Surplus	2759.6	1969.8	1902.4	1405.5	1600.2	3651.5	3914.7

Source: Central Bank of Kuwait, Economic Report 1980, p. 90.

(1) Estimates.
(2) Actuals for value and volume of exports for the first half, and estimates as based on the rate of oil production, and oil prices for the second half of the year and on the assumption of the application of a premium on the official prices, about $5.5/barrel to part of the exports.
(3) Based on actual data for the first ten months.

This increase could be attributed to both local and global origins. On the other hand, there was a decline in clothing and cosmetics and durable consumer goods division. The decline in these divisions is due to a deceleration in the wholesale markets in Kuwait in 1980. One can say that during the past five years (1976-1980) the cost of living in Kuwait rose by an annual average of 7.1 percent.

Kuwait's balance of trade realized a substantial surplus in 1974, exceeding three times its level in 1973. During the period 1974-77, however, it took a downward trend, declining by an average of around 20 percent per annum as a result of the increased imports by an average of around 45 percent during this period and the decline in exports in 1975 and 1977 in particular. The surplus then rose by 14 percent in 1978, on account of the decrease in the value of imports and again by 128.2 percent in 1979 following the increase in the value of exports. The estimates for 1980 show that Kuwait's balance of trade amounted to KD 3915 million, an increase of 7.2 percent over 1979. This increase is due to a 26 percent rise in the value of imports against 912.4 percent increase in the total value of exports.

Many items such as rice (the main item in the Kuwaiti's diet), sugar, bread, etc., are subsidized by the government. Continued government subsidies for foodstuffs played a significant role in curbing the rise of market prices for alternative commodities at a time when prices for some other items such as coffee and cocoa increased despite the drop in their world price indices.

The Central Bank of Kuwait supervises the activities of all specialized banks and financial and investment companies currently operating in Kuwait. An exception is the Credit and Savings Bank which is fully owned by the government, and the Kuwait Finance House, which operates in accordance with

Islamic Laws.

Since the Central Bank is the authority in charge of formulating and implementing the monetary policy in Kuwait, it has continued its effort to regulate and control domestic monetary developments, which were in a rather dangerous trend in the past five years. This trend has subsided in the past two years, but the question of regulating domestic liquidity accumulations and directing local monetary development as well, remains on the major issues of concern to the Bank

b. Development Planning

Kuwait's technical base for planning has been inadequate because of the lack of skill in formulation, lack of adequate statistical information and lack of ability to implement. Accordingly, long-range planning in Kuwait has had a short and un-spectacular history.

The first comprehensive national long range development plan was the Five Year Economic and Social Plan of 1976-71. Only 46 percent of the investment proposed under the plan was achieved. In general, the plan succeeded in strenghthening ties with Arab countries and developing infrastructure. However, the population and labor plans were not implemented and economic diversification was not successful. Relatively little (5 percent of total public expenditure) was allocated to the productive sector, as the government preferred private investment in these areas. The private sector however, was equally reluctant, and this strategy was a failure. A second five year plan was to be launched by 1975, but was delayed until 1976. In other words, the period from 1972-1975 passed without any plan being followed.

As cited in the current Five-year Development Plan (1976-1981), Kuwaits economic development goals are: "the construction of an economic society propelled by internal forces and a growing rate of income and production with a minimum guaranteed level of welfare to each individual."[17]

The Plan's goals include:

1) To insure levels of income to accompany the consistent increase in living expenses.

2) To find production alternatives that could generate increasing income.

3) To develop human resources to expose the technical and leadership abilities; concentrating on reinforcing women's roles in development.

4) Reinforce the infrastructure and the basic services to accompany the execution of development plans, especially in the fields of energy, water, and transportation.

5) Insure social balance and achieve equal chances in productive work to guarantee social justice.

6) To develop social systems and institutions in order to have integration and coordination to achieve the desired social change.

7) To insure geographical balance in making available general utilities and basic services in all areas.

8) To develop the natural environment and protect it from pollution.

9) To reinforce the social and eocnomic relations in the Gulf area and on the Arabic and international levels. Also, to encourage attitudes which aim to achieve higher degrees of cooperation and coordination between Arab countries.

5. Social and Cultural Change

Kuwait has progressed rapidly in the field of education. An indication of this is the increase in the number of students and teachers in the last quarter of a century. The total number of students in public schools increased from 4,665 in 1948/49 to 267,518 in 1978/79.[18] The number of teachers increased from 198 to 20,264 during the same period. Private education has also recorded rapid growth in recent years. This expansion has taken place in response to the needs of the large and varied expatriate community in the country. Private education in Kuwait is available in both foreign language and Arabic. In 1979 the total private secondary school enrollment in foreign and Arabic language schools was 2,791 and 5,908 respectively. Males and females are rather equally represented in Kuwaiti private schools. The male/female ratio in pbulic schools is , however, weighted more heavily toward males.[19] The number of students in private schools and institutes during the academic year of 1978/79 was 59,424 compared to 55,777 in 1977/78. This represents an increase of 6.5 percent.

Good progress was also registered in the increase in evening classes of adult literacy; from 33 in 1956/66 to 140 in 1978/79. The number of participants also increase from 10,829 to 18,314 in 1978/79. In spite of this positive indication, the rate of illiteracy is still high. According to the 1975 census, the illiteracy rate was 36 percent (45.8 percent for females and 28.5 percent for males) for the whole population. For the Kuwaiti nationals, the rates were much higher; 59.1 percent for females and 30 percent for males. This higher percentage of illiteracy among Kuwaitis could be attributed to the naturalization of Bedouins policy followed by the government. The 1980 census will certainly show a change because, although in 1975 in the over-fifty age group most female Kuwaitis and three quarters of male Kuwaitis were illiterate, by the end of 1979, only 18.7 percent of the 15 year olds were illiterate (but still two and a half times as many girls as boys).

The handicapped and educationally subnormal (ESN) childrens' needs are met by a complex of nine institutes of special education which provide classes at primary, intermediate and vocational levels for deaf, blind, ESN and paralytic children. The complex started in 1956 as a school for blind boys and it is now considered to be the most advanced center of its kind in the Gulf. It's teachers amount to 500 and the children to 2,485, of whom 27 percent are non-Kuwaitis.

As for higher education, Kuwait has only one university. The number of students at Kuwait University reached 17,123 during the academic year 1978/79 as compared to 9,318 in the previous year. The Kuwaiti nationals counted 11,498 i.e., 67.1 percent of the total university enrollment, while students from the Arabian Gulf States counted 1,433; or around 8.4 percent.

The largest item in the government's 1979/80 budget was education and it was allocated KD 165.42 million ($613 million) or 7.3 percent of the total budget.

6. Absorptive Capacity Contraints and Structural Analysis

a. Traditional Constraints on Absorptive Capacity

Traditionally, the notion of absorptive capacity has referred to the level of net investment consistent with equilibrium between the rate of interest and the marginal efficiency of investment schedule. For public projects where externalities might be involved, an equivalent condition exists where social benefits just equal social costs using an appropriate discount-rate. If investment is carried beyond this point, resources are being allocated inefficiently since social rates of return are not equilibrated throughout the system.

In the analysis of Kuwait it is very difficult to conclude that infrastructure investment in roads and communications have proceeded far beyond the equilibrium break-even point between benefits and costs. Kuwaiti planners seemingly are not willing to initiate Saudi-like development (e.g., the Jubail and Yanbu mammoth industrial projects). In their new development plan, the Kuwaitis emphasize the services sector; spending on infrastructure and downstream operations.

The Kuwaiti government has been pursuing an oil conservation policy. Due to its new low oil production level, and vast reserves oil could last for a longer time than neighboring countries. Thus, Kuwait is in no hurry to develop alternative income sources as are, for example, Saudi Arabia and the United Arab Emirates. At the same time, Kuwaiti money managers have built an international reputation for their sound lucrative investments.

The usual marginal efficiency criteria hold that investment should proceed until the discounted value of the expected stream of future benefits just equals the cost of the proposed investment project where an appropriate rate is used for discounting. When public projects are being considered, external as well as direct benefits and costs, must be evaluated and an appropriate rate of discount determined; which may not necessarily coincide with the current market note of interest. This is especially true when we consider the case of nonrenewable resources. Thus, the economic evaluation of projects is immensely more complicated than might be suggested by the usual present value formulas which are used in elementary discussions of the subject. The issue becomes even more complex when we add the labor constraint and diversification factors relevant in the case of Kuwait.

To fight inflationary pressures, the Kuwaiti government has been trimming the budget and government expenditures. In addition, large projects execution is being delayed pending more feasibility studies.

(1). Import Capacity and Other Physical Constraints

The ability to handle a large and increasing volume of imports presented a number of bottlenecks to capital absorption in the 1970s in Kuwait. Most of the congestion arose with port facilities which, aside from a small air-freight terminal, handled the vast majority of all Kuwaiti imports. The main port in "Shuweikh" underwent several major expansion. Bottlenecks of the kind experienced from 1973 through 1977 are now a thing of the past and imported goods routinely flow to their final destination without delay.

(2). Manpower Constraints

Rapid development in virtually all fields forced Kuwait to import foreign labor on a vast scale. Consequently, Kuwaitis became a minority in their own country. In 1957, for example, when the population was 206,473, non-Kuwaitis made up 45 percent of the total population. By 1975, they amounted to 53 percent. In 1980 (preliminary results) non-Kuwaitis are estimated to make up 58.6 of the total population. Preliminary results of 1980 population census estimate the rate of population increase between 1975-1980 as 3.5 percent for Kuwaitis and 8.7 percent for non-Kuwaitis. Abolfathi (1977)[20] noted that, due to Kuwait's industrialization plans and its expanded need for foreign workers, the population is expected to grow at a rate of 9 to 10 percent in the next few years. Clearly, the answer to this problem is a clear naturalization policy to be set forward and implemented.

(3). Physical Bottlenecks

Although Kuwait shares many of the problems that are faced by many other developing countries, infrastructure is hardly one of them. Kuwait's urban roadways are by far the best among all OPEC countries. Although it has one of the largest automobiles-per-capita figures in the world, the construction of modern roads and highways have eased most of the traffic and congestion problems. Kuwait's ports went and are undergoing expansion operations to stay ahead of demand as mentioned earlier. They are considered among the least congested of all OPEC countries. Kuwait has recently finished construction on a new international airport designed to stay ahead of future demand. Therefore, in general terms, Kuwait has adequate infrastructure; which will undoubtedly help in its development process.

b. New Internal Constraints on Absorptive Capacity

In addition to the traditional constraints just discussed, a number of additional domestic considerations may reduce the flexibility of Kuwait to absorb large amounts of surplus funds. These internal constraints include: (1) Adverse movements in the distribution of income between urban and rural areas which might develop as a result of rapid industrialization,(2) inflationary pressures resulting from a large imbalance between aggregate demand and aggregate supply, (3) problems of urban congestion and noise and air pollution which accompany rapid urbanization of a developing country, and (4) social, cultural and political instability which may result from rapid development and which are not directly associated with any of the above mentioned items.

(1). Income distribution

The data available about income distribution in Kuwait is insufficient for detailed analysis. However, in Al-Sadoun's study (1976) the Gini coefficient has been found to be in the upper forties for 1972/73.[21]

Some major factors that help keep Kuwait's income distribution as poor as some developed countries are: (1) the absence of rural and urban divisions in the society with their associated modern and traditional problems, (2) the absence of real economic development at the early stages of the oil era, (3) the level of the per-capita GDP which exceeded the $500,000 level at which income distribution starts to improve, and (4) the important role of the public sector. (Al Sadoun also notes that the Gini coeffieient should have been kept low by adopting appropriate policies at the beginning of the oil era. He assumes that Kuwait, at that time, had a low coefficient. Surprisingly, Kuwait's coefficient was found to be relatively high in 1972/73.)

(2). Urbanization and congestion

Unlike many other developing countries, Kuwait's population is almost all urban. Still,some bedouins roam the desert around Kuwait City, but the government has been naturalizing them in recent years.

Along with the naturalization policy comes the government's housing policy. One part of the government's cradle-to-grave welfare policy is to make sure that every Kuwaiti has a modern roof over his or her head. Housing was allocated more than KD 705 million ($2,539 million) in the current Five Year Plan (1976-1981). There are three types of government housing which are available to all Kuwaiti citizens, provided they do not own property and that they form a "family", which means a married couple, with or without children. The groups which the government seek to provide housing for are the LIC (limited income) and AIC (average income) groups. Also, the rural and low income group, i.e., the large number of Beduoins who were setting up satellite shanty towns around Kuwait City.

Hand in hand with urbanization comes the problem of pollution. The current Five Year Plan (1976-1981) specifies the current environmental problems and the proposed solutions. Among the proposed measures to protect the environment are: (1) undertaking the necessary studies and evaluating the factors which effect the natural environment, (2) planning a long range environmental policy to accompany the country's social and economic policies, (3) formulating a program to face the resulting problems of environmental pollution, (4) promulgating laws and regulations that are necessary to organize and regulate the methods of overcoming pollution, (5) increasing public sanitary services in all areas, and (6) allocating 0.5 percent of general public expenditures to cover the expenses of environmental protection research.

The above points are some of the points mentioned in the current plan. They are very general and serve to outline policies towards the problem.

(3) Social, Cultural, and Political Stability

Kuwait, with a long history of substantial oil wealth, is a country that exemplifies both the potential for development and the problems associated with it.

The fact that the economy is flourishing seems to have eased social tension and the population of slightly over one million has a per-capita income of $18,332/year (1979 estimate); one of the highest in the world. It has modern infrastructure and service sectors, and has gained valuable expertise in managing its development priorities and vast financial resources. Up until August 1976,when the National Assembly (Parliament) was prorogued by the Amiri decree, Kuwait was probably the most democratic country in the Middle East. The fifty member Assembly was duly elected by about 50,000 adult male first class citizens, "meaning those descended from families resident in Kuwait in 1920." (The law requires 20 years residency for naturalization.)

Many reasons were forwarded for the prorogation of the National Assembly. The official version was that the Assembly, with some of its progressive elements, was delaying the approval of necessary projects and legislation. Another story was that the government did not want Kuwait to turn into another war-torn Lebanon. At that time, Lebanon was engaged in its civil war. The Kuwaiti press, written and edited largely by Palestinians, attacked the government's position of allying with the Syrian forces against the joint forces of the leftist Lebanese movement and the Palestinians. Saudi involvement could also be traced in the dissolving of the National Assembly; which was accompanied by imposing curbs on the press and suspending the Constitution. In February 1981 Kuwait witnessed a return to democracy as the National Assembly was restored and the constitution rectified. It will be noteworthy how the new era of 'democracy' will survive.

In the area of the Arabian Gulf economic cooperation, a most distinctive achievement by the states of the area was the establishment of the Gulf Cooperation Council in early 1981. This council is intended to act as an organ for strengthening the ties of these states, and to coordinate their mutual affairs, particularly in economic and social fields.

c. New External Constraints on Absorptive Capacity

Theoretical models have been developed by economists to determing the optimal rate of extraction of a nonrenewable resource. Using mathematical control techniques, they attempt to maximize the discounted present value over time of a stream of assets, subject to certain constraints. These models can be modified to take into consideration the possibility of extracting the nonrenewable resource and placing the proceeds into earning assets. Here, the decision whether to buy the earning asset or leave the resource unexploited will depend upon the projected appreciation of the resource, the variance of that appreciation, the riskiness of the earning asset, and the projected appreciation of the asset. Obviously, if the return on the asset is projected to be greater over some finite time horizon, then the resource will be exploited and the earning asset purchased.

A decision of this sort confronts Kuwait as it contemplates whether to extract oil at more rapid rates and use the proceeds to either finance economic development or to buy earning assets from the western countries.

Kuwait has chosen the strategy of buying earning assets from the western countries. Kuwaiti money managers have shown extreme shrewdness in managing their amassed oil wealth. It has been the declared policy of Kuwait to charge whatever the market will bare for their oil. In addition, they have been cutting back their oil production to keep pace with their expenditures.

In the long run, Kuwait, in our own judgement, will still belong to the "Hawks" group within OPEC and also play a moderating role whenever the future of OPEC is threatened.

Foreign Investment

Kuwait enjoys one of the highest per-capita incomes in the world. Its oil riches have been accumulating at a rate greater than its population's needs. The adeptness of the Kuwaitis in managing their money is an established fact on the world's monetary markets.

When the oil riches began flowing in 1952, Kuwait established the Kuwait Investment Office (KIO) in London. Today, the KIO is affiliated with Kuwait's Ministry of Finance. The Kuwait Investment Office is responsible for investing Kuwaiti petro-dollars in Europe and in other areas of the world. Kuwait's investments on the world markets were directed by Khalid Abu-Su'ud who had the confidence of the then Crown Prince and who now is the present Emir of Kuwait, Sheikh Jaber Al-Ahmad Al-Sabah. Abu-Su'ud is now the private consultant for the Emir of Kuwait.

Kuwait's investments are managed by the Ministry of Finance. The head of the Department of Foreign Investments reports directly to the Minister of Finance who, in turn, reports directly to the Emir.

The Department of Foreign Investment has three specialized section, responsible for investments placed in North and South America, in Europe, and in Asia. Being a tightly knit organization as it is, renders it difficult to assess Kuwait's investments and the rate of return on its various transactions.

With the quadrupling of oil prices in 1973, Kuwait, like all the other oil-rich, low-absorbing economies amassed a huge amount of wealth. The Kuwaiti money managers, trained long before that date, surpassed their peers in Saudi Arabia, and in the U.A.E., etc. in international investment. Kuwait's accumulated surplus is now approaching the $70 billion[22] mark and is constantly rising.

In 1970, Kuwait initiated the Reserve Fund for Future Generations. This unique project is allocated 10 percent of national oil revenues annually. The accumulated funds cannot be released until the year 2000. To give an idea of the immense size of this Fund, Kuwait's revenues in 1979/80 were estimated at $17,407 million.[23]

Another Kuwaiti investment fund is the Public Institute of Social Security. Although smaller in size, its assets top $2 billion.[24]

A well known and established fund for Third World development is the Kuwait Fund for Arab Economic Development. The Fund has been extending low-cost loans to poor countries since 1961. Of these very low-interest loans, 40 percent go to non-Arab countries.[25] The Fund's reserves have been accumulating by more than $100 million a year.[26] In spite of these facts, the percentage of Kuwait's GNP allocated to aid dropped significantly, from 10.6 percent in 1977 to 5.14 percent in 1979. The reason for this decline can be found in the government's wish to channel its aid through such organization as the International Monetary Fund in order to reduce credit risk.

The principal government agencies responsible for overseeing the most exciting element of Kuwait's accumulated surpluses, i.e., the international investment portfolios are: The Ministry of Finance, the Kuwait Investment Office (KIO), and a long list of banks and money managers. In addition to the Kuwaiti banks and investment houses entrusted with Kuwait's surpluses, some large New York houses, e.g., Morgan Guaranty Trust Company and Chase Manhattan, are utilized. The total value of Kuwait's foreign portfolio is estimated at $32 billion.

The much publicized but highly secretive agent acting on behalf of Kuwait's Finance Ministry is the KIO mentioned earlier. This office has gained professional expertise over the years and acts through St. Martin's Property Corporation, bought for $256.8 million in 1974 and fully owned by Kuwait.

Another activity of the KIO is investment in high-quality stock of real estate, insurance companies, investment trusts, and hotels, including the Savoy Hotel (28.3 percent), Chubb (10.2 percent), General Accident (7.95 percent), Guardian Royal Exchange (5.91) and Legal and General Assurance (6.2 percent). KIO ventures spread to Japan in pursuit of diversification. Through the Office's arrangements from London, today Kuwait owns shares in some leading Japanese household firms, in concerns such a Toshiba (35.5 million shares), Mitsubishi Electric Corporation (12 million shares), Hotochi (10.5 million shares), at a total cost of about $26.2 million.*

Kuwait's investments in Britain are estimated at above $600 million.* They were boosted up to this figure with the highly publicized Kuwaiti acquisition of the Hay's Wharf property and distribution group in London's dockland.

Kuwait's German interests include 14 percent of Daimler Benz, 25 percent of the Khorf-Stahl Steel Company, and 10 percent of Metallgessellshft —a Frankfurt-based metals and engineering concern.

Much of Kuwait's surplus is invested in the United States. How much and where these funds are located is a question still begging and answer. A spectacular acquisition was the purchase of Kiawah Island off the coast of South Carolina in 1976. Kuwaiti money managers are interested in the "top 500" United States companies. However, legal and fiscal obstacles, especially in real estate, are now causing problems.

Khaled Abu-Su'ud, the private advisor to the Emir of Kuwait, and the initiator of Kuwait's investment schemes, visited Brazil in 1980. Several weeks after his visit, Kuwait bought 10 percent of olkswagen de Brasil, In other parts of the world, Kuwait also has investment interests. Among the countries are: Pakistan, India, Indonesia, Malaysia, Singapore, Tunisia, Morocco, in addition to Sudan and Egypt.

Kuwait's bid to buy Santa Fe Company (October 1981) for 2.5 billion dollars is another proof of the government's interest in building up its energy portfolio. It has earlier taken 25 percent in the International Energy Development Corporation. Other shareholders include AZL Resources of the United States, Volvo of Sweden and Canada's Sulpetro.*

Three Kuwaiti companies act as important outlets for Kuwaiti surpluses. These companies are: Kuwait Foreign Trading, Contracting, and Investment Company (KFTCIC) which is 80 percent state-owned; Kuwait Investment Company (KIC) which is 50 percent state-owned; and Kuwait International Investment Company KIIC) which is a privately-owned merchant bank and investment company. An exact assessment of the three companies' investments is virtually impossible.

FOOTNOTES

[1]Figures in this section were taken from National Basic Intelligence Factbook, January 1980, pp. 108-9.

[2]Parts a and b of this section depend on facts and figures taken from the Central Bank of Kuwait Economic Report, 1978, pp. 18-23.

[3]Al-Kazemi, The Entrepreneural Factor in Economic Development, Ph.D. dissertation, 1973, pp. 116-21, unpublished.

[4]Ragaei El Mallakh and Jacob Atta, Absorptive Capacity of Kuwait: Domestic and International Perspectives, D.C. Heath and Company, 1981, pp. 11-3.

[5]Central Bank of Kuwait, Economic Report for 1978, p. 24.

[6]State of Kuwait, Ministry of Planning, Central Statistical Office, Annual Statistical Abstract, 1979, p. 170.

[7]Middle East Economic Survey, October 19, 1981, p. (vi).

[8]Figures are taken from Middle East Economic Digest (MEED), Special Report, February 1980, p. 27.

[9]Ibid.

[10]Central Bank of Kuwait, Economic Report for 1978, pp. 37-8.

[11]For a more detailed analysis see ibid, p. 35.

[12]Figures in this section are taken from the Annual Statistical Abstract, Ministry of Planning, Central Statistics Office, 1979, p. 218.

[13]The Economic Development of Kuwait, by missions organized by the International Bank for Reconstruction and Development, Johns Hopkins Press, Baltimore, 1965.

[14]Facts and figures in the preceeding section were extracted from Economic Report for 1976, pp. 29, 40, 41.

[15]Figures were compiled from the Annual Statistical Abstract, Ministry of Planning, Central Statistical Office, State of Kuwait, 1979.

[16]Central Bank of Kuwait, Economic Report for 1978, Public Finance Section, pp. 42-9.

[17]Five-Year Development Plan, 1976-81, Ministry of Planning.

[18]Facts and figures in this section were taken from the Annual Statistical Abstract, Ministry of Planning, Central Statistical Office, 1979.

[19]Ibid. p. 350.

[20]Abolfathi, F., The OPEC Market to 1985, Lexington Books, 1977.

[21]This section was condensed from an unpublished paper written by Jasem Al-Sadoun, entitled "Contributing Factors to Inequalities of Income Distribution: A Case of Kuwait."

[22]World Business Weekly, April 6, 1981, p. 32.

[23]"Kuwait 1980," Middle East Economic Digest, Special Report, February 1980, p. 5.

[24]Ibid., p. 32.

[25]Ibid., p. 32.

[26]Ibid., p. 32.

ECONOMETRIC MODELLING: KUWAITI ECONOMY

I. Introduction

Events in the Middle East have cast Kuwait increasingly into a role of leadership. As other Middle Eastern countries have experienced the crises of internal revolution and military conflict with their neighbors, Kuwait has remained an island of stability and prosperity. The Iranian revolution had a relatively modest impact on Kuwait. After some initial disturbances and demonstrations by the Shia population, Kuwait quickly established diplomatic relations with the Khomeini government in Iran and has not experienced further domestic turmoil. Kuwait has a long standing border dispute with Iraq but that has not led to any major conflict with Iraq in recent years. In fact, Kuwait finds itself aligned with Iraq on many issues with the Arab Middle East, and plays the role of moderator in many of the disputes between Middle Eastern countries.

Kuwait was one of the first Arab oil producing countries to follow a policy of conservation of its oil resources in the 1970s. Other OPEC countries are now following Kuwait's lead in reducing production in the face of an oil glut in the early 1980s. The domestic capital market is growing rapidly with the introduction of stocks and bonds and other financial inducements. Kuwait has emerged as the most sophisticated of the Middle Eastern oil producers in the investment of surplus funds generated by oil revenues. Other oil producing countries are following Kuwait's lead in the diversification of their foreign assets both with respect to the type of asset held and the foreign investment market in which those funds are invested.

Kuwait, like the other oil producing countries, has launched an ambitious development plan. In some respects, Kuwait is further along in its plans for diversification of their economy away from dependence on oil exports compared to other oil producers in the region. It has a rapidly growing petrochemical industry. Kuwait's nonoil output includes food, beverages, clothing, footwear, leather goods, building materials, and assembled goods. Kuwait is particularly sensitive to the preservation of its oil wealth for future generations. It is attempting to strike a delicate balance between this goal of conservation and the short run needs for oil revenue to finance development projects. All of these factors make the Kuwaiti experience unique and to some extent a bellweather of change for other oil producing countries in the Middle East.

We have developed a model of absorptive capacity in Kuwait designed to capture these unique characteristics of their economic, social, and political life. The approach for the estimation of the Kuwaiti absorptive capacity advocated in this chapter is more comprehensive than any other study on the subject in the sense that it has as its foundation a macroeconomic model of the Kuwaiti economy. We may break the methodology for estimation and forecasting down into three principal stages. The first stage involves specifying the system of structural equations which we believe best describe the economy of Kuwait. Second, the stochastic equations are estimated. Last, the estimated equations are combined with identities to make up the complete system, which is then utilized for forecasting important variables in the Kuwaiti economy, such as the total levels of consumption, investment, the domestic absorptive capacity, and above all, the level of petroleum production. These forecasts will be undertaken for alternative scenarios, representing different configurations of the effectiveness of the absorptive capacity constraints of Kuwait.

II. Data

Like most studies on macroeconometric models of developing economies, the most intractable problems faced by this study are those related to data. The difficulties encountered in finding empirical correlates for the analytical model forced us to use proxies. Also, the recent origin of data collection in Kuwait in the form consistent with macroeconomic modelling necessarily gives limited degrees of freedom.[1] The series, which are all annual, cover sixteen years, 1962-1977. With one-year lagged variables in some equations, the sample size for the purpose of regression is fifteen.

The data on the Kuwaiti economy were obtained from various issues of the following publications:

(i) Quarterly Statistical Bulletin, published by the Central Bank of Kuwait (CBK);

(ii) Statistical Abstract, published by the Central Statistical Office of the Planning Board in Kuwait; and

(iii) International Financial Statistics, published by the International Monetary Fund (IMF).

Four major problems were encountered in the collection of data for the econometric study. First, some of the series are for financial years, while others are for calendar years. Specifically, data on national product, national expenditure and government expenditure/revenue variables correspond to financial years. On the other hand, monetary aggregates are given in terms of calendar years, as is the data on oil.

It was decided to equate a financial year to the calendar year in which it begins. Thus for example, the 1966/67 financial year is made equivalent to the 1966 claendar year. The change in the financial year from April 1-March 31 to July 1-June 30, produced an extended financial year for 1975/76 (or 1975) of fifteen months. A dummy variable, D75, was therefore defined to take into account this exceptional financial year in equations involving variables originally corresponding to financial years.

The second data problem is the apparent inconsistency which exists in the pre- and post-1969/70 series on national income variables. It appears that improvement in the method of data compilation in the 1970s made the values of the gross national product (GNP) and its components, which were computed by the new method, lower for 1969/70 than the values which were computed earlier. Indeed, the <u>Quarterly Statistical Bulletin</u> of April-June 1976 noted that "the two series are not fully comparable."[2] Since the new series do not go back into time beyond 1970/71, we had no choice but to use both series and allow a dummy variable, D69, to reflect the discrepancy between the two series.

The principal reason is that private and official transfers and the control of a large proportion of the government's foreign assets by the Ministry of Finance make any relation between the changes in the Central Bank's assets and the balance of payments of the country spurious. As a result, it was decided to define another dummy variable, DD, with unitary value for years in which we believe the relationship between BOP and DFA is completely off, and zero value for other years.

Finally, there is no data on the GNP deflator. Hence the model is cast in nominal terms. We however want to examine price determination in order to analyze inflation. Therefore, since the series on the consumer price index for Kuwait was only started in 1972, we had to supplement the index with the Saudi Arabian consumer price index obtained from publications of the Saudi Arabian Monetary Agency (SAMA).

III. Specification of the Model

A. Absorptive Capacity Equations

The domestic absorptive capacity of Kuwait is defined as the utilization of the flow of goods and services in the economy for the purpose of domestic consumption and investment. Total domestic absorption is therefore described by the following relation:

$$GDA = CP + CG + IP + IG \quad \text{(see table 7.1 for variable names)} \tag{7.1}$$

Total consumption in the economy consists of the sum of private consumption (CP) and government consumption (CG). Also, private investment (IP) plus government investment (IG) equals total capital formation in the Kuwaiti eco

TABLE 7.1

VARIABLES APPEARING IN THE STUDY

(Dependent Variables)		
BOP	=	Balance of payments (X-M)
CG	=	Government consumption
CLPS	=	Commercial banks claim's on the private sector
CP	=	Private consumption
FA	=	Foreign assets of the central bank
GDA	=	Gross domestic absorption
GDCN	=	GDP from construction
GDCO	=	GDP from commerce (wholesale & rental trade)
GDP	=	Gross domestic product
GDPA	=	GDP from agriculture, hunting, forestry & fishing
GDPE	=	GDP from electricity, water & gas
GDPM	=	GDP from manufacturing
GDPN	=	Nonoil GDP
GDPO	=	GDP from mining & quarrying (proxy for oil GDP)
GDPS	=	GDP from finance, insurance, real estate, government & Other services
GDPT	=	GDP from transport, storage & communication
GNP	=	Gross national product
GR	=	Total government revenue
GVD	=	Government deposits with the central bank

TABLE 7.1 (con't)

IP	=	Private investment
L	=	Total labor force (thousands)
LA	=	Labor force engaged in agriculture, hunting, forestry & fishing (thousa
LC	=	Labor force engaged in commerce (thousands)
LE	=	Labor force engaged in electricity, water & gas (thousands)
LM	=	Labor force engaged in manufacturing (thousands)
LN	=	Labor force engaged in construction (thousands)
LS	=	Labor force in finance, insurance, real estate, & government services (thousands)
LTR	=	Labor force engaged in transport, storage & communication (thousands)
M	=	Imports of goods and nonfactor services
MONY	=	Quantity of money defined as currency plus demand deposits plus time and saving deposits
NGJ	=	Net government injection
NOLX	=	Value of nonoil exports
OILQ	=	Oil output (millions of barrels)
OIQX	=	Quantity of oil exported (million of barrels)
OILX	=	Value of oil exports
P	=	Price level (consumer price index, 1972 = 100)
RNOL	=	Government nonoil revenue
ROIL	=	Government oil revenue
X	=	Exports of goods & non factor services

TABLE 7.1 (con't)

(Exogenous Variables)

DD	=	Dummy variable	= 1 for 1969, 1972-73 and 1975-77 = 0 for other years
D69	=	Dummy variable	= 1 for 1962-1969 = 0 for other years
D74	=	Dummy variable	= 1 for 1974-1977 = 0 for other years
D75	=	Dummy variable	= 1 for 1975-1977 = 0 for other years
GEXO	=	Government non-investment expenditures	
GOEX	=	Government expenditures	
LAK	=	Kuwaiti labor force engaged in agriculture, etc. (thousands)	
LANK	=	NonKuwaiti labor force engaged in agriculture, etc. (thousands)	
LCK	=	Kuwaiti labor force engaged in commerce (thousands)	
LCNK	=	NonKuwaiti labor force engaged in commerce (thousands)	
LEK	=	Kuwaiti labor force engaged in electricity, etc. (thousands)	
LENK	=	NonKuwaiti labor force engaged in electricity, etc. (thousands)	
LMK	=	Kuwaiti labor force engaged in manufacturing (thousands)	
LMNK	=	NonKuwaiti labor force engaged in manufacturing (thousands)	
LNK	=	Kuwaiti labor force engaged in construction (thousands)	
LNNK	=	NonKuwaiti labor force engaged in construction (thousands)	
LO	=	Labor force engaged in mining & quarrying (thousands)	
LSK	=	Kuwaiti labor force engaged in services (thousands)	
LSNK	=	NonKuwaiti labor force engaged in services (thousands)	
LTK	=	Kuwaiti labor force engaged in transport, etc. (thousands)	
LTNK	=	NonKuwaiti labor force engaged in transport, etc. (thousands)	
NFY	=	Net factor income to abroad	
OD	=	Other deposits	
OILP	=	Index of crude oil prices (1970 = 100)	
PIM	=	Index of the prices of Kuwaiti imports (1972 - 100)	

Note: All variables, except where specifically indicated, are in millions of current Kuwaiti dinars (KD)

It has become conventional to specify the private consumption relation in terms of disposable income, usually defined as GNP less taxes from income. This is not done here because taxes on labor income are insignificant and may therefore be ignored. We have also included lagged consumption to reflect the distributed lag response of consumption to change in disposable income.

$$CP = a_0 + a_1(GNP_{-1}) + a_2(CP_{-1}) \tag{7.2}$$

The government's private consumption expenditure is simply made a linear function of total government expenditures.

$$CG = b_0 + b_1(GOEX) + b_2(D69) \tag{7.3}$$

Private investment is assumed to be determined by a distributed lag response to movement in the gross national production (GNP_{-1}).

$$IP = c_0 + c_1(GNP_{-1}) + c_2(IP_{-1}) + c_3(D69) \tag{7.4}$$

Government investment includes investment in state-participating enterprises. It is made exogenous in the model because the erratic nature of the series on this variable made it difficult to find a satisfactory regression.

B. Foreign Trade

The difference between gross domestic product (GDP) and total domestic absorption (GDA) is net foreign investment which is equal to the balance of trade (BOP); hence,

$$GDP = GDA + BOP \tag{7.5}$$

Exports consist of oil and nonoil components:

$$X = OILX + NOLX \tag{7.6}$$

The value of oil exports is explained by

$$OILX = e_0 + e_1(OIQX) + e_2(OILP) \tag{7.7}$$

A regression is used to estimate the value of oil exports rather than a single identity with price times quantity because the price of oil is expressed as an index.

The quantity of oil exported is assumed to be a constant proportion of the amount of oil produced.

$$OIQX = f_0 + f_1(OILQ) \tag{7.8}$$

Nonoil exports are postulated to be determined by nonoil GDP and imports:

$$NOLX = g_0 + g_1(GDPN) + g_2(M) \tag{7.9}$$

The inclusion of imports (M) in the nonoil exports equation serves to explain the re-exports component of nonoil exports.

Imports are simply made a function of gross domestic absorption (GDA). This makes the demand for imports derived from domestic spending:

$$M = h_0 + h_1(GDA) \tag{7.10}$$

Instead of determining balance of payments (BOP) through exports (X) and imports (M), we may, for the purpose of forecasting, postulate that net foreign investment is influenced by the policy decisions of the Kuwaiti government. A case in point is the postulation that future levels of balance of payments (BOP) depend on (a) the government policy which reserves 10 percent of all oil revenue of the government to a Reserve Fund for Future Generations, and (b) what the country considers to be a foreign aid/investments committments which it must meet in the future.

C. Nonoil Output

The flow of goods and services in the economy is summarized by the gross domestic product (GDP) identity.

$$GDP = GDPO + GDPN \tag{7.11}$$

where gross domestic product in the nonoil sector (GDPN) is the sum of output in each nonoil sector of the economy.

$$GDPN = GDPA + GDCN + GDCO + GDPE + GDPM + GDPS + GDPT \tag{7.12}$$

Considering net factor income from abroad, relation (7.11) may be put into a gross national product (GNP) format.

$$GNP = GDPO + GDPN - NFY \tag{7.13}$$

As will be explained later, gross domestic product in the oil sector (GDPO) is treated as a residual component of gross national product (GNP). It is postulated that the output of a supply sector, except the oil sector, is proportional to the quantity of labor employed in that sector. The following general identity is therefore the basis for estimating the value added to each supply sector other than oil.

$$GDP_i = h_i L_i \tag{7.14}$$

where the i subscript refers to the i^{th} supply sector. The above relation is consistent with a Leontief/Harrod-Domar production function, with labor as the constraining input.

D. Oil Output

Gross domestic product in the oil sector (GDPO) can be derived as a residual variable:

$$GDPO = GNP - GDPN + NFY \tag{7.15}$$

The quantity of oil output (OILQ) is made a linear function of the current and lagged real gross domestic product in the oil sector.

$$OILQ = m_1 + m_2\left(\frac{GDPO}{OILP}\right) + m_3\left(\frac{GDPO}{OILP}\right)_{-1} \tag{7.16}$$

E. Government Sector Equations

Revenue from oil (ROIL) is made a linear function of gross domestic product in the oil sector, both present and lagged. The lagged term is included to smooth out fluctuations in revenue resulting from payment lags and variations in inventory. The following set of relations therefore describe the government sector in the model in terms of government revenues (GR), revenue from nonoil sources (RNOL), and revenue from the oil sector (ROIL).

$$GR = ROIL + RNOL \tag{7.17}$$

$$RNOL = n_0 + n_1(GDPN) \tag{7.18}$$

$$ROIL = p_0 + p_1(GDPO) + p_2(GDPO_{-1}) + p_3(D74) \tag{7.19}$$

F. Monetary Sector

The money supply (MONY) is estimated as a function of the domestic base, including claims on the private sector (CCPS), government deposits (GVD), and other deposits (OD); and of the foreign monetary base composed of foreign assets (FA).

$$MONY = q_0 + q_1(CLPS) + q_2(GVD) + q_3(FA) + q_4(OD) + e \tag{7.20}$$

Government deposits (GVD) equal government revenue minus government spending.

$$GVD = r_0 + r_1(GR - GOEX) \tag{7.21}$$

Foreign assets (FA) are a function of the volume of payments and a dummy variable distinguishing the break in governmental institutions in 1969.

$$FA = s_0 + s_1(BOP) + s_2(D69) \tag{7.22}$$

Claims on the private sector (CLPS) are a function of gross domestic product in the nonoil sector and the dummy variable.

$$CLPS = t_0 + t_1(GDPN) = t_2(GDPN_{-1}) + t_3(D69) \tag{7.23}$$

G. Prices

Prices in Kuwait are affected by the large share of imported goods in the total consumption of the country. The price equation incorporates variables for the money supply and for the prices of imported goods and services.

$$P = u_0 + u_1(\text{MONY}) + u_2(\text{PIM}) \tag{7.24}$$

H. Labor Market Equations

The following identities give the supply side of the labor market in the Kuwaiti economy.

$$L_i = L_iK + L_iNK \tag{7.25}$$

$$L = L_1 + L_2 + \ldots + L_n \tag{7.26}$$

where i refers to a supply sector and n is the number of these sectors, (k) is the Kuwait labor force in that sector and (NK) is the non-Kuwaiti labor force in that sector.

IV. Estimation Results

A. The Forecasting Model

We need to estimate only the stochastic equations in the model, i.e., relations other than identities. We obtain a system of equations forming the model for forecasting under alternative scenarios. The basic forecasting model is presented below. In evaluating the results, note that:

(i) t-values are given in parenthesis; and

(ii) DW* denotes that the Cochran-Orcutt correction procedure was applied.

A. Absorptive Capacity

$$CP = \underset{(6.16)}{0.08111}(GNP)_{-1} + \underset{(11.83)}{0.7938}(CP)_{-1}$$

$R^2 = 0.9741$

$DW = 2.2556$

$$CA = \underset{(3.78)}{99.8817} + \underset{(14.42)}{0.3838}(GOEX) - \underset{(-3.00)}{76.2283}(D67)$$

$R^2 = 0.9741$

$DW = 2.2556$

$F_{(2,12)} = 225.524$

$$IP = \underset{(-0.84)}{-7.8397} + \underset{(6.18)}{0.029401}(GNP)_{-1} + \underset{(3.38)}{0.4715}(IP)_{-1} + \underset{(4.08)}{39.4423}(D67)$$

B. Foreign Trade and Payments

$$*OILX = \underset{(-1.88)}{-2416.43} + \underset{(6.58)}{4.39682}(OILP) + \underset{(2.26)}{2.59708}(OIQX)$$

$R^2 = 0.9651$

$DW* = 1.9357$

$F_{(2,12)} = 152.158$

$$NOLX = \underset{(-4.06)}{-41.296} + \underset{(2.58)}{0.09717}(GDPN) + \underset{(3.87)}{0.1302}(M)$$

$R^2 = 0.9715$

$DW = 1.2350$

$F_{(2,12)} = 204.653$

$$* \; OIQX = 0.9991(OILQ)$$
$$(237.878)$$

$R^2 = 0.9901$

$DW = 2.3691$

$$M = -110.271 + 0.611(GDA)$$
$$(-6.27) \qquad (35.69)$$

$R^2 = 0.9899$

$DW = 1.6863$

$F_{(1,13)} = 1273.61$

$$X = OILX + NOLX$$

$$BOP = X - M$$

$$FA = 1891.79 + 0.0594(BOP) + 23.94(D67)$$
$$(2.54) \qquad (65) \qquad (0.18)$$

$R^2 = 0.8588$

$DW^* = 1.8108$

$F_{(2,11)} = 33.4630$

C. Oil Output

$$OILQ = 293.4 + 0.9806\left(\frac{GDPO}{OILP}\right) + 0.2334\left(\frac{GDPO_{-1}}{OILP_{-1}}\right)$$
$$(7.52) \qquad (10.89) \qquad (2.33)$$

$R^2 = 0.9488$

$DW = 2.1956$

$F_{(2,11)} = 101.824$

$GDPO = GDP - GDPN$

D. Nonoil Output

$GDPN = GDPA + GDCN + GDCO + GDPE + GDPM + GDPS + GDPT$

$GDPA = 1.224(LA)$

$GDPCN = 1.144(LN)$

$GDCO = 5.679(LC)$

$GDPE = 1.193(LE)$

$GDPM = 7.977(LM)$

$GDPS = 3.066(LS)$

$GDPT = 6.606(LTR)$

E. Government Sector

$$ROIL = -438.9 + 0.2401(GDPO) + 1.074(GDPO_{-1})$$
$$(-3.75) \qquad (1.20) \qquad (5.01)$$

$R^2 = 0.9508$

$DW = 1.2662$

$F_{(2,12)} = 115.917$

$$RNOL = -148.71 + 0.5063(GDPN)$$
$$(-3.86) \qquad (9.44)$$

$R^2 = 0.9291$

$DW = 1.6260$

$F_{(1,12)} = 157.284$

$$GOEX = IG + GEXO$$

$$GR = ROIL + RNOL$$

$$NGJ = GOEX - RNOL$$

F. Monetary Sector

$$MONY = 0.2617(CLPS) - 2.318(GVD) + 0.682(FA) + 4.593(OD)$$
$$(1.02) \qquad (-6.27) \qquad (5.55) \qquad (5.34)$$

$R^2 = 0.9912$

$DW = 1.5302$

$$GVD = 72.11 + 0.1398(GR-GOEX)$$
$$(3.62) \qquad (6.92)$$

$R^2 = 0.7865$

$DW = 1.4275$

$F_{(1,13)} = 47.8884$

$$CLPS = -426.159 + 0.5642(GDPN) + 0.7976(GDPN_{-1}) - 35.30(D67)$$
$$(-2.18) \qquad (2.52) \qquad (2.43) \qquad (-3.1)$$

$R^2 = 0.9304$

$DW^* = 1.4527$

$F_{(3,10)} = 44.5387$

G. Price Equation

$$P = 44.65 + 0.007019(MONY) + 0.4082(PIM)$$
$$(23.60 \qquad (4.89) \qquad (23.09)$$

$R^2 = 0.9972$

$DW^* = 2.0339$

$F_{(2,11)} = 1985.41$

H. Labor Market

$$LA = LAK + LANK$$

$$LN = LNK + LNNK$$

$$LC = LCK + LCNK$$

$$LE = LEK + LENK$$

$$LM = LMK + LMNK$$

$$LS = LSK + LSNK$$

$$LTR = LTK + LTNK$$

$$L = LA + LN + LC + LE + LM + LS + LTR + LO$$

I. National Income Identities

GDA = CP + CG + IP + IG

GNP = GDP = FY

GDP = GDA + X - M

The forecasting model consists of forty equations made up of fifteen stochastic equations and twenty-five identities. It is a linear model but it contains equations which are related. A single equation method may therefore not be appropriate for the estimation of some of the stochastic equations. The objective of this subsection is to examine the rationale for the estimation methods used in the study.

The system of equations in the model may be grouped under three blocks as described by table 7.2. The system of equations in the Kuwaiti model are block-recursive.[3] The equations in the first block can be solved without reference to the third block. The solution of the equations in the second block is preceeded by the solution of the first block of equations, while the solution of the equations in the third block is preceeded by solution of the equations in both the first and second blocks. The solution of the first block is not preceeded by the solution of any block of equations.

In addition, the equations in the first block are recursive, and hence, the application of Ordinary Least Squares estimation procedure to the stochastic equations will yield full-information estimators.[4] This observation

TABLE 7.2

BLOCK RECURSIVENESS OF THE KUWAITI MODEL

Block 1

(1)	CP	(22)	GDPN	(33)	LA
(2)	CG	(23)	GDPA	(34)	LN
(3)	IP	(24)	GDCN	(35)	LC
(6)	NOLX	(25)	GDCO	(36)	LE
(7)	M	(26)	GDPE	(37)	LM
(10)	RNOL	(27)	GDPM	(38)	LS
(14)	CLPS	(28)	GDPS	(39)	LTR
(16)	GDA	(29)	GDPT	(40)	L
(19)	GOEX	(32)	NGJ		

Block 2		Block 3	
(4)	OILX	(9)	ROIL
(5)	OIQX	(11)	MONY
(8)	OILQ	(12)	GVD
(17)	GDP	(13)	FA
(20)	X	(18)	GNP
(21)	BOP	(31)	GR
(30)	GDPO	(15)	P

also applies to the subsystem of equations in the third block. However, the second block contains equations which are simultaneously related, and it is in the estimation of the stochastic equations in this block that one should find a procedure other than OLS. Hence, apart from equations (4), (5), and (9), determining OILX, OIOX, and OILQ, respectively, all the regression results in the forecasting model are those based on the OLS regression procedure.

B. Structural Analysis of the Model

Before going into the forecasting aspect of the study we discuss the structural equations of the model. An important characteristic which the private consumption function brings out is the very low short-run marginal propensity to consume (MPC). Only thirteen percent of an addition to disposable income is spent on consumer goods by the private sector in a given year. Whereas such a feature may be attributable to the fact that our definition of disposable income might overstate the true purchasing power of the private sector, one can interpret the low short-run MPC as reflecting the low absorptive capacity of the country. It would appear that the consumption theory which best describes private consumption in Kuwait is the Permanent Income Hypothesis of Brown's framework.[5] Indeed, the long-run marginal propensity to consume derived from equation (1) is 0.84, which is consistent with the results of most studies on consumption functions.[6] The government consumption equations does not require further comment.

Private investment is determined as a distributed lag response to changes in nonoil GDP as equation (3) indicates. Government investment equation exhitited an explosive tendency, the coefficient of lagged IG being 1.16. Therefore, since none of the alternative specifications we tried gave satisfactory results, it was decided to make IG exogenous. A close examination of the series on government investment reveals that this variable has been erratic in the past. Particularly, the level of government investment expenditures depends on the ability of the government to implement its development policies. Hence, this variable has been constrained by administrative bottlenecks.

The export and import regression results are consistent with those originally specified in the previous section. The marginal propensity to import, defined as the ratio of the change in imports to the change in gross domestic absorption is as high as 61 percent.

The equation explaining the consumer price index, it will be noted, plays no direct role in the determination of absorptive capacity which is in nominal terms. It is, however, crucial in the forecasting scenarios which will later be introduced, when the government reacts to inflation by undertaking certain fiscal policies. Despite the aggressive subsidization programs of the government, price formation in Kuwait is highly influenced by the prices of imports. This should be expected, given the high marginal propensity to import noted earlier. Monetary creation, however, influences the price level. All these go to show that one of the consequences of increased oil income in Kuwait has been inflation. As later analysis will show, a concern for inflation and actions which the government takes to reduce it, other than subsidization, will necessarily involve the curbing of absorptive capacity and oil production.

V. Simulation

The general idea of forecasting the absorptive capacity and the level of petroleum output involves two steps. First is the description of the assumptions which define the scenarios under which the forecasting is done. This also implies projecting all the exogenous variables in the model for the entire forecasting horizon, and making adjustments to the coefficients of the structural equations necessitated by the assumptions. The second step involves simulating the model, under alternative scenarios, to solve for the endogenous variables for the years covered by the forecasting horizon.

It is important at this stage to look at the consistency of the model and to comment further on the forecasting horizon. The model consists of forty equations in forty endogenous variables, hence it is consistent in the sense that it can be solved for the values of all the endogenous variables. There are twenty-one exogenous variables, the values of which are supplied in order to simulate the model for solutions during the forecasting period. The forecasting horizon covers 1978 to 1990, but forecasting results are reported for only the selected years, 1980, 1985, and 1990.

A. The Control Scenario/Solution

In order to carry out comparative analysis, a control solution is necessary. Technically speaking, a control solution is a scenario. It is however, in addition, a benchmark in comparison to which all the other scenarios acquire meaning. The relevant question in this case is the extent to which the solutions based on a particular scenario described by an alternative configuration of absorptive capacity constraints differ from those based on the control scenario. We define two control scenarios based on alternative paths for the price of oil (OILP).

Both scenarios are based upon the following assumptions:

(a) The structure of the model holds true in the future, and that there are no additional absorptive capacity constraints other than those reflected in the structural equations of the model. It will be noted that the dummy variables are not binding during the forecasting period.

(b) Government expenditures are assumed to grow at a rate consistent with its annual rate recorded during 1975-1977 (i.e., 1975/76 - 1977/78 financial years), of 18.6 percent. The 1974/75 financial year was excluded from the computation of the average annual rate of increase of government spending (GOEX) and its components, government investment (IG) and government non-investment expenditures (GEXO), since that year was exceptional owing to the big jump in oil revenues. The current Five-Year Development Plan (1976-1981) does not provide much guidance since it gives only investment expenditures of the government for the plan period.

(c) Provisional data for 1978 and 1979 are available for some of the variables in the model. Other deposits (OD) is one of the variables, and the projection for the 1979-1990 period is based on the historical annual average rate of increase computed for the period 1975-1978. The benchmark for projecting the figures for 1979-1990 is the 1978 level of KD 581.2 million.

(d) The price of Kuwaiti imports (PIM) is projected upon the assumption that it will follow the time path in 1973-77 during which period it grew at an annual rate of 11.89 percent.

(e) Since net factor income to the rest of the world (NFY) became negative (i.e., net factor income from the rest of the world turned positive) only in 1975, the projection of this variable is based on the rate of growth in 1966-1976, which averaged 29.6 percent annually.

(f) The most difficult of all the projections of the exogenous variables were those related to labor force in the supply sectors. The reason is non-availability of data in the inter-census years. Fortunately, the 1976-1981 Development Plan has sectoral projections for 1981 labor force requirements. The Plan projections were therefore utilized as the basis for our own projections of labor force. Since the Plan gives only projections for 1981, a compound annual rate of growth of the labor force in each supply sector was calculated using the 1975 census figures as benchmarks. The rates of increase obtained are those which ensure that the 1981 labor requirements are met in each sector. The levels of labor required for each year in the forecasting horizon 1978-1990 were then projected for each supply sector by the following formula:

$$L_{ij} = L_{i,1975}(1 + r_i)^{j - 1975}$$

where

L = the quantity of labor

i = the supply sector

j = the year for which the projection is made

r_i = the annual compound rate of increase in the labor force in the i^{th} sector derived from the Plan projections.[7]

(g) The assumptions underlying the projection of the price of Kuwaiti crude oil is simple. Ironically, we have resorted to such simple assumptions because the determination of the world price of oil is too complicated, to do full justice to its analysis in this manuscript. The importance of price scenarios for oil is, of course, recognized in that it is a precondition for the derivation of all scenarios under which forecasting is undertaken in this study. It is felt, however, that it is realistic to assume that the future price of Kuwaiti oil (and indeed the world price of oil) would be influenced most by the prices of goods and services upon which the foreign exchange derived from oil production in producing countries are spent. In other words, it is postulated that the single most important determinant of the future rate of growth of Kuwaiti oil price is the rate at which the prices of the country's imports are growing. From this assumption, therefore, two crude oil price scenarios are defined reflecting two sub-assumptions. First, is the assumption that the real price of oil will increase at the rate of five percent during the period 1978-1990.[8] This implies projecting the crude oil price with the index for 1980 as the base, at an annual rate of growth of 16.89 percent, five percentage points above the annual rate of growth in the price of Kuwaiti imports of 11.89 percent.[9] We call this Scenario A. The second sub-assumption has a less optimistic tone. It is assumed that the worst thing that can happen to the price of Kuwaiti oil is for it to be maintained at the 1980 level in real terms. In the spring of 1981, a glut in the world petroleum market placed downward pressures on petroleum prices. Expectations are that this glut will continue in 1981 and possibly during 1982. However, we project that this is a temporary glut and that oil prices will resume an upward trend over the decade as a whole. Our second oil price scenario, Scenario B, assumes an annual growth in the nominal price of oil of 11.89 percent, leaving the real price of oil unchanged for the decade as a whole.

Given these assumptions, the model is simulated under the control scenarios. The results are produced in the first parts of tables 7.3 (A_{11}, A_{21}, A_{31}) and 7.4 (B_{11}, B_{21}, B_{31}).[10] There are, therefore, two control solutions, each based upon assumptions (a) through (f), and reflecting alternative future time paths of crude oil prices. These are referred to in the tables as A_{11} and B_{11}, for assumed growth of OILP at 16.89 and 11.89 percent, respectively.

We now compare the two control scenarios, A_{11} and B_{11}. As would be expected, A_{11}, with a higher rate of growth of the price of oil, shows a lower level of oil output for the forecast years. This is essentially because the higher oil prices allow Kuwait to obtain increased oil revenue with a lower level of oil output. It will be noted that oil prices are negatively correlated with oil output in the model.

One interesting observation which both control scenarios A_{11} and B_{11} bring out is the fact that, given the assumptions underlying the scenarios, Kuwait cannot maintain its oil production policy of producing not more than 2 million barrels per day. If Kuwait succeeds in keeping the real price of its oil constant, Scenario B, then it will have to increase its oil output to reach 2.8 million barrels per day in 1990. It remains true from the results that if Kuwait continues with the present trends in government expenditures, consumption, investment, and foreign accumulation of funds, it will have to expand oil production beyond the current limit of 2 million barrels per day, even if real oil prices increase at the current rate of 5 percent (Scenario A).

TABLE 7.3

SIMULATION RESULTS FOR KUWAIT: SCENARIOS A_{11}-A_{81}

Scenario	Year	BOP	GDA	GDP	GDPN	GNP	GR	M	OILQ	P	ROIL
A_{11}	1980	5,155.1	3,979.9	9,135.0	1,641.7	9,947.0	7,029.3	2,321.4	816.92	206.08	6,346.8
	1985	11,742.0	8,875.4	20,617.0	2,292.3	23,586.0	21,458.0	5,312.6	870.66	343.01	20,446.0
	1990	26,746.0	19,905.0	46,651.0	3,276.2	57,501.0	50,794.0	12,052.0	916.64	654.79	49,284.0
A_{21}	1980	5,157.2	3,926.9	9,084.2	1,641.7	9,896.2	6,990.1	2,289.1	813.83	205.97	6,307.6
	1985	11,753.0	8,496.6	20,250.0	2,292.3	23,321.9	21,084.0	5,081.1	860.34	342.66	20,072.0
	1990	26,768.0	18,419.0	45,187.0	3,276.2	56,037.0	49,223.0	11,144.0	897.52	653.94	47,713.0
A_{31}	1980	1,872.6	3,979.9	5,852.5	1,641.7	6,664.5	4,154.7	2,321.4	427.35	211.78	3,472.0
	1985	4,510.5	8,875.4	13,386.0	2,292.3	16,355.0	13,071.0	5,312.6	477.37	360.25	12,059.0
	1990	10,966.0	19,905.0	30,871.0	3,276.2	41,721.0	32,493.0	12,052.0	523.35	692.41	30,983.0
A_{41}	1980	1,874.7	3,926.9	5,801.6	1,641.7	6,613.6	4,115.5	2,289.1	424.26	211.67	3,433.1
	1985	4,522.0	8,496.6	13,019.0	2,292.3	15,988.0	12,697.0	5,081.1	467.04	359.90	11,685.0
	1990	10,988.0	18,419.0	29,407.0	3,276.2	40,257.0	20,922.0	11,144.0	504.22	891.56	29,411.0
A_{51}	1980	5,282.2	3,943.7	9,225.9	1,504.7	10,038.0	7,159.9	2,299.3	831.30	205.54	6,546.7
	1985	12,179.0	8,696.1	20,875.0	1,830.7	23,844.0	22,068.0	5,203.0	891.71	340.67	21,290.0
	1990	27,743.0	19,456.0	47,199.0	2,227.4	58,049.0	52,149.0	11,777.0	938.09	649.53	51,170.0
A_{61}	1980	5,284.4	3,890.7	9,175.0	1,504.7	9,987.0	7,120.7	2,266.9	838.21	205.43	6,507.5
	1985	12,191.0	8,317.3	20,508.0	1,830.7	23,477.0	21,694.0	4,971.6	881.39	340.32	20,916.0
	1990	27,765.0	17,970.0	45,735.0	2,227.4	50,585.0	50,578.0	10,870.0	918.97	648.68	49,549.0
A_{71}	1980	1,999.7	3,943.7	5,943.3	1,504.7	6,755.3	4,285.3	2,299.3	441.73	211.25	3,672.2
	1985	4,948.0	8,696.1	13,644.0	18,307.0	16,613.0	13,681.0	5,203.0	498.42	357.91	12,903.0
	1990	11,963.0	19,456.0	31,419.0	2,227.4	42,269.0	33,848.0	11,777.0	544.80	687.16	32,869.0
A_{81}	1980	2,001.8	3,890.7	5,892.5	1,504.7	6,704.5	4,246.1	2,266.9	438.64	211.14	3,633.0
	1985	4,959.5	8,317.3	13,277.0	1,830.7	16,246.0	13,308.0	4,971.6	488.09	357.56	12,529.0
	1990	11,985.0	17,970.0	29,955.0	2,227.4	40,805.0	32,278.0	101,870.0	525.67	680.30	31,297.0

SIMULATION RESULTS FOR KUWAIT: SCENARIOS B_{11}-B_{81}

enario	Year	BOP	GDA	GDP	GDPN	GNP	GR	M	OILQ	P	ROIL
B_{11}	1980	5,155.1	3,979.9	9,135.0	1,641.7	9,947.0	7,029.3	2,321.4	816.92	206.08	6,346.8
	1985	9,053.1	8,875.4	17,929.0	2,292.3	20,898.0	18,788.0	5,312.6	901.42	348.40	17,776.0
	1990	16,209.0	19,905.0	36,114.0	3,276.2	46,964.0	39,359.0	12,052.0	1,012.60	678.12	37,849.0
B_{21}	1980	5,162.5	3,779.9	8,942.3	1,641.7	9,754.3	6,878.9	2,199.2	805.18	205.67	6,196.5
	1985	9,099.5	7,573.0	16,673.0	2,292.3	19,642.0	17,491.0	4,516.8	857.71	347.27	16,479.0
	1990	16,307.0	15,241.0	31,548.0	3,276.2	42,398.0	34,389.0	9,202.1	920.77	675.77	32,879.0
B_{31}	1980	1,872.6	3,979,9	5,852.5	1,641.7	6,664.5	4,154.7	2,321.4	427.35	211.78	3,472.3
	1985	3,241.6	8,875.4	12,117.0	2,292.3	15,086.0	11,809.0	5,312.6	508.13	362.80	10,797.0
	1990	6,017.1	19,905.0	25,922.0	3,276.2	36.772.0	27,120.0	12,052.0	619.35	703.37	25,610.0
B_{41}	1980	1,879.0	3,779.9	5,659.8	1,641.7	6,471.8	4,004.4	2,199.2	415.60	211.38	3,321.9
	1985	3,288.0	7,573.0	10,861.0	2,292.3	13,830.0	10,512.0	4,516.8	464.42	361.67	9,500.1
	1990	6,114.7	15,241.0	21,356.0	3,276.2	32,206.0	22,150.0	9,202.1	527.47	701.02	20,640.0
B_{51}	1980	5,282.2	3,943.7	9,225.9	1,504.7	10,038.0	7,159.9	2,299.3	831.33	205.54	6,546.7
	1985	9,482.5	8,696.1	18,179.0	1,830.7	21,148.0	19,389.0	5,203.0	927.06	346.08	18,611.0
	1990	17,187.0	19,456.0	36,644.0	2,227.4	47,494.0	40,692.0	11,777.0	1,045.10	672.91	39,713.0
B_{61}	1980	5,289.6	3,743.6	9,033.2	1,504.7	9,845.2	7,009.5	2,177.0	819.56	205.14	6,396.4
	1985	9,528.8	7,393.7	16,923.0	1,830.7	19,892.0	18,092.9	4,407.3	883.36	344.95	17,314.0
	1990	17,285.0	14,793.0	32,078.0	2,227.4	42,928.0	35,722.0	8,928.0	953.26	670.56	34,753.0
B_{71}	1980	1,999.7	3,943.7	5,943.3	1,504.7	6,755.3	4,285.3	2,229.3	441.73	211.25	3,672.2
	1985	3,671.0	8,696.1	12,367.0	1,830.7	15,336.0	12,410.0	5,203.0	533.77	360.48	11,632.0
	1990	6,995.7	19,456.0	26,452.0	2,227.4	37,302.0	28,453.0	11,777.0	651.84	698.16	27,474.0
B_{81}	1980	2,007.1	3,743.6	5,750.7	1,504.7	6,562.7	4,135.0	2,177.0	429.98	210.84	3,521.8
	1985	3,717.3	7,393.7	11,111.0	1,830.7	14,080.0	11,113.0	4,407.3	490.06	359.35	10,335.0
	1990	7,093.3	14,793.0	21,886.0	2,227.4	32,736.0	23,483.0	8,928.0	559.97	695.81	22,504.0

B. Alternative Scenarios Under Oil Price Scenarios A and B

Apart from the definition of two alternative scenarios for the price of Kuwaiti oil, we are interested in the solutions for the model when three things change.

(i) Suppose the government decides to revise the rate of growth of its non-investment expenditures (GEXO) downwards, what will the solutions for domestic absorptive capacity and oil output be? For example, a policy aimed at price stability might be to allow (GEXO) to grow only at the rate at which the price of oil is growing. In that case, (GEXO) is projected in the forecasting period at the rate of 16.89 percent and 11.89 percent, respectively for oil price Scenarios A and B, instead of at the historical rate of 18.6 percent.

(ii) We want to investigate what the level of the endogeneous variables will be if the government decideds to reduce oil output by 500 thousand barrels per day during the forecasting period.

(iii) Recognizing that the Plan projections of labor force in all sectors are too optimistic, we are interested in what happens to the simulation results if the labor force is allowed to grow at 4 percent, the approximate rate at which male labor in the Kuwaiti economy has increased in the recent past.

In addition to the control scenarios, A_{11} and B_{11}, therefore, we define fourteen scenarios by combining the three assumptions discussed in the preceeding paragraphs. Scenarios A_{21}, . . . , A_{81}, are based upon the simulated oil price Scenario A, i.e., that (OILP) increases at an annual rate of 16.89 percent, while Scenarios B_{21}, . . . , B_{81} are based upon oil price Scenario B, i.e., that (OILP) increases by 11.89 percent. The results of the former groups of scenarios are contained in table 7.3 while those of the latter groups are presented in table 7.4.

Table 7.5 summarizes the assumptions which describe the remaining fourteen scenarios. The explanation of the scenarios is necessary for the analysis which follows.

It will be seen that the pairs (A_{11}, A_{21}), (A_{31}, A_{41}), (A_{51}, A_{61}), and (A_{71}, A_{81}) have a common characteristic in the sense that the scenarios in each pair differ from one another solely because of alternative assumptions regarding the future growth of non-investment government expenditures (GEXO). Whereas the first scenario of each pair is based upon the assumption that (GEXO) grows at an annual historical rate of 18.6 percent. the second scenario assumes 16.89 percent annual rate of growth, a rate consistent with the time path of oil prices assumed for the forecast period. It is clear from comparing the results under the scenarios in the above pairs that, when the rate of growth of government expenditures is revised downwards, the domestic absorption (GDA) or domestic absorptive capacity, and oil output decline. However, oil output is still above the 2 million barrels per day ceiling even with this assumption of reduced government spending. Another interesting result is that Kuwait's balance of payments improves with a reduction of the rate at which government expenditures and gross domestic absorption is growing, although oil production and hence, oil exports decline. This is due to the fact that the decline in oil production is offset by the decline in imports caused by the decrease in absorptive capacity. It will be recalled that one of the reasons for the government decision to slow down the growth of its expenditures is to reduce price instability. As would be expected, inflation is reduced with the decreased rate of growth of (GOEX) from 18.6 percent to 16.89 percent.

When one compares the following pairs of scenarios, (A_{11}, A_{31}), (A_{21}, A_{41}), (A_{51}, A_{71}), and (A_{61}, A_{81}), one sees the difference which a more restrictive

TABLE 7.5

EXPLANATION OF THE CONSTRAINED SCENARIOS

Scenario A_{21} All the assumptions underlying Scenario A11, except that government expenditures other than investment (GEXO) is allowed to grown not at the historical rate, but at the same rate as the price of oil, i.e., at 16.[illegible]9 percent.	Scenario B_{21} All the assumptions underlying B11 excep that government expenditures other than investment (GEXO) is allowed to grow not at the historical rate, but at the same rate as the price of oil, i.e., 11.89 percent.
Scenario A_{31} All the assumptions underlying Scenario A11, plus the assumption that oil output is reduced by 500,000 barrels per day.	Scenario B_{31} All the assumptions underlying Scenario B11, plus the assumption that oil output is reduced by 500,000 barrels per day.
Scenario A_{41} All the assumptions under Scenario A21 plus the assumption that oil output is reduced by 500,000 barrels per day.	Scenario B_{41} All the assumptions under Scenario B21 plus the assumption that oil output is reduced by 500,000 barrels per day.
Scenario A_{51} All the assumptions under Scenario A11, except that instead of labor force growing according to the Plan projections it grows at 4 percent.	Scenario B_{51} All the assumptions under Scenario B11 except that instead of labor force growing according to Plan projections, it grows at 4 percent.
Scenario A_{61} All the assumptions under Scenario A21, except that instead of labor force growing according to Plan projections, it grows at 4 percent.	Scenario B_{61} All the assumptions under Scenario B21 except that instead of labor force growing according to Plan projections, it grows at 4 percent.
Scenario A_{71} All assumptions under Scenario A51 plus the assumption that oil output is reduced by 500,000 barrels per day.	Scenario B_{71} All assumptions under Scenario B51 plus the assumption that oil output is reduced by 500,000 barrels per day.
Scenario A_{81} All the assumptions under A61 plus the assumption that oil output is reduced by 500,000 barrels per day.	Scenario B_{81} All the assumptions under B61 plus the assumption that oil output is reduced by 500,000 barrels per day.

oil policy makes. The second scenario in each pair describes the additional assumption that the government undertakes to cut oil production by 500,000 barrels per day in the future. The oil cut does not change the domestic absorptive capacity, but reduces the balance of payments surplus. All the results for Scenario A, which assumes a 500,000 barrels-per-day reduction in output, show oil output levels of less than 2 million barrels per day for 1990.

Scenarios A_{11} through A_{41} differ, correspondingly, from scenarios A_{51} through A_{81} by the fact that in the latter group, we have the additional assumption that the Plan projections of labor requirements in each industry are too optimistic and that more realistic projections are those based upon the assumption that the labor force in all sectors grows at an annual rate of 4 percent, the rate at which the male population has increased in the past. As expected, domestic absorptive capacity declines, albeit slightly, with the imposition of labor constraints. Since imports also depend on gross domestic absorption, this variable declined when the projections for the labor force were revised downwards. Oil output, on the other hand, actually increases when we introduce a labor constraint. This is because when nonoil gross domestic product is reduced by the labor constraints, oil GDP has to rise to ensure equilibrium between supply and demand in the economy. Total absorptive capacity, defined as gross domestic absorption (GDA) plus the surplus on the balance of payments (BOP), increased by about 2 percent.

The comparative analysis which has been carried out for solutions under oil price Scenario A (table 7.2) are generally applicable to the results under oil price Scenario B (table 7.3). All that one needs to do in order to analyze table 7.5 is to replace "A" with "B" in the preceeding discussion.

C. Scenarios Incorporating Inflation and Productivity Change

In addition to the above, since the output produced in all sectors is nominal, one needs to adjust the output-labor ratios for the inflation and labor productivity rates.

In the scenarios A_{12}-A_{82}, and B_{12}-B_{82} (see tables 7.6 and 7.7, respectively) we follow the assumptions below:

i. 10 percent annual compounded inflation rate;

ii. 3 percent annual increase in the productivity of labor in construction;

iii. 8 percent annual increase in the productivity of agriculture;

iv. 6 percent annual increase in the productivity of services; and

v. 6 percent annual increase in the productivity of transport (all compounded rates).

Comparing the scenarios A_{12} and B_{12} with A_{11} and B_{11}, respectively, we see that when we adjust the output-labor ratios for inflation and productivity, we get higher nonoil gross domestic product (GDPN), higher gross domestic absorption (GDA), and higher gross national product (GNP), but lower gross domestic product (GDP). Because the level of imports goes up due to higher gross domestic absorption, and the level of exports goes down because of less oil exports, the balance of payments decreases. This decrease in the balance of payments more than offsets the increase in gross domestic absorption, causing gross domestic product to delcine.

When adjusting for inflation-productivity factors, the production and export of oil goes down and therefore, with the price of oil the same, oil revenue goes down as well. But, at the same time, nonoil revenue goes up. However, the increase in nonoil revenue is less than the decrease in the oil revenue of government. As a result, government revenue goes down. However,

SIMULATION RESULTS FOR KUWAIT: SCENARIOS A_{12}-A_{82}

Scenario	Year	BOP	GDA	GDP	GDPN	GNP	GR	M	OILQ	P	ROIL
A_{12}	1980	4,288.2	4,227.2	8,515.3	2,615.7	9,327.3	6,216.6	2,472.5	718.40	209.53	5,040.9
	1985	7,097.7	10,681.0	17,778.0	8,002.3	20,747.0	16,963.0	6,415.5	640.07	362.47	13,060.0
	1990	6,914.9	27,889.0	34,804.0	25,201.0	45,654.0	25,554.0	16,930.0	475.05	754.82	12,944.0
A_{22}	1980	4,290.3	4,174.2	8,464.5	2,615.7	9,276.5	6,177.3	2,440.1	715.31	209.42	5,001.7
	1985	7,109.2	10,302.0	17,411.0	8,002.3	20,380.0	16,589.0	6,184.0	629.75	362.12	12,687.0
	1990	6,937.2	26,403.0	33,341.0	25,201.0	44,191.0	23,983.0	16,022.0	455.93	753.97	11,372.0
A_{32}	1980	1,005.6	4,227.2	5,232.8	2,615.7	6,044.8	3,342.0	2,472.5	328.82	215.23	2,166.4
	1985	- 133.7	10,681.0	10,547.0	8,002.3	13,516.0	8,576.7	6,415.5	246.78	379.71	4,673.8
	1990	- 8,865.2	27,889.0	19,024.0	25,201.0	29,874.0	7,253.0	16,930.0	81.76	792.45	- 5,357.7
A_{42}	1980	1,007.8	4,174.2	5,182.0	2,615.7	5,994.0	3,302.8	2,440.1	325.73	215.12	2,127.2
	1985	- 122.2	10,302.0	10,180.0	8,002.3	13,149.0	8,202.8	6,184.0	236.46	379.36	4,300.0
	1990	- 8,842.9	26,403.0	17,560.0	25,201.0	28,410.0	5,681.8	16,022.0	62.63	791.59	- 6,928.9
A_{52}	1980	4,479.5	4,172.6	8,652.1	2,395.9	9,464.1	6,386.5	2,439.2	740.20	208.79	5,322.2
	1985	8,100.1	10,277.0	18,377.0	6,364.5	21,346.0	16,869.0	6,169.1	691.60	361.25	13,795.0
	1990	14,285.0	25,047.0	39,332.0	16,909.0	50,182.0	34,704.0	15,193.0	641.17	718.26	26,291.0
A_{62}	1980	4,481.6	4,119.7	8,601.3	2,395.9	9,413.3	6,347.3	2,406.8	737.11	208.68	5,283.0
	1985	8,111.7	9,898.5	18,010.0	6,364.5	20,979.0	16,495.0	5,937.7	681.27	360.89	13,421.0
	1990	14,307.0	23,561.0	37,868.0	16,909.0	48,718.0	33,133.0	14,285.0	622.04	717.41	24,720.0
A_{72}	1980	1,196.9	4,172.6	5,369.6	66.4	6,181.6	3,512.0	2,439.2	350.62	214.49	2,447.7
	1985	868.8	10,277.0	11,146.0	6,364.5	14,115.0	8,482.2	6,169.1	298.30	378.49	5,408.5
	1990	- 1,495.1	25,047.0	23,552.0	16,403.0	34,402.0	16,403.0	15,193.0	247.88	755.82	7,990.1
A_{82}	1980	1,199.1	4,119.7	5,318.7	2,395.9	6,130.7	3,472.8	2,406.8	347.53	214.38	2,408.5
	1985	880.3	9,898.5	10,779.0	6,364.5	13,748.0	8,108.3	5,937.7	287.98	378.13	5,034.7
	1990	- 1,472.8	23,561.0	22,088.0	16,909.0	32,938.0	14,831.0	14,285.0	228.75	755.03	6,418.9

TABLE 7.7

SIMULATION RESULTS FOR KUWAIT: SCENARIOS B_{12}-B_{82}

cenario	Year	BOP	GDA	GDP	GDPN	GNP	GR	M	OILQ	P	ROIL
B_{12}	1980	4,288.2	4,227.2	8,515.3	2,615.7	9,327.3	6,216.6	2,472.5	718.40	209.53	5,040.9
	1985	4,046.3	10,817.0	14,864.0	8,002.3	17,833.0	12,480.0	6,499.1	594.88	373.68	8,577.3
	1990	-3,278.0	27,921.0	24,643.0	25,201.0	35,493.0	14,539.0	16,949.0	342.84	777.29	1,928.8
B_{22}	1980	4,295.6	4,027.1	8,322.7	2,615.7	9,134.7	6,066.2	2,350.3	706.65	209.12	4,890.6
	1985	4,522.4	9,378.2	13,901.0	8,002.3	16,870.0	13,079.0	5,619.8	575.34	366.56	9,176.2
	1990	-3,184.5	23,226.0	20,041.0	25,201.0	30,891.0	9,512.3	14,081.0	250.16	775.07	-3,098.4
B_{32}	1980	1,005.6	4,227.2	5,232.8	2,615.7	6,044.8	3,342.0	2,472.5	328.82	215.23	2,166.4
	1985	-1,765.2	10,817.0	9,052.3	8,002.3	12,021.0	5,501.2	6,499.1	201.59	388.07	1,598.4
	1990	-13,470.0	27,921.0	14,451.0	25,201.0	25,301.0	2,300.4	16,949.0	-50.45	802.54	-10,310.0
B_{42}	1980	1,013.0	4,027.1	5,040.1	2,615.7	5,852.1	3,191.7	2,350.3	317.08	214.83	2,016.1
	1985	-1,289.1	9,378.2	8,089.1	8,002.3	11,058.0	6,100.2	5,619.8	182.04	380.96	2,197.4
	1990	-13,376.0	23,226.0	9,849.3	25,201.0	20,699.0	-2,726.7	14,081.0	-143.14	800.32	-15,337.0
B_{52}	1980	4,479.5	4,172.6	8,652.1	2,395.9	9,464.1	6,386.5	2,439.2	740.20	208.79	5,322.2
	1985	5,472.7	10,277.0	15,750.0	6,364.5	18,719.0	14,262.0	6,169.1	682.76	366.51	11,189.0
	1990	3,965.6	25,047.0	29,012.0	16,909.0	39,862.0	23,506.0	15,193.0	594.51	741.11	15,094.0
B_{62}	1980	4,486.9	3,972.6	8,459.4	2,395.9	9,271.4	6,236.2	2,317.0	728.45	208.38	5,171.9
	1985	5,519.1	8,975.0	14,494.0	6,304.5	17,463.0	12,966.0	5,373.4	639.05	365.38	9,892.0
	1990	4,063.2	20,383.0	24,446.0	16,909.0	35,296.0	18,535.0	12,344.4	502.64	738.76	10,123.0
B_{72}	1980	1,196.9	4,172.6	5,369.6	2,395.9	6,181.6	3,512.0	2,439.2	350.62	214.49	2,447.7
	1985	-338.8	10,277.0	9,938.5	6,364.5	12,908.0	7,283.6	6,169.1	289.46	380.91	4,209.9
	1990	-6,226.2	25,047.0	18,821.0	16,909.0	29,671.0	11,267.0	15,193.0	201.22	766.36	2,854.6
B_{82}	1980	1,204.3	3,972.6	5,176.9	2,395.9	5,988.9	3,361.7	2,317.0	338.88	214.09	2,297.3
	1985	-292.44	8,975.0	8,682.5	6,364.5	11,652.0	5,980.8	5,373.4	245.76	379.78	2,913.1
	1990	-6,128.6	20,383.0	14,255.0	16,909.0	25,105.0	6,296.4	12,344.0	109.34	764.01	-2,116.1

the decrease in government revenue forces the government to borrow money from the Central Bank. This in turn pushes the level of the money supply up and therefore, creates a higher rate of inflation.

In the scenarios A_{13}-A_{83} and B_{13}-B_{83}, (tables 7.8 and 7.9, respectively), we follow the assumptions below:

i. 10 percent compounded annual inflation rate; and

ii. 3 percent annual increase in the productivity of labor in all sectors (compounded rate).

Comparing the scenarios A_{13} and B_{13} with A_{11} and B_{11}, respectively, we will get the same results as summarized above. However, if A_{13} and B_{13} is compared with A_{12} and B_{12}, respectively, we will see the change in the values of the variables from A_{11} and B_{11} are less in A_{13} and B_{13} than in A_{12} and B_{12}, respectively. This is because we are assuming higher levels of productivity in A_{12} and B_{12} than in A_{13} and B_{13}.

VI. Conclusions

From the simulation results we reach several conclusions.. First, if the historical pattern continues it will be difficult for the Kuwaitis to achieve their desired rate of economic growth and maintain oil production below the 2 million barrels-per-day ceiling that they have specified in their plans. This is true even if the Kuwaiti government reduces spending growth to match the rate of increase in oil prices. If the real price of oil remains constant, it will be even more difficult to hold production below the ceiling level of 2 million barrels per day and achieve the desired rate of economic growth. The implication is that the Kuwaitis must decide between achieving their desired rate of growth and their target ceiling for oil production because those two goals are incompatible.

TABLE 7.8

SIMULATION RESULTS FOR KUWAIT: SCENARIOS A_{13}-A_{83}

cenario	Year	BOP	GDA	GDP	GDPN	GNP	GR	M	OILQ	P	ROIL
A_{13}	1980	4,501.7	4,166.0	8,667.6	2,364.0	9,479.6	6,393.6	2,435.1	742.77	208.74	5,345.4
	1985	8,665.5	10,092.0	18,757.0	6,097.6	21,726.0	18,503.0	6,055.7	718.39	355.65	15,024.0
	1990	15,060.0	24,709.0	39,769.0	16,053.0	50,619.0	36,663.0	14,987.0	658.08	714.39	27,684.0
A_{23}	1980	4,503.8	4,113.0	8,616.8	2,364.0	9,428.8	6,354.4	2,402.7	739.69	208.63	5,306.2
	1985	8,677.0	9,712.8	18,390.0	6,097.6	21,359.0	18,189.0	5,824.2	708.06	355.30	15,251.0
	1990	15,082.0	23,223.0	38,305.0	16,053.0	49,155.0	34,092.0	14,079.0	638.96	713.54	26,112.0
A_{33}	1980	1,219.1	4,166.0	5,385.1	2,364.0	6,197.1	3,519.0	2,435.1	353.20	214.44	2,470.9
	1985	1,434.1	10,092.0	11,526.0	6,097.6	14,495.0	10,176.0	6,055.7	325.10	372.89	7,237.9
	1990	-720.4	24,709.0	23,989.0	16,053.0	34,839.0	17,362.0	14,987.0	264.79	752.01	9,382.5
A_{43}	1980	1,221.2	4,113.0	5,334.2	2,364.0	6,146.2	3,479.8	2,402.7	350.11	214.33	2,431.6
	1985	1,445.7	9,712.8	11,158.0	6,097.6	14,127.0	9,802.6	5,824.0	314.77	372.54	6,804.0
	1990	698.0	23,223.0	22,525.0	16,053.0	33,375.0	15,790.0	14,079.0	245.66	751.16	7,811.2
A_{53}	1980	4,676.0	4,116.3	8,792.3	2,166.8	9,604.3	6,554.6	2,404.8	762.61	208.05	5,606.2
	1985	9,420.9	9,779.5	19,200.0	4,809.7	22,169.0	18,498.0	5,865.0	756.94	354.72	16,182.0
	1990	19,697.0	22,876.0	42,573.0	10,914.0	53,423.0	41,572.0	13,807.0	761.83	691.00	36,195.0
A_{63}	1980	4,678.1	4,063.3	8,741.5	2,166.8	9,553.5	6,515.4	2,372.4	759.52	207.94	5,567.0
	1985	9,432.4	9,400.6	18,833.0	4,869.7	21,802.0	18,125.0	5,633.5	746.61	354.37	15,808.0
	1990	19,720.0	21,390.0	41,110.0	10,914.0	51,960.0	40,001.0	12,959.0	742.70	690.15	34,624.0
A_{73}	1980	1,393.5	4,116.3	5,509.8	2,166.8	6,321.8	3,680.1	2,404.8	373.04	213.75	2,731.7
	1985	2,189.5	9,779.5	11,969.0	4,869.7	14,938.0	10,112.0	5,805.0	363.65	371.96	7,795.0
	1990	3,917.2	22,876.0	26,793.0	10,914.0	37,643.0	23,271.0	13,867.0	368.53	728.62	17,894.0
A_{83}	1980	1,395.6	4,063.3	5,458.9	2,166.8	6,270.9	3,640.8	2,372.4	369.95	213.64	2,692.5
	1985	2,201.0	9,400.6	11,602.0	4,869.7	14,571.0	9,738.0	5,633.5	353.32	371.61	7,421.1
	1990	3,939.6	21,390.0	25,329.0	10,914.0	36,179.0	21,700.0	12,959.0	349.41	727.77	16,323.0

SIMULATION RESULTS FOR KUWAIT: SCENARIOS B_{13}-B_{83}

Scenario	Year	BOP	GDA	GDP	GDPN	GNP	GR	M	OILQ	P	ROIL
B_{13}	1980	4,501.7	4,166.0	8,667.6	2,364.0	9,479.6	6,393.6	2,435.1	742.77	208.74	5,345.4
	1985	5,688.0	10,198.0	15,886.0	6,097.6	18,855.0	14,481.0	6,120.5	696.21	365.56	11,542.0
	1990	4,730.6	24,734.0	39,464.0	16,053.0	40,314.0	24,496.0	15,002.0	620.83	737.17	16,517.0
B_{23}	1980	4,509.0	3,965.9	8,475.0	2,364.0	9,287.0	6,243.2	2,312.9	731.03	208.33	5,195.1
	1985	6,067.4	8,789.2	14,857.0	6,097.6	17,826.0	14,653.0	5,259.9	671.24	359.80	11,715.0
	1990	4,825.1	20,046.0	24,871.0	16,053.0	35,721.0	19,481.0	12,138.0	528.33	734.92	11,502.0
B_{33}	1980	1,219.1	4,166.0	5,385.1	2,364.0	6,197.1	3,519.0	2,435.1	353.20	214.44	2,470.9
	1985	-123.6	10,198.0	10,074.0	6,097.6	13,043.0	7,501.6	6,120.5	302.92	379.96	4,563.1
	1990	-5,461.2	24,734.0	19,273.0	16,053.0	30,123.0	12,257.0	15,002.0	227.53	762.42	4,277.5
B_{43}	1980	1,226.5	3,965.9	5,192.4	2,364.0	6,004.4	3,368.7	2,312.9	341.46	214.03	2,320.5
	1985	2,559.3	8,789.2	9,045.1	6,097.6	12,014.0	7,674.5	5,259.9	277.95	374.20	4,736.0
	1990	-5,366.7	20,046.0	14,679.0	16,053.0	25,529.0	7,242.2	13,138.0	135.03	760.17	736.96
B_{53}	1980	4,676.0	4,116.3	8,792.3	2,166.8	9,604.3	6,554.6	2,404.8	762.61	208.05	5,606.2
	1985	6,771.8	9,779.5	16,551.0	4,869.7	19,520.0	15,870.0	5,865.0	762.59	360.03	13,553.0
	1990	9,285.7	22,865.0	32,162.0	10,914.0	43,012.0	30,277.0	13,867.0	777.77	714.05	24,900.0
B_{63}	1980	4,683.4	3,916.3	8,599.6	2,166.8	9,411.6	6,404.2	2,282.5	750.87	207.64	5,455.9
	1985	6,818.2	8,477.1	15,295.0	4,869.7	18,264.0	14,563.0	5,069.2	718.89	358.90	12,257.0
	1990	9,383.3	18,212.0	21,595.0	10,914.0	38,445.0	25,306.0	11,017.0	685.89	711.70	19,929.0
B_{73}	1980	1,393.5	4,116.3	5,509.8	2,166.8	6,321.8	3,680.1	2,404.8	373.04	213.75	2,731.7
	1985	960.3	9,779.5	10,740.0	4,809.7	13,709.0	8,891.3	5,805.0	369.30	739.30	6,574.5
	1990	-906.1	22,876.0	21,970.0	10,914.0	32,820.0	18,038.0	13,867.0	384.48	739.30	12,661.0
B_{83}	1980	1,400.8	3,916.3	5,317.1	2,166.8	6,129.1	3,529.7	2,282.5	361.29	213.35	2,581.4
	1985	1,006.6	8,477.1	9,483.7	4,809.7	1,245.3	7,594.5	5,069.2	325.60	373.30	5,277.7
	1990	-808.5	18,212.0	17,404.0	10,914.0	28,254.0	13,067.0	11,017.0	292.60	736.95	7,690.1

A similar conflict emerges in the projections of Kuwaiti labor force and levels of oil output. If the Kuwaiti labor force grows at the rate consistent with historical trends, then nonoil output by the country will be lower than that projected in Kuwaiti plans. The only way that Kuwait can then achieve their target rate of economic growth is for the oil sector to grow more rapidly at a rate far exceeding the desired ceiling on oil production. If the planned growth of the labor force is achieved, then the Kuwaitis will be able to achieve their target rate of growth in the nonoil output and total output, and also maintain oil production below the 2 million barrels-per-day ceiling. However, we view the rates of growth in the Kuwait labor force projected by Kuwaiti planners as very optimistic.

In the future, one should not expect the current rate of foreign capital accumulation to continue, unless the capital markets of the advanced countries (particularly that of the United States) continue to be attractive. If the total foreign aid which Kuwait has committed itself in the future does not grow substantially, and if the attractiveness of the world capital market is not sufficient to increase other forms of capital outflow from Kuwait, this will also have a dampening effect on the absorptive capacity and on oil output.

All the scenarios indicate that over time, the domestic absorption of the country will increase with GDP and GNP resulting in increases in oil output. The nonoil GDP will grow at a slower rate than oil GDP, to the extent that by 1990, the share of GDPN falls to about 7.7 percent from a level of 27.7 percent in 1979.

Our most optimistic scenario is A_{11}, while the most pessimistic scenario is B_{81}. Whereas any of the forecasts based upon the alternative scenarios in tables 7.4 and 7.5 may turn out to be the best forecasts in the ex-post sense, depending on what the future holds for Kuwait, we believe the future is more likely to be approximated by Scenario B_{41}, which is reproduced in table 7.10.[11]

Political considerations have not been explicitly built into the model. As most model builders are aware, these are factors which are difficult to incorporate into an economic model. However, one can assume that the political and social changes which might occur will be reflected in changes in the exogenous variables in the model, in which case, our scenarios constitute a good basis for further analysis. However, there are some social and political changes which no model can predict, in the sense that they are structural and unforeseen. However, the possibility that these changes can put our forecasts off the mark is recognized.

Depsite these shortcomings, we beleive the model and the forecasts will be helpful to both policy makers and students of energy and absorptive capacity in their efforts to understand the Kuwaiti economy. This will be especially so if the structure of the model and the simulation results are examined in the light of discussions of the absorptive capacity of Kuwait contained in earlier and later chapters of this study. Also, the international implications which the forecasted absorptive capacities and the surplus funds (BOP) might generate are interesting in themselves.

TABLE 7.10

OUR MOST LIKELY FORECASTS
(millions of KD)

Item	1980	1985	1990
Total Absorptive Capacity (GDA + BOP)	5,660	10,861	21,356
Gross Domestic Absorption (GDA)	3,780	7,573	15,241
Current Account Balance (BOP)	1,880	3,288	5,115
Gross Domestic Product (GDP)	5,660	10,861	21,356
Nonoil Gross Domestic Product (GDPN)	1,642	2,292	3,276
Government Revenue (GR)	4,004	10,512	22,150
Oil Revenue (ROIL)	3,322	9,500	20,640
Imports (M)	2,199	4,517	9,202
Oil Production (millions of barrels) (OILQ)	416	464	527
Price Level (P)	211	362	701

FOOTNOTES

[1]Degrees of freedom (DF) is the number of observations, n, minus the number of coefficients in an equation (k). Therefore, given k, the bigger is n (i.e., the larger the sample size), the larger is DF. Furthermore, the larger the DF, the better the estimates.

[2]Central Bank of Kuwait, Quarterly Statistical Bulletin, April-June 1976, pp. 37 and 38.

[3]See, Jacob K. Atta, A Macroeconometric Model of a Developing Economy: The Case of Ghana (Washington, D. C.: University Press of America, 1980), pp. 226-227 for a definition of "block-recursiveness."

[4]A.S. Goldberger, Econometric Theory (New York: John Wiley, 1964), p. 355.

[5]T.M. Brown, "Habit, Persistence, and Lags in Consumer Behavior," Econometrica, Volume 20, 1952, pp. 355-371.

[6]Friedman and Goldsmith have obtained long-run MPC of 0.88 and 0.86, respectively, for the United States. Milton Friedman, A Theory of Consumption Function (Princeton, New Jersey: Princeton University Press for the National Bureau of Economic Research, 1957); Raymond W. Goldsmith, A Study of Saving in the United States, Vol. III (Princeton, New Jersey: Princeton University Press for the National Bureau of Economic Research, 1956).

[7]The relevent rates were: agriculture, 9.4 percent; commerce, 7.6 percent; electricity, 10.5 percent, manufacturing, 7.1 percent; construction, 5.4 percent; oil, 4.5 percent; services, 6.5 percent; and transport, 5.8 percent.

[8]Mr. Ait Laoassine, a petroleum consultant for OPEC and OAPEC, believes that "5 percent increase in real terms per year would be acceptable for the producing countries and tolerable for the consuming countries." Middle East Economic Survey, vol. 22, no. 51 (October 8, 1979), p. 6.

[9]As of May 1, 1980, the price of Kuwaiti crude (31° API) was $29.80 per barrel, giving an index of 1773.8 with 1970 as the base year.

[10]The simulation package used was developed at the University of Wisconsin. See Charles C. Holt, et. al., Program Simulate II: A User's Manual and Programmer's Manual (Madison, Wisconsin: Social Systems Research Institute, April 1967).

[11]Refer to table 7.5 for the assumptions underlying these scenarios.

COUNTRY REPORT: SAUDI ARABIA

A. An Overview of the Economy

1. Introduction

Saudi Arabia covers most of the Arabian Peninsula, which is located in Southwestern Asia. It is bounded on the north by Jordan, Iraq, and Kuwait; on the east by the Arabian Gulf, Qatar, the United Arab Emirates, Oman, South Yemen, and North Yemen; and on the west by the Red Sea and the Gulf of Aquaba. An estimate of the area enclosed by these boundaries is 865,000 square miles.

The Arabian Peninsula is mostly desert. Along the west coast, a narrow fertile plain of varying widths extends from the border with Yemen to the Gulf of Aquaba. East of the plains and parallel to the coast runs a mountain range. To the east of this range stretches the Nejd Plateau with an average elevation between 4,000 and 6,000 feet. The height of this plateau falls from its western borders to the Arabian Sea. From Taif eastward, the height of the plateau declines to 1,950 feet at Riyadh and to 72 feet at Dhahran.

There is a narrow band of sand mountains of varying widths extending from the Rub-al-Khali northwest to the Great Nafud. East of these mountains (the Dhahana), the elevation falls quickly to sea level; this is the area in which most of the country's oil reserves are located.

Saudi Arabia covers part of the world's largest oil reserves, bounded on the north by the Taurus Mountains, by the mountains of Lebanon and Syria, the central highlands of Saudi Arabia on the west, and on the east, by the mountains of Iran and Oman. With the exception of two fields, the country's producing fields are located in the Paleozoic stratum east of Riyadh. There is some evidence that oil may also be present under the Red Sea off the western coast of Saudi Arabia. Map 1 shows the major oil deposits.

Crude oil lifted in Saudi Arabia is divided into three density classes: Arabian Heavy, Arabian Medium, and Arabian Light crude oil. The Kingdom's known and proven oil reserves are said to be the largest in the world. Proven reserves are defined as those pools of crude known and recoverable with current technology and available equipment in place. Table 1.1 shows the proven oil reserves as of January 1, 1960-1980.

World reserves amounted to 648,525 million barrels by January 1, 1981, according to the Oil & Gas Journal (December 29, 1980, pp. 78 and 79). Thus, Saudi Arabia's reserves were about 25 percent of known world reserves. Since 1960, Saudi Arabia's proven reserves have risen about 231.4 percent, from 50,000 to 165,700 million barrels.

In addition to crude oil, Saudi Arabia owns huge amounts of natural gas in association with the oil in the ground. In the past, this gas was flared, except for relatively small amounts which were sold in the local markets as liquefied petroleum gas (LPG) for industrial and home use. In recent years, natural gas has been collected and used for the manufacture of fertilizer. Saudi Arabia's gas reserves on January 1, 1981 were 110,000 billion cubic feet; World gas reserves were 2,638,501 billion cubic feet. Thus, the Saudi's reserves were about 3.8 percent of known world reserves.

Besides crude oil resources, other minerals have been located in commercial quantities. The government is currently undertaking extensive geological

MAP 1

OIL FIELDS DISCOVERED IN SAUDI ARABIA AND THE SAUDI – KUWAITI DIVIDED ZONE

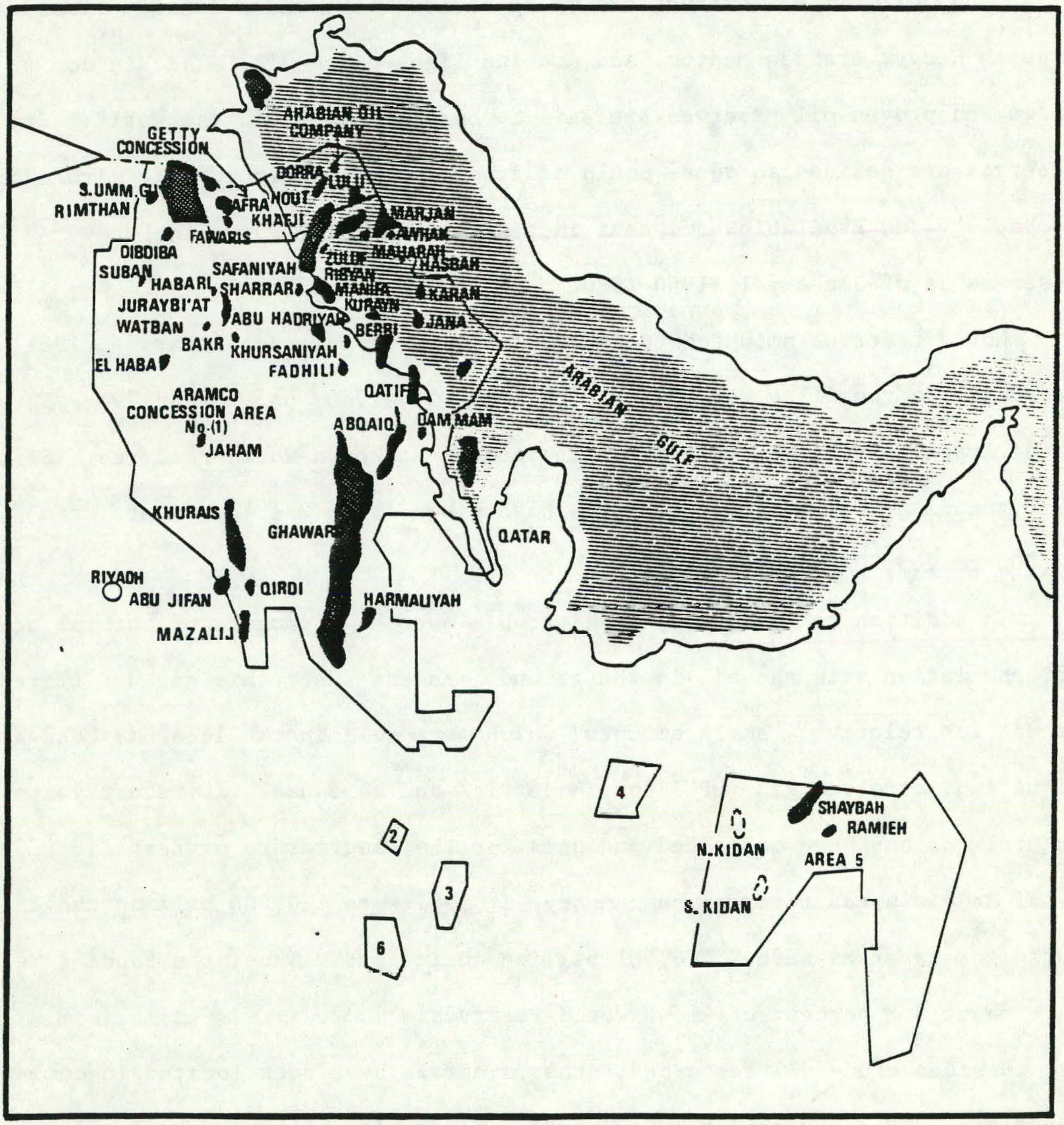


TABLE I.1

PROVEN OIL RESERVES, 1960-1979

Year	Million barrels	Year	Million barrels
1960	50,000	1970	140,000
1961	50,000	1971	128,500
1962	52,000	1972	145,300
1963	52,000	1973	138,000
1964	60,000	1974	141,000
1965	60,500	1975	145,000
1966	60,000	1976	151,000
1967	66,000	1977	169,000
1968	74,700	1978	167,000
1969	77,000	1979	167,000
		1980	167,000

Sources: Figures for 1960-1973 from Oil and Gas Journal, Worldwide issue, and International Petroleum Encyclopedia, 1979, p. 284. Figures for 1974-1979 from Kingdom of Saudi Arabia, Ministry of Planning, Third Development Plan, 1400-1405 A.H. (1980-1985 A.D.).

exploraton to determine the nature of the known deposits and to search for additional mineral deposits of copper, gold, silver, iron, sulphur, and phosphates.

Saudi Arabia has no overland free-flowing fresh water, although when it rains some valleys fill with water. Many dams have been constructed to impound this important source of water for irrigation and other purposes. Other natural sources of water consists of confined and free-flowing aquifers and springs. Large reservoirs of fossil water are believed to exist in the central region, perhaps sufficient for 100 years.

The climate and soil converge to determine cultivable agricultural lands. Saudi Arabia's climate is controlled by the subtropical high-pressure system. In the interior sections of the country, the summer is hot and dry, and the winter is relatively cool. The arable lands include Al-Hasa, Al-Qateef, Al-Aflaj, Al-Kharj, Juzan, Tihamah, Wadi Fatima Al-Median, Taif, Abha, and Ha'il. There also exists a substantial area of Saudi land which can be brought under cultivation given an adequate supply of water.

The most significant feature of the land is its geo-political importance. Saudi Arabia dominates the Arabian Peninsula, the land mass being between Asia and Africa. Most of the oil fueling the industrial economies of Europe, Japan, and the United States is transported in the waters surrounding this peninsula. If in pumping the life-blood of industrial economies Saudi Arabia is characterized as the heart, then the sea routes--the Suez Canal, the Bab al-Mandab Straits, and the Strait of Hormuz--are as vital as the aorta in bringing oil to the western world. It is of no surprise that western observers are concerned; the Suez Canal has already been closed once as a result of the Israeli-Arab conflict, the

Bab al-Mandab Straits are bordered by Ethiopia and South Yemen--both Soviet satellites, and the Strait of Hormuz has an uncertain future due to the political instability of Iran.

The population of Saudi Arabia is relatively homogeneous. No figure has been agreed upon for the population size. Estimates vary between 3 to 15 million. The 1979 population estimate by the International Monetary Fund was 8,110,000.[1] Even with the 1974 census, the government is still uncertain about the natural rate of growth of the Saudi population, owing to incomplete reporting of births and deaths throughout the nation, especially in the rural areas. It is estimated to be in the range of 2.8 to 3 percent per annum. Using data provided by the International Monetary Fund in the International Financial Statistics for the period of 1972 to 1978, the average annual population growth rate was 3.0559 (see table 1.2). Given that over population is not an immediate problem, the Saudi government has had a relaxed attitude towards family planning.

The number of non-Saudi residents has increased owing to the increasing demand for skilled technicians. The proportion of non-Saudis in the workforce has been estimated to be as high as 60 percent and presents a continuing problem for the government, which wishes to keep the proportion from increasing in the future. Net immigration may increase the estimated population growth in the country to an annual rate of 4 percent, which would raise the population of Saudi Arabia to 10 million in 1985, and almost double the 1974 population figure of 7,012,642[2] by 1990.

Taking into consideration the entire land area of Saudi Arabia, which is 2,150 square kilometers, the population density is very low, not more than 3 persons per square kilometer. The non-Saudis, among them Palestinian refugees and Yemeni laborers are concentrated in the major cities. Most non-Saudis are located in the major east and west coast cities, and in Riyadh.

Thirty-nine percent of the population in Saudi Arabia live in towns having 30,000 inhabitants or more. A criterion such as the size of the population of a town obviously cannot be used to measure the extent of urbanization in the Kingdom, since it will tend to under estimate it vis-a-vis other countries. For example, in the United States, the urban population may include areas with 2,500 inhabitants or more.[3]

Saudi Arabia shares with most emerging nations the problem of rural-to urban migration. In recent years, this trend has accelerated the growth of the major cities. For instance, it has been estimated that Riyadh has grown 12-fold over the last 40 years.[4] The population size of the 16 major cities can be seen in table 1.3. The four largest, Riyadh, Jeddah, Mecca, and Taif, each have a population of more than 200,000.

Such a rural-urban shift presents the Saudi economy with many problems. Depopulation of the countryside has been faster than the rate at which technological advancement in the agricultural sector could release labor to the other sectors of the economy, especially during the 1970s. Hence, agricultural production has not been able to keep pace with the rest of the economy, and its contribution to the gross domestic product has been falling as the discussion in that context will show.

Rural-urban migration has also created all but one of the problems which usually accompany rapid urbanization: housing shortages, congestion, pressure on social infrastructure, inflation, and the like. The single exception is that unemployment is not yet a problem in the urban centers. However, as is

TABLE 1.2

POPULATION OF SAUDI ARABIA, 1972-1978
(in million, mid-year estimates)

Year	Population	% Increase
1972	6.57	---
1973	6.76	2.89
1974	6.97	3.11
1975	7.18	3.01
1976	7.40	3.06
1977	7.63	3.11
1978	7.87	3.15
1979	8.11	3.06
Average increase		

Source: International Monetary Fund, International Financial Statistics (Washington, D. C.: International Monetary Fund, March 1980), p. 334.

TABLE 1.3

PRINCIPAL TOWNS IN SAUDI ARABIA WITH A POPULATION OF OVER 30,000 IN 1976

Town	Population	Number of families
Riyadh	666,840	101,506
Jedda	561,104	97,363
Mecca	366,801	67,947
Taif	204,857	30,877
Medina	198,186	35,390
Damman	127,844	21,513
Hofuf	101,271	14,551
Tabouk	74,825	10,696
Buraida	69,940	8,774
Mubarraz	54,325	7,775
Khamis Mushait	49,581	9,142
Khobar	48,817	9,065
Najran	47,501	9,149
Hail	40,502	6,065
Jizan	32,812	5,648
Abha	30,150	5,143

Source: A. R. Al-Madani and Muhamed Al-Fayez, "The Demographic Situation in the Kingdom of Saudi Arabia," Population Bulletin of the United Nations Economic Commission for Western Asia, Nos. 10 and 11, January-July 1976 (Amman, Jordan: United Nations Economic Commission for Western Asia, 1976), p. 187.

usually the case with a rapidly growing population, Saudi Arabia has a youthful population. Persons under 15 years of age constitute 44 percent of the total.[5] The proportion of women in the labor force is low. Thus, although the share of population 65 years and over is relatively small (in 1970, 2.7 percent), the economically active population in 1970 was estimated at only 15.2 percent of the total population.

It would appear that the population size alone cannot be held responsible for the scarcity of both skilled and unskilled manpower and the resultant constraint on economic development. The literacy rate, inadequate training, youthfulness of the population, attitudes towards female labor and female education, and the high proportion of unsettled nomadic population all contribute to keeping the proportion of the population actively engaged in economic activities at such a low level. If the labor force constraint is to be relaxed, the government must devise more progressive educational programs and change the attitude of the society towards female participation in the labor force. This is all the more critical in view of the large number of non-Saudis in the labor force.

Structural change in the distribution of employment by economic activity in Saudi Arabia between 1970 and 1975 are apparent from table 1.4. There has been a shift of manpower away from the agricultural sector towards construction, manufacturing, and the other modern sectors of the society. These trends continued through the last half of the decade's Second Development Plan.

The social and political system of Saudi Arabia is dominated by the monarch and by the Royal Family. The King is the symbol of both political and religious power, although the extent of the power of each ruler depends on his personality and ability. Since leaders differ in administration capabilities, Saudi rulers

TABLE 1.4

EMPLOYMENT BY ECONOMIC ACTIVITY, 1970, 1975

Activity	Number of employed ('000) 1970	1975	% Change 1970-75	% Distributio 1970	197
Agriculture, fishing					
Settled, fishing	311.9	311.2	- 0.2	28.3	20.
Nomadic	133.9	114.9	- 14.2	12.1	7.
	445.8	426.1	- 4.4	40.4	28.
Mining & quarrying					
Crude petroleum & natural gas	12.0	19.2	60.0	1.1	1.3
Other	13.7	26.4	92.7	1.2	1.7
	25.7	45.6	77.4	2.3	3.0
Manufacturing					
Petroleum refining	1.4	2.1	50.0	0.1	0.1
Other	34.7	44.4	28.0	3.1	2.9
	36.1	46.5	28.8	3.2	3.0
Utilities	12.2	18.3	50.0	0.1	0.1
Construction	141.5	314.1	122.0	12.8	20.6
Commerce					
Trade, restaurants, hotels	114.3	191.7	67.7	10.4	12.
Finance, insurance, real estate, business services	15.9	19.3	21.4	1.4	1.
	130.2	211.0	62.1	11.8	13.
Transport, comm. & storage	62.1	103.2	66.2	5.6	6.
Community, social & personal services	137.5	188.4	37.0	12.5	12.
Subtotal, Private sector	991.1	1,353.5	49.8	10.2	11.
Public Administration	60.8	85.2	40.1	5.5	5.
Education	38.5	62.5	62.3	3.5	4.
Health	13.4	21.1	57.5	1.2	1.
Subtotal, Public sector	112.7	168.8	49.8	10.2	1.
Total	1,103.8	1,522.1	37.9	100.0	100.

Source: Kingdom of Saudi Arabia, Ministry of Planning, The Second Development Plan 1395-1400 (1975-1980), p. 19.

have had varied successes in managing the economy, especially since the exploration of oil brought an infiltration of Western socio-economic values into the social fabric of the country. Most of the Saudi rulers were able to accept the modernization which oil wealth bestowed upon the country but without drastic changes in the social values of the population. But whereas social values for some time have remained stable, education and wealth are changing the living patterns of many Saudis. In the coming years, Saudi Arabia will face the challenge of expanding its capacity to accept changes in the social system in order to develop at a rate consistent with the rate of oil revenues inflow. The problem which will continue to confront policy makers is the choice of measures and the extent to which they should be applied so that modernization is accepted with a minimum effect on the positive aspects of traditional institutions.

The political decision-making process in Saudi Arabia may be termed a "family affair." All aspects of government are handled by the King and other members of the Royal Family. Fortunately, there have been up to now no conflicts between the technocrats and the Royal Family, as this new western-trained elite has been integrated rather well into the traditional political system. This is primarily because the ministers are given full authority in the day-to-day administration of their respective ministries, and the respect which both the Royal Family and the bureaucracy have for the traditional values of Islam. However, the social, political, and cultural framework of Saudi Arabia will undoubtedly be strained by the country's rapid development.

2. Recent Economic Performance

a. Economic Growth

From tables 1.5 and 1.6 we observe that nominal gross domestic product (GDP) on the average has grown quite dramatically, averaging 44.3 percent in the period of 1974-1979. Thus, in terms of nominal GDP, the Saudi economy can be said to have performed remarkably well. Most of this growth is attributable to rapid growth in oil revenues, largely as a result of oil price increases in 1973 and 1974. However, during the 1970-1975 period, inflation accelerated, and consequently, the real rate of growth of GDP was substantially lower, averaging 16.2 percent for the 1970-1974 period and 10.2 percent for the period of 1974-1978.[6]

b. Capital Formation

Turning to the demand side, we explore the composition of national income in the period of 1970 to 1978. Table 1.6 shows the composition of GNP by aggregate demand components. Two features are important to note. First, gross fixed capital formation is quite large by any standard, averaging just over 16 percent of GDP.[7] Second, the foreign sector is enormous, 46.6 percent of GDP. Since investment is so large, the Saudi economy can be expected to grow rapidly, but at the same time it is dependent upon the rest of the world for many of the products it consumes.

c. Structural Change

The dominance of oil in the country's foreign exchange earnings, government revenue, and as a source of growth of the national income is the most obvious characteristic of the economic system of Saudi Arabia. The oil

TABLE 1.5

SHARE OF SECTORS IN GDP, 1969/70 - 1977/78 AT CURRENT PRICES

Year	GDA	Percent change from previous year	GDPM Petro	%	GDPM Other	%	Total GDPM	%	GDPE	%	GDCN	%
1970	984		1,241		431		1,572		273		934	
	5.7*		7.1		2.5		9.6		1.6		5.4	
1971	1,016	3.3	1,474	18.8	484	12.3	1,968	17.7	298	9.2	1,007	7.8
	4.4		6.4		2.1		8.5		1.3		4.4	
1972	1,059	4.2	1,442	- 2.2	543	12.2	1,985	0.9	302	1.3	1,174	16.6
	3.8		1.5		1.9		7.0		1.1		4.2	
1973	1,139	7.6	1,811	25.6	617	13.6	2,428	22.3	319	5.6	1,809	54.1
	2.8		4.5		1.5		6.0		0.8		4.5	
1974	1,242	9.0	4,347	240.0	730	18.3	5,077	209.1	328	2.8	2,720	50.4
	1.2		4.4		0.7		5.1		0.3		2.7	
1975	1,392	12.1	5,766	32.6	1,600	119.2	7,366	45.1	195	-40.5	7,719	183.8
	1.0		4.1		1.1		5.2		0.1		5.5	
1976	1,586	13.9	5,962	3.4	2,211	38.2	8,173	11.0	151	-22.6	15,854	105.4
	1.0		3.6		1.3		4.9		0.1		9.6	
1977	1,866	17.5	6,221	4.3	3,063	38.5	9,284	13.6	144	4.6	25,546	61.1
	0.9		3.0		1.4		4.4		0		12.4	
1978	2,255	20.8	5,908	- 5.0	4,066	32.7	9,974	7.4	204	41.7	31,959	25.1
	1.0		2.6		1.8		4.4		0.1		14.3	
Average	2.4*	(11.1)	4.5	(56.5)	1.6	(35.6)	6.1	(40.9)	0.6	(-0.9)	7.0	(63.0)

TABLE 1.5 (Continued)

Year	GDCO	%	GDPT	%	GDPS	%	Total Non-oil GDP Amount	Total Non-oil GDP %	GDPO	%	Less import duties	%	Total GDP	%
1970	1,008		1,243		2,866		8,999		8,153		247		17,399	
	5.8		7.1		16.6		51.8		46.9		1.3		100.0	
1971	1,068	6.0	1,479	9.0	3,124	8.2	9,949	10.6	12,631	54.9	341	38.1	22,921	31.7
	4.7		6.5		13.6		43.3		55.1		1.6		100.0	
1972	1,177	10.2	1,567	5.9	3,603	15.3	10,867	9.2	16,983	34.5	407	19.4	28,259	23.3
	4.2		5.6		12.8		38.7		60.1		1.2		100.0	
1973	1,554	32.0	2,121	35.4	4,344	20.6	13,714	26.2	26,374	55.3	463	13.8	40,551	43.5
	3.8		5.2		10.8		33.9		65.0		1.1		100.0	
1974	2,355	51.5	2,718	28.1	5,908	36.0	20,348	48.4	78,491	197.6	475	2.6	99,315	144.9
	2.4		2.7		5.9		20.3		79.1		0.6		100.0	
1975	3,897	65.5	2,310	-15.0	11,384	92.7	34,263	68.4	104,960	33.7	376	21.7	139,600	40.6
	2.8		1.7		8.2		24.5		75.2		0.3			
1976	6,180	58.6	4,077	76.5	17,776	56.1	53,797	57.0	110,095	4.9	634	68.6	164,526	17.9
	3.8		2.5		10.8		31.7		75.2		1.7		100.0	
1977	8,507	37.7	6,775	66.2	22,531	26.7	74,653	38.8	129,289	17.4	1,114	75.7	205,056	24.6
	4.1		3.3		10.8		35.9		63.0		1.1		100.0	
1978	11,049	29.9	9,960	47.0	29,582	31.3	94,983	27.2	127,181	-1.6	1,583	42.1	223,747	9.1
	4.9		4.5		13.3		42.5		56.9		0.6		100.0	
Average	4.1	(36.4)	4.3	(32.9)	11.4	(35.9)	35.8	(35.7)	63.1	49.6	0.9	29.8		42.0

Notes: GDPA = GDP from agriculture, forestry, and fishing; GDPM = GDP from manufacturing, crude petroleum and other; GDPE = GDP from electricity, gas, and water; GDCN = GDP from constuction; GDCO = GDP from commerce wholesale retail trade, restraurants, and hotels; GDPT = GDP from transport, storage, and communications, GDPS = GDP from finance, insurance, real estate, business services, ownership of dwellings and other; community social sector is not an important source of employment although it does require a small cadre of highly skilled technicians.

A convenient methodology for carrying out structural analysis of the economy is to look at the distribution of its gross national product (GNP) according to economic activities. This analysis can be done either at a point in time, or from a more dynamic view, by looking at the way the shares of various economic activities have been changing over time.

During the nine-year period of 1969/70 to 1977/78, there have been important structural changes in the economy of Saudi Arabia. Table 1.5 shows a number of major characteristics of this decade.[8] There was a relative shift toward crude petroleum and gas, whose share of nominal GDP increased by 10 percentage points while the relative contributions of all nonoil and gas activities in the economy declined from 51.8 percent in 1970 to 42.5 percent in 1978.

If the Saudi government reduces production of crude oil to, say, 8-9 million barrels per day and attempts to diversify the economy, the oil sector is not likely to show the same upward trend for the share of oil in total output. As the bottlenecks presently existing in the economy are reduced, the nonoil sectors may be able to catch up. There is, of course, the outside chance that the dominance of crude oil and gas will continue to grow, especially if plans to market all associated gas, most of which is currently flared, succeed on a continuing basis, and if oil production continues at over 10 million barrels per day.

TABLE 1.6

EXPENDITURES ON GROSS DOMESTIC PRODUCT BY SECTOR, 1970-1978
(At current prices, in million SRs)

	Public/government consumption		Private consumption		GFCF total[b]		Gross fixed capital formation: Government		Gross fixed capital formation: Non-oil private		Gross fixed capital formation: Oil sector	
Year	Amount (percent)	% change[a]	Amount (percent)	% change	Amount (percent)	% change	Amount (percent)	% change	Amount (percent)	% change	Amount (percent)	% change
1970	3,421		5,859		2,579		1,214		1,056		327	
	19.7		33.7		14.9		7.0		6.1		1.9	
1971	3,798	11.0	6,412	9.4	2,931	12.9	1,204	-0.8	1,150	8.9	577	76.5
	16.6		28.0		12.8		5.3		5.0		2.5	
1972	4,285	12.8	6,915	7.8	3,403	16.1	1,443	19.9	1,290	12.2	670	16.1
	15.2		24.5		12.0		5.1		4.6		2.4	
1973	5,335	24.5	7,895	14.2	5,694	67.3	1,985	37.6	1,669	29.4	2,040	204.5
	13.2		19.5		14.0		4.9		4.1			
1974	9,864	84.9	9,827	24.5	8,400	47.5	3,416	72.1	2,351	40.9	2,633	29.1
	9.9		9.9		8.5		3.4		2.4		2.7	
1975	15,911	61.3	17,897	82.1	17,841	112.4	7,370	115.7	6,812	189.7	3,659	39.0
	11.4		12.8		12.8		5.3		4.9		2.6	
1976	28,883	81.5	23,738	32.6	33,705	88.9	17,491	137.3	10,792	58.4	5,422	48.2
	17.6		14.4		20.5		10.6		6.6		3.3	
1977	41,033	42.1	34,148	43.9	51,416	52.5	27,352	56.4	16,748	55.2	7,316	34.9
	20.0		16.7		25.1		13.3		8.2		3.6	
1978	47,034	14.6	50,995	49.3	67,136	30.6	40,484	48.0	18,591	11.1	8,053	10.1
	21.0		22.8		30.0		18.1		8.3		3.6	
Yearly ave. % of GDP	1		20.3		16.7		8.1		5.6		[illegible]	
Ave. % change		41.6		33.0		52.5		60.8		50.7		

	Gross fixed capital formation											
	Transport equipment		Machinery		Other capital goods		Construction		Increase in stocks (inventory)		Expenditures on GDP	
r	Amount (percent)	% change	Amount (percent)	% change	Amount (percent)	% change	Amount (percent)	% change	Amount (percent)	% change	Amount (percent)	% change
0	309		319				1,969		209		17,399	
	1.8						11.3		1.2		100.0	
1	313	1.3	423	32.6			2,195	11.5	-205	-198.1	22,902	31.7
	1.4		1.8				9.6		-0.9		100.0	
2	335	7.0	473	11.8			2,595	18.2	95	146.3	28,258	23.3
	1.2		1.7				9.2		0.3		100.0	
3	468	39.7	520	9.9			4,706	81.3	-113	-218.9	40,551	43.5
	1.2		1.3				11.6		-0.3		100.0	
4	757	61.8	1,429	174.8			6,214	32.0	835	838.9	99,315	144.9
	0.8		1.4				6.3		0.8		100.0	
5	2,221	193.4	2,021	41.4	203		13,396	115.6	748	- 10.4	139,600	40.6
	1.6		1.4		0.1		9.6		0.5		100.0	
6	3,445	55.1	2,798	27.8	315	55.2	27,147	102.7	780	4.3	164,526	17.9
	2.1		1.7		0.2		16.5		0.5		100.0	
7	5,328	54.7	7,546	169.7	471		38,914	40.2	838	7.4	205,056	24.6
	2.6		3.7		0.2		18.6		0.4		100.0	
8	6,264	17.6	7,778	3.1	1,180		51,914	36.4	895	6.8	223,749	9.1
	2.8		3.5		0.5		23.2		0.4		100.0	
ly ave. of GDP	1.7		2.0		0.3		12.9		0.3		100.0	
hare of GDP		53.8		58.8		85.1		54.7		72.0		42.0

TABLE 1.6 (Continued)

Year	Exports of goods and services: Amount (Percent)	Exports of goods and services: % change	Less imports of goods and services: Amount (Percent)	Less imports of goods and services: % change
1970	10,302		4,990	
	59.2		28.7	
1971	15,189	47.4	5,205	4.3
	66.3		22.7	
1972	19,862	30.8	6,302	21.1
	70.3		22.3	
1973	30,012	51.1	8,272	31.3
	74.0		20.4	
1974	85,682	185.5	15,293	84.9
	86.3		15.4	
1975	114,461	33.6	27,257	78.2
	82.0		19.5	
1976	120,284	5.1	42,863	57.3
	73.1		26.1	
1977	140,321	16.7	62,699	46.3
	68.4		30.6	
1978	139,544	- 0.6	81,856	30.6
	62.4		36.6	
Yearly average % of GDP	71.3		24.7	
Average % change		46.0		44.7

[a]Percentage change from previous year.

d. International Trade and Finance

One of the most difficult sectors to forecast for the Saudi economy is the foreign trade and finance sector. The Saudis have more discretion than any other country in determining the level of oil exports because they have such large reserves and production capacity on the one hand and because their absorptive capacity is relatively small, on the other hand. The Saudis have adjusted their petroleum production and exports over 10 million barrels this year. There is much controversy over the Saudi motives in producing at such a high rate of output. The Saudis argue that they are offsetting declines in production and exports by Iran and Iraq in order to stabilize the world market for petroleum. Others have argued that the Saudis are attempting to stabilize OPEC petorleum prices at lower levels, i.e., $32 per barrel, in order to maximize the present value of their oil reserves. One view is that the Saudis have launched ambitious development plans that will require high levels of oil production and exports to generate needed financial resources. Whatever the motives, it is clear from recent experience that the Saudis have a wide latitude in pursuing their own production and pricing policies even when that policy is in conflict with that of other OPEC nations. It is for this reason that we treat the oil sector as a residual.

Oil exports in turn dominate the trends in Saudi export revenue and balance of payments. One of the limitations of the model is that we are not able to capture the effects of foreign asset accumulation and foreign investment earnings on the Saudi balance of payments. This is a refinement that we hope to introduce once better data and information is available on foreign asset movements by the OPEC countries.[9]

3. <u>Sectoral Analysis</u>

a. <u>Petroleum</u>

Saudi Arabia is the world's dominant oil producer. The Kingdom has reserves of approximately 165,700 million barrels or about one-fourth of the world's proven petroleum reserves. As of March 1981, Saudi Arabia produced a little over one-fifth of the non-communist world's needs (see table 1.7). At current production levels of 10.3 million barrels per day, proven reserves are expected to last 35 to 40 years. Saudi Arabia is also the dominant producer in OPEC, currently supplying over 40 percent of total OPEC production. As Iranian and Iraqi oil production have fallen due to the war and internal disruption, Saudi Arabia elected to take up the production slack, increasing its role in OPEC production. Long a price dove, Saudi Arabia has recently maintained a posted price of about $4 less than the other members of OPEC ($32 per barrel versus $36 to $46 for all others but Abu Dhabi, as determined at the Bali meetings in December 1980 and unchanged after the meeting in May 1981 in Vienna). The Saudis exerted pressure in the August 1981 OPEC meeting to unify prices. Venezuela dissented and most other members were obliged to reduce their prices in order to maintain sales in a glutted oil market. However, Saudi Arabia agreed to increase the price of its marker crude to $34 per barrel, and as most other members agreed to do, reduce production by 10 percent.

Saudi Arabian production has increased to about 10.3 million barrels per day in the face of declining demand for oil worldwide and for OPEC oil in particular. Table 1.7 shows the relative proportions of world oil production by OPEC and by Saudi Arabia, while table 1.8 shows total OPEC and world

TABLE 1.7

CRUDE OIL PRODUCTION

Year	Saudi percentage of world	OPEC percentage of world	Saudi percentage of OPEC
1973	16.4	66.9	24.5
1974	18.6	67.4	27.6
1975	16.9	64.8	26.1
1976	18.8	67.5	27.9
1977	19.6	66.4	29.5
1978	16.6	63.5	27.9
1979	19.5	63.4	30.8
1980 (November)	24.2	56.6	42.7

Note: Excludes USSR, China,but includes Eastern Europe and minor producers.

Source: United States Department of Energy, Monthly Energy Review. Figures are average barrels per day produced.

TABLE 1.8

WORLD OIL PRODUCTION AND CONSUMPTION

Year	OPEC Production	% change from previous year	World Production	% change from previous year	IEA consumption	% change previous
1973	30,961	--	46,270		34,150	--
1974	30,683	- 0.08	45,545		32,960	-3.48
1975	27,134	-11.6	41,870		31,810	-3.48
1976	30,711	13.2	45,490		33,770	6.16
1977	31,230	1.7	47,035		34,930	3.40
1978	29,800	- 1.7	46,095		35,880	2.70
1979	30,928	2.8	48,810		35,900	0.39
1980 (November)	24,015	-22.4	42,433		32,820	-8.58

Source: United States Department of Energy, Monthly Energy Review.
Annual averages based on barrels per day produced except for 1980.

production and consumption. This has caused softness in oil prices and the appearance of an oil glut of 2 to 3 million barrels per day, with OPEC member countries each fighting for a share of a sagging market.

Some observers view this relentless move of Saudi Arabia to increase production as an attempt to force OPEC prices to a unified level as a basis for negotiations with consuming countries or as a price indexing tied to the costs of OPEC imports from the developed countries (e.g., The Guardian, May 3, 1981). The conventional view is that Saudi Arabia is sustaining production at high levels because of its concern for the health of the world economy. Without further price increases, the western countries may be able to solve their inflation problems which will help with import costs and help maintain the real value of OPEC foreign investments.

One view is that the Saudis are maintaining high levels of production and exports in order to finance their ambitious development plans. It is true that occasionally in the past the Saudis have overspent their budget plans, e.g. in 1980. Development plans 1 and 2, for example, did not incorporate an inflation factor into planned levels of spending. However, the Third Plan does incorporate an inflation factor. Even if the Saudis overspend the budget during the third plan period by 10 to 20 percent, this will still leave a substantial surplus on current account resulting in a rapid accumulation of foreign assets.

From a purely political-economic point of view, it makes a lot more sense for Saudi Arabia to cut back on production somewhat until prices can firm up at existing levels. Certainly the present policy is not making Saudi Arabia many friends in OPEC. The soft market has led to both production cuts and price decreases by several OPEC members such as Kuwait and Nigeria.

From a domestic development perspective, the revenue available from the increased production cannot be easily absorbed. Assuming production of 10.3 million barrels per day, domestic absorption of one-half million barrels per day, and a price of $32 per barrel, a surplus of $40 billion would be generated, assuming also that the 1980-1981 budget allocation is fully spent. (See table 1.9 for various oil revenue scenarios and expenditures).

Several other arguments can be made for maintaining low production rates and higher prices. If the price elasticity of demand is less than one, then price increases will lead to increases in revenue. Evidence of the last eight years suggest this is the case, although softness in demand over 1980 and 1981 suggests that the long-run elasticity may be somewhat higher than the short-run. This is especially true in the western developed countries where petroleum-saving technological changes have recently been implemented at a more rapid pace. If this trend continues, and if oil substitutes are developed rapidly enough, oil may become a wasting asset rather than a nest egg for future generations. This is, of course, the long-run dilemma of the cartel countries.

To finance the very ambitious Third Five-Year Plan and to take care of its foreign lending and defense needs, Saudi Arabia needs to earn about $75 billion to $100 billion per year over the next five years. At current prices, it could finance its 1980-1981 budget by producing just over 7 million barrels per day. Whether it continues to produce 10.3 million barrels per day depends upon political events outside the economic sphere.

TABLE 1.9

PROJECTED REVENUE ASSUMING 500,000 BARRELS/DAY CONSUMED DOMESTICALLY AND A POSTED PRICE OF $32/BARREL

Barrels/day produced (millions)	Revenue (billion US $)
5	52.56
6	64.24
7	75.92
8	87.60
9	99.28
10	110.96
10.3	114.46

Note: 1980-1981 budget is $74 billion.

Source: Middle East Economic Digest.

b. Agriculture

As in many other oil-producing countries, the Saudi Arabian agricultural sector has been declining over the past decade. While the average rate of growth in agricultural output in the Kingdom is considerably higher than that of most developing countries (4 percent on average for the past several years), its share of non-oil GDP has dropped from 12.1 percent to 2.4 percent between 1970 and 1978. Depsite this decline, the agricultural sector has not been stagnant. On the contrary, value added per worker has been rising and modern agricultural methods have been adopted at least on a trial basis in several localities. Rather, the fundamental reason for the decline of agriculture can be traced to a precipitous drop in the size of the agricultural labor force. Only 28 percent of the labor force was employed in agriculture in 1975, down from 40 percent in 1970. While current figures are not available, there appears to have been no reversal of this trend since 1975. As a result agricultural output has been unable to keep pace with rapidly growing domestic income. Food imports have increased both because of a rapidly growing population and because of a relatively high income elasticity of food demand. A further decline in the agricultural labor force will undoubtedly lead to increased import food dependence which is unlikely to be completely offset by productivity increases.

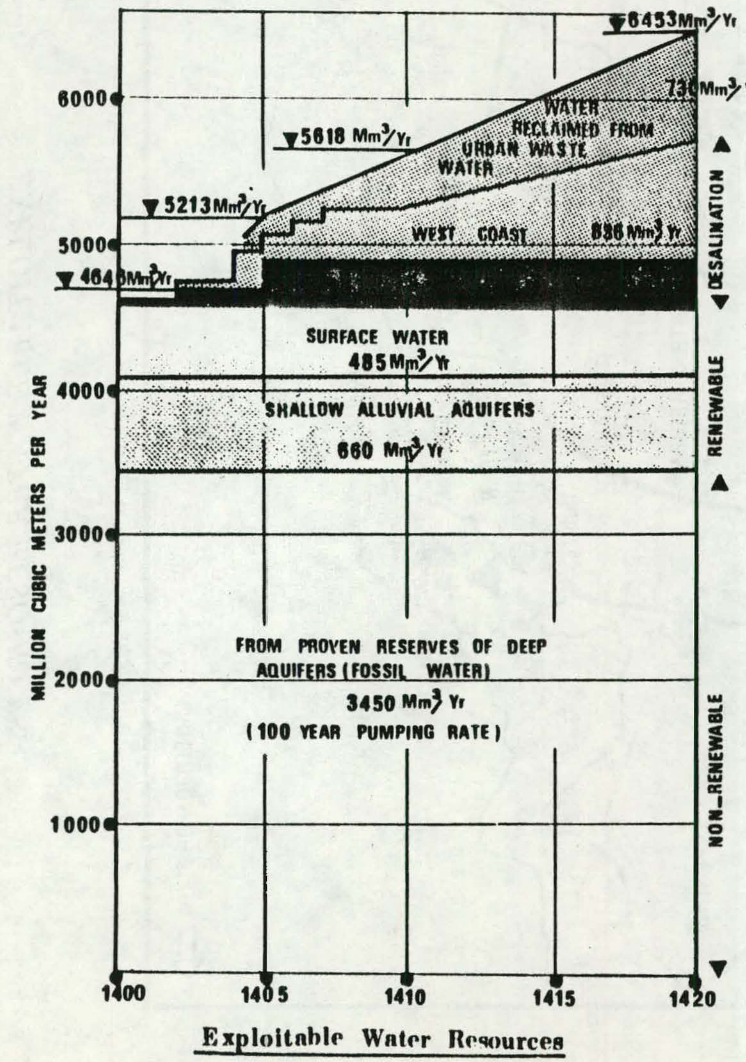
Traditional agricultural methods are widespread, particularly in the southwest. The land tenure system fosters small holdings and there is insufficient infrastructure for an efficient marketing system to develop. Water availability remains a continuing problem, despite the fact that 20 in the future and these reserves are expected to last 100 years at the projected pumping rates. This is augmented by renewable ground water and desalinized and reclaimed waste water from urban areas. Most of the deep aquifer fossil water is available in the north central and eastern regions (see figure 1.2). The western region, which contains Mecca, Jeddah, Medina, and Taif, is projected to be short of water in the future. Even now water is being diverted from the agricultural sector to serve the needs for potable water in these cities and this will increase in the future (see table 1.10). Riyadh's needs will also have to be served. The problem will be complicated by the fact that it will probably grow more rapidly over the next ten years than the other major cities. Water use in Riyadh is projected to double by 1987 to over 700 thousand cubic meters per day. To meet these needs, the desalination complex at Jubail will supply up to 660,000 cubic meters per day and 200,000 cubic meters will be available from the Wasia aquifer near Khurais.

Much of the modern irrigated agriculture is also planned for the central region south of Riyadh, based on the large water reserves available. The Third Development Plan estimates that over 40 percent of the Kingdom's irrigated area can be developed in the central region by the year 2000.

With rapid economic development, the major cities of Saudi Arabia will be growing very rapidly and will demand a considerable proportion of available and projected water resources. Because of this pressure there is a definite possibility that the agricultural sector will be overlooked. While the Third Plan puts some emphasis on the needs of the traditional agricultural sector, much of the section on water deals with the needs of Riyadh and desalination

Figure................... 1.1

NATIONAL WATER BALANCE



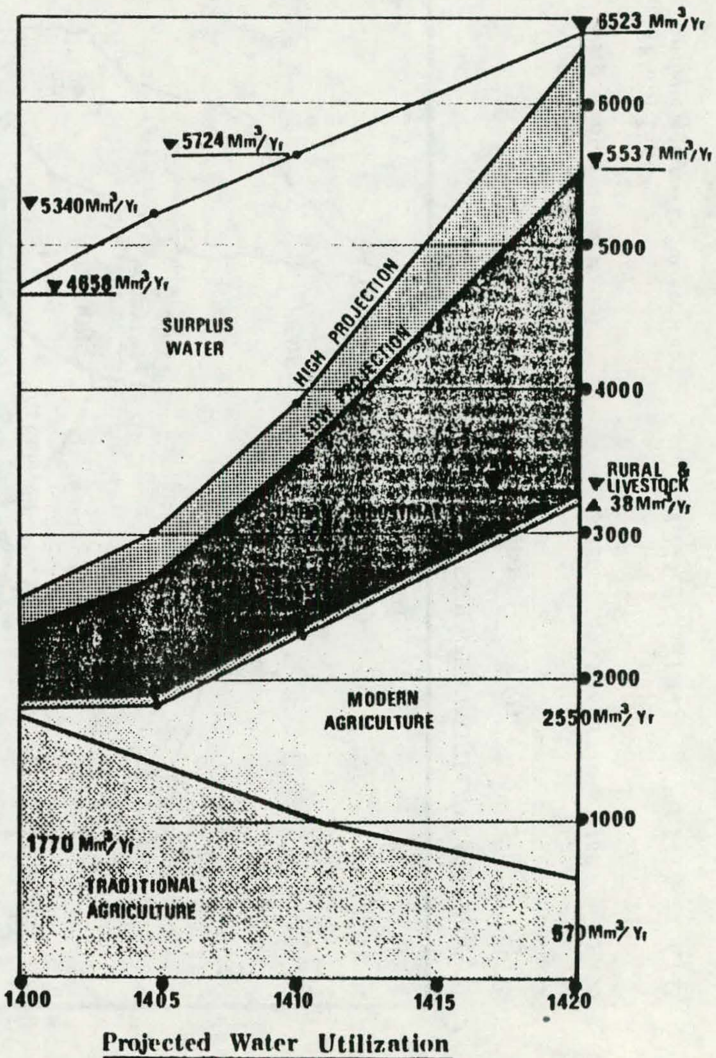
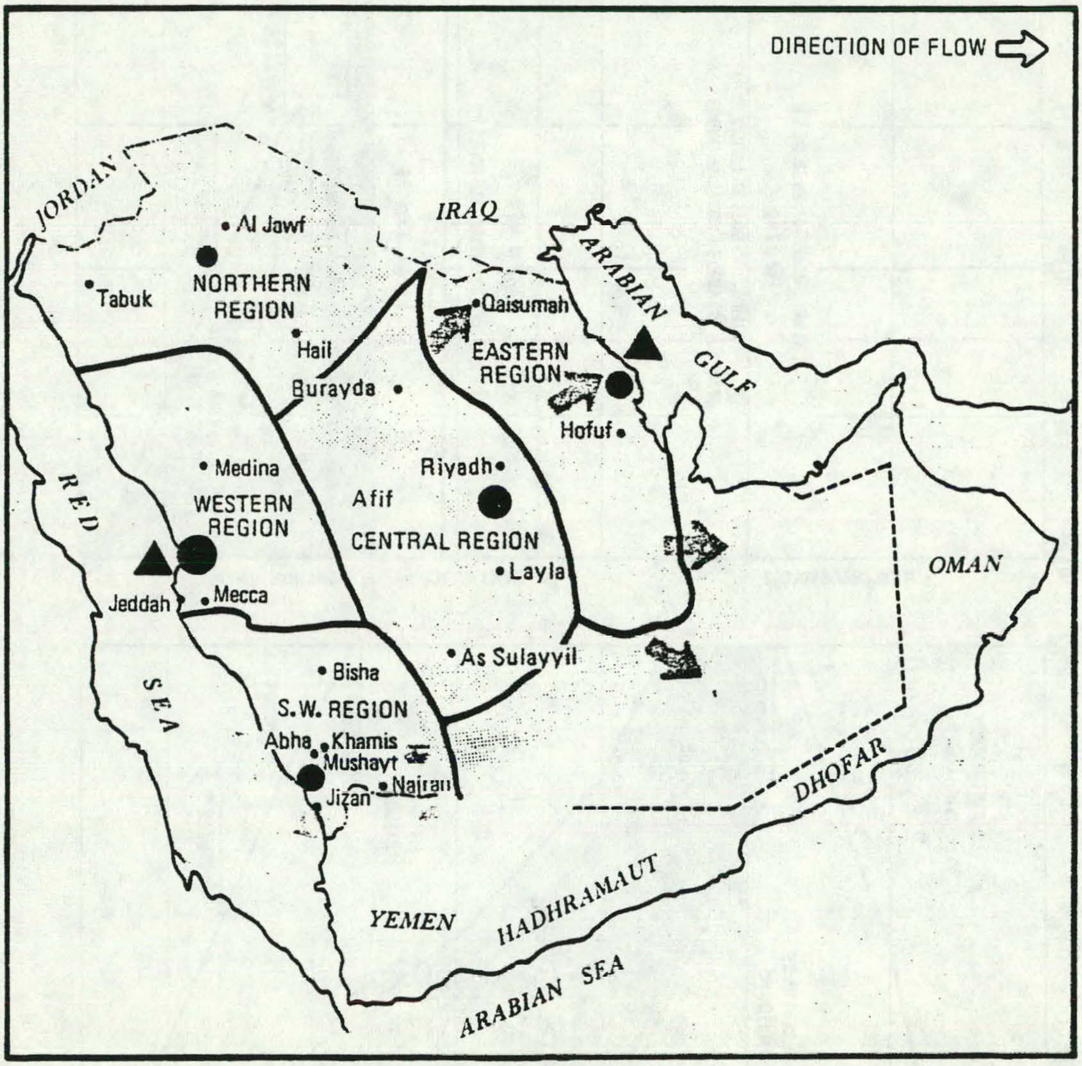


Figure............ 1.2

EXPLOITABLE WATER RESOURCES



RESOURCES IN MILLION M^3 /YEAR

	1400	1405	1410	1420
NON–RENEWABLE *Deep Aquifers (Fossil Water)*	*3,450*	*3,450*	*3,450*	*3,450*
RENEWABLE *Shallow Aquifers & Surface Water*	*1,145*	*1,145*	*1,145*	*1,145*
DESALINATION–West Coast	*52*	*243*	*432*	*836*
–East Coast	*11*	*362*	*362*	*362*
URBA . RECLAIMED FROM URBAN *WASTE FOR NON–DOMESTIC USE*	*–*	*140*	*335*	*730*
TOTAL AVAILABLE	*4,658*	*5,340*	*5,724*	*6,523*

TABLE 1.10

NATIONAL WATER BALANCE

(Million cubic meters per year)

Region	Water Resources	1400	1405	1410	1420	Water Utilization	1400	1405	1410	1420
Central	Non-renewable	2.000	2.000	2.000	2.000	Urban & industrial	128	196	298	579
	Renewable	200	200	200	200	Rural & livestock watering	8	8	9	11
	Desalination	-	193	193	193	Irrigated agriculture	890	790	1.090	1.710
	Reclaimed from urban waste water	-	40	90	200	Surplus (Deficit)	1.174	1.439	1.086	293
	Subtotal	2.200	2.433	2.483	2.593	Subtotal	2.200	2.433	2.483	2.593
Western	Non-renewable	-	-	-	-	Urban & industrial	219	343	479	897
	Renewable	225	225	225	225	Rural & livestock watering	7	7	7	8
	Desalination	52	237	392	777	Irrigated agriculture	125	200	255	405
	Reclaimed from urban waste water	-	85	155	330	Surplus (Deficit)	(74)	(38)	31	22
	Subtotal	277	547	772	1.332		277	547	772	1.332
Eastern	Non-renewable	1.000	1.000	1.000	1.000	Urban & industrial	68	153	231	402
	Renewable	-	-	-	-	Rural & livestock watering	1	1	1	1
	Desalination	11	169	169	169	Irrigated agriculture	367	470	550	575
	Reclaimed from urban waste water	-	15	25	50	Surplus (Deficit)	575	560	412	241
	Subtotal	1.011	1.184	1.194	1.219	Subtotal	1.011	1.184	1.194	1.219
Northern	Non-renewable	450	450	450	450	Urban & industrial	20	32	54	111
	Renewable	15	15	15	15	Rural & livestock watering	6	7	9	12
	Desalination	neg.	4	4	4	Irrigated agriculture	150	138	180	220
	Reclaim from urban waste water	-	-	15	40	Surplus (Deficit)	289	292	241	166
	Subtotal	465	469	484	509	Subtotal	465	469	484	509
Southwestern	Non-renewable	-	-	-	-	Urban & industrial	67	99	149	290
	Renewable	705	705	705	705	rural & livestock watering	5	5	5	6
	Desalination	neg.	2	36	55	Irrigated agriculture	300	275	270	310
	Reclaimed from urban waste water	-	-	50	110	Surplus (Deficit)	333	328	367	264
	Subtotal	705	707	791	870	Subtotal	705	707	791	870
Kingdom	Non-renewable	3.450	3.450	3.450	3.450	Urban & industrial	502	823	1.211	2.279
	Renewable	1.145	1.145	1.145	1.145	rural & livestock watering	27	28	31	38
	Desalination	63	605	794	1.198	Irrigated agriculture	1.832	1.873	2.345	3.220
	Reclaimed from urban waste water	-	140	335	730	Surplus (Deficit)	2.247	2.616	2.137	986
	TOTAL RESOURCES	4.658	5.340	5.724	6.523	TOTAL UTILIZATION	4.658	5.340	5.724	6.523

neg. = negligible

efforts on the west coast designed to supply Jeddah and the other west coast towns which have no available fossil water. The Kingdom's desalination capacity is projected to increase from 65.4 million cubic meters to 533 million cubic meters per year by 1983.

The Third Plan does not address the problem of agricultural pricing. Surely, this is an issue in the choice between fossil and renewable sources. While the long time horizon makes the issue somewhat academic now, the problem will have to be addressed in the future.

Before the discovery of oil, Saudi agriculture was able to support only a small population at near subsistence. Continuous infusion of petrodollars into the agricultural sector has not changed that basic fact. Modern technology will provide some productivity increases but they will almost assuredly be outstripped by the demands of an increasing population whose incomes are increasing at a rapid rate. Depsite the rapid rate of increase in overall income in the Kingdom, incomes in rural areas are still low absolutely. Thus, the shape of the Engel curve is unlikely to slow the rise in food demand in the near future. Furthermore, the agricultural sector will continue to be plagued by shortages of water and indigenous labor. The Third Plan's emphasis on a drastic reduction of the rate of increase in expatriate labor may also have detrimental effects to the extent that the modern sector, which depends primarily upon imported laborers, is affected.

Increases in the allocation of funds to municipal and rural affairs to 19.7 billion SR will pump more money into rural development projects in the third plan period. If these projects follow the same pattern as previous projects, emphasizing high technology and the use of foreign labor, there will likely be inflationary effects unless subsidies are given to keep prices down. Also, it is hard to see how this empahsis on the use of foreign labor will be compatible with the goal of decreased overall economic dependence on foreign labor. Another difficulty in meeting the Plan's goal is that potential expansion of agriculture is inhibited by water and manpower shortages as outlined above. Furthermore, any increase in production will be costly, since new technologies will probably not be competitive with prices of agricultural products purchased from overseas. Thus, agricultural self-sufficiency can probably only be accomplished at a high cost. Chances are a bit better for wheat and dairy products which depend upon rainfall conditions in the high, cool southwest and parts of the Najd and Eastern Province.

c. Industrialization

To offset its overwhelming reliance on the export of crude oil, the Saudi Arabian government has embarked upon an ambitious program of industrialization. The Deputy Minister for Industrial Affairs, Ministry of Industry and Electricity, Dr. Fouad Al-Farsy, stressed the reasoning behind this industrialization effort:

> While some argue that wealth is simply an unending source of income, we believe wealth implies productivity. We believe that we cannot have real wealth unless we can use our revenues, not simply to maintain a flow of income, but to provide productive work for our people--and benefits to our people, and to the world. Therefore, we reject proposals to simply invest our oil revenues and live from the income. Instead, we decided to build an industrial economy---based on the hope and promise of world economic interdependence. (10)

Cheap and abundant supplies of natural gas collected from the Eastern Province oil fields will serve as a feedstock for a wide variety of petrochemical products. Saudi Arabia's production of petrochemical products is projected to account for up to 4 percent of the world's petrochemical product production. (See table 1.11 and table 1.12).

These petrochemical projects form the heart of an ambitious program to establish a heavy industrial base in Saudi Arabia. The Saudi Arabian Basic Industries Corporation (SABIC) and the Royal Commission for Jubail and Yanbu are the guiding forces behind these projects. SABIC has responsibility for industrial projects such as petrochemicals, iron and steel, and aluminum, while the Royal Commission for Jubail and Yanbu has responsibility for the development of the two industrial cities of Jubail and Yanbu. This includes implementing the master plans, setting up infrastructure, community facilities, and providing manpower and training. The infrastructure built in these two cities may run as much as $35 billion. Jubail, by far the largest of the two complexes, is projected to have a population of close to 400,000 by the end of this century.

The gas-gathering scheme upon which the petrochemical projects are based is being managed by Arabian-American Oil Company (ARAMCO) and is projected now to cost as much as $20 billion. There are five main elements in the ARAMCO system which is designed to eventually collect 3.5 billion cubic feet of gas per day, given oil output of 7.5 million barrels per day. The petrochemical projects are summarized in table 1.12.

In addition to petrochemical plants, a number of other industrial projects are planned at the Jubail and Yanbu sites. These include iron and steel mills, an aluminum smelter, and petroleum refineries. (See table 1.13).

If successfully implemented, this wide variety of projects will enable Saudi Arabia to telescope the development process, which took the United States

TABLE 1.11

SABIC'S PLANNED PRODUCTION CAPACITY
(million tonnes)

	1985	Projected percentage of world 1985 production
Methanol	1.3	8.5
Ethylene glycol	0.6	7.2
Ethanol	0.281	7.0
Ethylene		
Styrene	0.300	2.1
Low density polyethylene	0.514	2.4
High density polyethylene	0.195	2.0
Urea fertilizer	1.4	1.3

Source: Middle East Economic Digest, Special report, 1980.
Original source: Sabic, p. 21.

TABLE 1.12

GAS GATHERING AND PROCESSING PROGRAM
(daily capacity)

NGL centers			
Berri	commissioned October 1977	methane	400 mcf*
		NGL	54,000 barrels
		sulphur	1,400 tonnes
Shedgum	commissioned May 1980	throughput	1,500 mcf
		sweetgas	700 mcf
		ethane	780 mcf
		NGL	160,000 barrels
		sulphur	1,600 tonnes
Uthmaniya	scheduled for 1982	throughput	1,400 mcf
		methane	525 mcf
		NGL	305,000 barrels
Fractionation plants			
Juaymah	commissioned March 1980	ethane/NGL	300,000 barrels
		storage:	
		propane	2.4 million barrels
		butane	1.8 million barrels
Yanbu	scheduled for 1982	ethane/NGL	270,000 barrels

*million cubic feet

Source: Aramco, Dhahran

TABLE 4.15

HEAVY INDUSTRY PROJECTS AT JUBAIL AND YANBU

abic partner	Site	Cost	Product	Capacity (tonnes pa)	Status
		PETROCHEMICALS			
elanese Chemical/Texas Eastern	Jubail	$ 300m*	methanol	730,000	pending
ow Chemical	Jubail	1,500m*	ethylene	500,000	pending
			polyethylene	173,000	
			ethylene glycol	300,000	
xxon	Jubail	1,100m*	polyethylene	240,000	signed April 1980
obil	Yanbu	2,000m*	ethylene	450,000	signed March 1980
			polyethylene	291,000	
			ethylene glycol	200,000	
audi Petrochemical Development	Jubail	1,946m	ethylene	450,000	feasibility study
orporation			polyethylene	330,000	signed April 1980
			ethylene glycol	80,000	
audi-Japanese Methanol Company	Jubail	270m	methanol	730,000	signed October 1979
nell Oil	Jubail	3,000m	ethylene	656,000	agreed July 1980
			styrene	295,000	
			ethylene dichloride	454,000	
			ethanol	281,000	
			caustic soda	377,000	
			chlorine	330,000	
			ethylbenzine	327,000	
		METALLURGICAL			
orf Stahl	Jubail	$3,000m	(dry) sponge iron	800,000	signed March 1979
			steel billets	850,000	
ubail Rolling Mill	Jubail		rods & bars	850,000	
eddah Rolling Mill	Jeddah	30m	rods & bars	140,000	signed mid-1979
luminium smelter	Jubail		aluminium ingots & other products	225,000	dropped May 1980
		FERTILIZERS			
aiwan Fertilizer Company	Jubail	$ 360m	urea	500,000	signed December 1979

*estimates

Source: Middle East Economic Digest, Special report, July 1980, p. 22. Original source Sabic.

and Western Europe over a century, into a mere 20 or 30 years. The obstacles to success are formidable. While few observers doubt that Saudi Arabia is committed to this ambitious program, many western analysts have been somewhat skeptical.

Building and operating costs are likely to be substantially higher in Saudi Arabia than in the developed world because of the severe climate and lack of trained local personnel. Marketing costs are also likely to be higher, since new customer relations will have to be established. These problems may be exacerbated by over capacity and softness in world demand for petroleum products in the 1980s. The world steel industry is in the doldrums and aluminum is only slightly less depressed. On petrochemicals, western industry sources tend to think the Saudi projections are too optimistic, especially in regard to the potential for cultivating the developing markets in the Indian subcontinent and in Southeast Asia. One of the leading chemical experts, Michael Ayde, estimates that there will be 55 percent world over capacity of ethylene production by the mid-1980s. This could create a hostile environment when Saudi Araiba begins to export petroleum products to Europe.

Juxtaposed against this are more positive, but still cautious assessments by L. Turner and J. Bedore. They stress the low cost of financing provided by the Saudis, the surpluses, the low cost of feedstock, and the promise of low-cost entitlements to Saudi crude oil. These factors have led Shell to calculate that the cost of producing ethylene and its primary derivatives in the Gulf are competitive with Europe.

The ambitious nature of Saudi industrialization is put in perspective when viewed against the background of its past. As table 1.4 demonstrates, manufacturing has historically played an extremely small role in the

Saudi Arabian economy. Even now, industrial growth is inhibited by the underdeveloped nature of the Saudi business and financial sectors. Local entrepeneurs are still often reluctant to provide venture capital for local industry and loans have to be sought from foreign sources. Fortunately, SABIC appears to be playing an increasingly important role in attracting local funds for industrial development purposes.

Industry in Saudi Arabia is concentrated mainly in the principle cities of Jeddah, Mecca, and Medina in the Western Province, Riyadh in the Central Province, and Paruman and Al-Khobas in the Eastern Province. This is largely attributable to the lack of adequate transportation infrastructure, the dependence of industry upon raw material inputs for nonoil manufacturing, and the lack of water and extreme climatic conditions in most of the country. As long as these impediments to industrialization exist, it is unlikely that industrial development will spread quickly to the outer regions of the Kingdom.

The existing industrial and infrastructural base is concentrated in cement, power generation, and of course, oil refining. There is also a small steel mill and a fertilizer plant. The existing oil refinery and LNG plants remain under the authority of Petromin. They consist of the Jeddah and Riyadh refineries with 210,000 barrels per day and 115,000 barrels per day expected capacity in 1980, respectively, which are designed to meet domestic consumption requirements. The principle export refinery at Ras Tamura has a daily capacity of 40,000 barrels per day. Several additional refineries are planned at Jubail and Yanbu.

A half dozen major private power companies provide power to the major cities of the country. In addition, government-owned desalination plants are providing an increased contribution to the power needs of the country.

Finally, one of the largest heavy industries already existing in Saudi Arabia is cement. Current production capacity is about 2 million tons per year. However, this is not sufficient to meet the heavy demand resulting from rapid industrial development and construction requirements. The Third Plan calls for expansion to over 12 million tons per year.

If Saudi Arabia can overcome the barriers of manpower shortages and infrastructural bottlenecks, many of its proposed industrial projects may be competitive in the world market. If this does occur, then the only limits to industrial development will be in international marketing of the products produced; an area where increased cooperation with the western countries may be beneficial.

Abdulaziz Alzamil, Vice-Chairman and Managing Director of Saudi Basic Industries Corporation, stressed at the Conference on the Third Development Plan of Saudi Arabia at the International Research Center for Energy and Economic Development (ICEED) in August 1981 that traditional values would be preserved:

> We are daily in the foreign press that there is a conflict between what we are doing and our traditional way of life. However, we have managed very successfully and we will continue to do so to keep away alien values and to preserve our beliefs and maintain our values and morals.

d. <u>Labor and Human Capital</u>

One of the most difficult issues to examine in the Saudi economy is the role of labor and human capital. Estimates of the size and composition of the labor force vary considerably in different surveys.

The Saudi government is particularly sensitive to the size of the expatriate labor force relative to the indigenous labor force. The

Saudi government has biased development planning toward capital-intensive projects in all of the industrial sectors in an effort to reduce reliance on expatriate labor. If the government sets strict limits on the influx of expatriate labor this will have a profound effect on the development prospects in coming years. The Third Plan calls for reductions in the size of the expatriate labor force. We expect that these limits in expatriate labor force growth will be difficult to implement.

4. Monetary and Banking System and Monetary and Fiscal Policy

Some of the features of the monetary sector of the Saudi Arabian economy are common to that of the LDCs. Lack of a market for government securities and large and variable holdings of excess reserves vitiate the traditional tools of open market operations and reserve requirement changes which are so often employed by the monetary authorities in developed countries. In Saudi Arabia, there are no government securities, and while the Saudi Arabian Monetary Agency does set legal reserve requirements (maximum of 17.5 percent and actual ratio of 10 percent since 1961, according to M. E. Edo, IMF Staff Papers, 1975), the actual reserve-deposit ratio never fell below 0.31 during the period from 1963 to 1976, and in recent years the ratio was as high as 100 percent. Thus, the high and variable reserve-deposit ratio combined with the lack of a government securities market removes two of the three traditional tools of monetary policy. The third, discounting commercial loans or extending loans to commercial banks is precluded by Islamic law and SAMA is prohibited in its charter from lending to the government.

In developing countries, similar characteristics leave the monetary sector dependent upon movements in the balance of payments. This is especially true for small open economies where a balance of payments surplus (defict) is accompanied by an accumulation (depletion) of foreign assets on the part of the central bank. This is matched by an increase (decrease) in the monetary base since virtually no possibilities for sterilization exist.

Saudi Arabia and the other capital-surplus oil-exporting countries differ from the LDCs in that the oil exports responsible for the Saudi Arabian balance of payments surpluses generate primarily government, rather than private revenue. Most government revenue is derived from oil exports and these revenues may be disposed of by the government in three different ways: (1) purchase of foreign goods and services; (2) purchases of foreign assets; and (3) domestic Saudi purchases. Only the third type of expenditure will lead to domestic money creation. These expenditures lead to an increase in domestic liquidity since they are financed from external sources. This increase in the monetary base will lead to an increase in the money supply and the relationship between the base and the money supply will depend upon the money multiplier.

There will also be secondary effects as the increase in the money supply and domestic income spreads through the economy. In particular, increased imports and private outflow of funds for the purchase of foreign assets will occur. If interest rates are freely fluctuating, the higher interest caused by fiscal expansion (IS curve shifts to the right) will lead to a reduced outflow of private capital. In the case of Saudi Arabia, interest rates are controlled by the government and the outflow of capital may continue unabated unless domestic profit-making opportunities are abundant, or risks associated with holding foreign assets are considered to be high.

The money multiplier will depend upon the currency ratio as a percent of the money supply and upon the level of reserves held by the commercial banks. The level of the multiplier in Saudi Arabia is close to 1 (around 1.2) and has been pretty stable over time despite some variations in the components. Both the currency-to-money ratio and the reserve-to-deposit ratio are considerably higher in Saudi Arabia than in the United States, so the multiplier is lower. Thus, there appears to be a fairly stable relationship between the monetary base and government spending for domestic Saudi goods and services.

Inflationary pressures will be exerted if the increase in the money supply outstrips the increase in the quantities of goods and services available either through domestic production or imports. In addition, excessive inflation may lead to increases in the velocity of circulation of money which would tend to exacerbate the inflationary problem.

The Saudi Arabian Monetary Agency and the Saudi government have recently become acutely aware of the problems associated with continued high levels of domestic government spending. Rapid inflation in the aftermath of the 1974 price increases for oil was fueled by the rapid development push of the Second Plan. Fiscal policy in Saudi Arabia must rely primarily upon changes in government expenditures since tax collections are minimal. Therefore, to retard the rate of domestic inflation, the government sharply curtailed domestic spending in 1978 and in 1979; in some cases by refusing to pay contractors for work already completed. The curtailment in expenditures plus an elaborate subsidy program desigend to keep prices down, have been responsible for the abatement of inflation in recent years; somewhat to the surprise of many western observers. Furthermore, depite the Quoranic dictum, interest rate payments are becoming more common. Currently, a three-tier system of prime interest rates exists, based on the length of time an individual is a customer, with new non-Saudis having to pay the highest rates. These rates are competitive with those in the international market.

The structure of banking in the Kingdom is also changing rapidly. Until a few years ago, there were few local banks and the money changer of the Souk still remains the preferred agency for many Saudis in their day-to-day financial affairs. However, McNown and Wallace found significant increases in velocity for the 1974 to 1976 period. A number of recent changes in the banking laws suggest increased competition and use of banks. Under the Saudization of the Kingdom's banking system, the majority of all bank stock will be held by Saudis. In the past, foreign banks were not allowed to branch and only the two wholly-owned Saudi banks, National Commercial Bank (NCB) and the Riyadh Bank were allowed to branch. In the future, all banks will be accorded this privilege and increased competition and penetration of the banking habit will be likely.

5. Absorptive Capacity Constraints

a. Traditional Concepts of Absorptive Capacity

(1) Marginal Efficiency Criteria

Traditionally, the notion of absorptive capacity has referred to the level of net investment consistent with equilibrium between the rate of interest and the marginal efficiency of investment schedule. For public projects where externalities might be involved, an equivalent condition exists where social benefits just equal social costs using an appropriate discount rate. If investment is carried beyond this point, resources are being allocated inefficiently since social rates of return are not equilibrated throughout the system.

In the analysis of Saudi Arabia, conventional economic wisdom suggests that the marginal efficiency criterion has been violated so often that it has ceased to be a useful allocative device. Despite the difficulties inherent in evaluating such investment, many observers have argued that public housing and infrastructure investment in roads and communications have proceeded far beyond the equilibrium break-even point between benefits and costs. Similar arguments have been made with regard to the agricultural sector, where subsidies and other government support systmes have been used to encourage wheat and dairy production, where the cost of domestic production far exceeds the costs of imports, and where infant industry arguments do not hold much water. We will have to suspend judgment on the efficacy of the mammoth Jubail and Yanbu operations, although they seem to have a much greater probability of being economically feasible than the cases just cited.

A careful analysis of the situation suggests that the Saudis have few viable alternatives to rapid growth and high capital absorption. For various reasons, not the least of which is Western pressure, cut backs in oil production are extremely difficult in the short run. At the same time, the 1973/74 and the recent 1979/80 price increases continue to bring embarassing riches to the government. Thus, the alternatives become government spending at home and/or increased purchases of foreign assets. Both options are being pursued, as neither outlet is alone capable of absorbing all of the projected revenue. The mix between overseas and domestic spending is, of course, up to the Saudi government and they have chosen to rapidly pursue increased domestic spending. While official foreign asset holdings have increased dramatically since 1973, government spending has increased almost twice as fast af foreign asset holdings of the Central Bank between 1973 and 1978.

The rapid growth in domestic spending has surprised many writers who, almost to a man, predicted in 1973 a relatively slow growth in domestic absorption and a more rapid build up of foreign assets. This view was perhaps conditioned by a relatively narrow and traditional view of the concept of absorptive capacity, and failed to take into account a number of additional considerations. Unlike the Kuwaitis who are used to dealing in the arcane world of international monetary exchange, the Saudis are relatively inexperienced in the ways of high finance. As an outlet for their large foreign exchange reserves, they have tended to purchase low-yielding sterling or dollar assets. As a result, they have witnessed an erosion of their foreign capital base by foreign exchange rate fluctuations and inflation. Furthermore, the threat of confiscation, while probably still quite small, has been appreciably increased by the freezing of Iranian assets by the United States government in 1980. On the other hand, increased domestic absorption contributes directly to growth in income and is tangible by nature. Furthermore, investment in downstream oil operations and other industry contributes to the diversification of the economy and creates the potential for reduced dependence upon oil in the future.

(2) Investment Criteria

The usual marginal efficiency criteria hold that investment should proceed until the discounted value of the expected stream of future benefits just equals the cost of the proposed investment project, where an appropriate interest rate is used for discounting. When public projects are being considered, external, as well as direct benefits and costs must be evaluated and an appropriate rate of discount determined which may not necessarily coincide with the current market rate of interest. This is especially true when we consider the case of nonrenewable resources.

Thus, the economic evaluation of projects is immensely more complicated than might be suggested by the usual present value formulas which are used in elementary discussions of the subject. The issues become even more complex when we add the labor constraint and diversification factors relevant in the case of Saudi Arabia, as well as the number and variety of payment procedures employed in the various projects.

The development of the new industrial cities of Jubail on the Gulf and Yanbu on the Red Sea serve as a case in point. These two mammoth projects will contain petrochemical plants, refineries, metallurgical and fertilizer projects totalling between 11 and 12 billion dollars.

The Committee for Middle East Trade estimates that the eventual cost of infrastructure will reach 35 billion dollars. In assessing the economic feasibility of this undertaking, a myriad list of factors had to be taken into account. In their book, Middle East Industrialization, a study of Saudi and Iranian downstream investments, Turner and Bedore cited several factors in favor of Saudi petrochemical projects, including the fact that 60 percent of capital costs are to be met by the Saudi Public Investment Fund at interest rates well below international levels and that experienced joint-venture partners are attracted, in part, by the promise of large entitlements of low-priced Saudi crude. In addition, the cost of feedstock available from Juaymah on the Gulf and at Yanbu make these complexes quite attractive. The Middle East Economic Digest quotes Shell International as now estimating the costs to be comparable to those in Europe for the production of ethylene.

Whether these inducements and the costly infrastructure which will also have to be provided are worth it or not will depend upon (1) future prices of the commodities, (2) whether the wide variety of petrochemical products can be successfully marketed internationally, (3) the continued availability of enough skilled technicians to run the plants efficiently, and (4) the cost of maintenance of equipment in a difficult environment. In addition, the benefits to the Saudi economy in terms of diversity and the promise of increased industrialization in highly desirable capital-intensive activities must also be evaluated.

Thus in terms of practical application, it is not sufficient to resort to the usual arguments regarding investment criteria. To many observers, Saudi Arabia is providing subsidies which are too large, both in terms of cheap gas feedstock and lucrative entitlements, to enable them to ever benefit from the Jubail and Yanbu projects. Much of this inducement is, of course, needed to compensate for potential risk associated with volatile political events in the Middle East. On the other hand, Saudi Arabia has limited options if it continues to produce more foreign exchange that it can absorb domestically or invest prudently overseas. The Jubail and Yanbu projects are appealing from the point of view of diversification, the existance of comparative advantage in petroleum-based industries, and the fact that the projects are highly capital rather labor intensive.

In other sectors, the traditional absorptive capacity constraints certainly come into play.. Investment possibilities in agriculture, construction, and light industry are probably heavily conditioned by marginal efficiency criteria, which have been largely ignored in the first and second plans. Clearly, the construction industry proceeded much too fast and housing and many infrastructure projects, such as the Jeddah and Riyadh ariports. are overbuilt. The inflationary effects due to overcommitments in these areas need not be recounted at length for one to realize that more moderation is needed. Learning from experience, the Saudis have committed less money and resources in the third plan to construction, especially infrastructure projects. They hope to instead spread the money into rural areas where returns may be greater. Thus the traditional constraints on absorptive capacity seem to be working, albeit with a substantial lag.

3. Import Capacity and Other Physical Constraints

There are no import taxes, licenses, or other import restrictions in Saudi Arabia. However, the ability to handle a large and increasing volume of imports presented a number of bottlenecks to capital absorption in the 1970s. As one sanguine observer put it, "In the early years after the 1973 price rise, the sole constraint on spending had been the ability of officials to disburse and contractors to import." (James Buchanan, Financial Times, April 28, 1980). Most of the congestion arose with port facilities which, aside from a small air freight terminal, handled the vast majority of all Saudi imports. All three major ports, Jeddah, Darmmam, and Yanbo have been expanded considerably and there are plans for significant additional expansion at Jubail. Currently, Jeddah and Darmman are operating at 85 and 60 to 70 percent capacity, respectively, and some observers contend that port facilities are overbuilt. However, the government has consistently underestimated the growth of imports, and we can probably look for full utilization of most port facilities within the next few years.

To give some idea of the growth in imports over the past few years, 1972 and 1979 are relevant. Imports grew twelve-fold between 1972 and 1979, from 2.2 to 24 million tons and there is no reason to believe that growth will slacken appreciably in the 1980s. Relaxation of port congestion and expansion of the Yanbu facility have helped relieve some of the import price acceleration caused by high land transport costs and demurage and handling fees. Bottlenecks of the kind experienced from 1973 to 1977 are now out of the question and imported goods routinely flow to their final destination without delay.

4. Manpower Constraints

Lack of sufficient manpower has been a continuing problem for Saudi Arabi for many years and constitutes one of the biggest bottlenecks to sustained development faced by the Kingdom today. Saudi males have historically been averse to physical labor and these traditions are still strong today. Estimates of population size, labor force, and the balance between Saudi and foreigners are difficult to come by. Total population has been estimated by the IMF at close to 8 million in 1978. The natural increase is just over three percent but this is swelled considerably by continued immigration. Labor force estimates of the Second and Third Development Plans are shown in Table 1.14. In any event, a slowing of the rate of employment growth is exhibited from 1980 to 1985 as opposed to the 1975 to 1980 period. The service sector is growing vis a vis the productive

TABLE 1.14

PROJECTED CIVILIAN EMPLOYMENT IN SAUDI ARABIA 1399/1400 to 1404/05 (1979/80 to 1984/85)

Nationality/sex	Civilian employment 1399/1400	1404/05	Net change	Annual growth rate 1399/00 to 1404/05 (percent)
	(thousands)			
Saudi men	1,308.4	1,437.4	129.0	1.9
Non-Saudi men	1,014.9	1,023.9	9.0	0.2
Subtotal men	2,323.3	2,461.3	138.0	1.2
Saudi women	103.0	120.0	17.0	3.1
Non-Saudi women	44.9	44.9	--	--
Subtotal women	147.9	164.9	17.0	2.2
Subtotal: Saudis	1,411.4	1,557.4	146.0	1.9
Subtotal: Non-Saudis	1,059.8	1,068.8	9.0	0.2
Total	2,471.2	2,626.2	155.0	1.2

Source: Kingdom of Saudi Arabia, Ministry of Planning, Third Development Plan, 1400-1405 A.H. (1980-1985 A.D.), p. 98.

sector primarily as a result of the decline in employment in agriculture. Figures on the non-Saudi proportion of the labor force fluctuate considerably depending upon the source. Table 1.14 reports growth and projection of civilian employment in Saudi Arabia for the years 1980 and 1985. The highest proportion of foreign labor is observed in 1980 at 42.9 percent. Foreign sources put the proportion of foreign labor somewhat higher. For example, the Financial Times of London estimates that 75 percent of the labor force of 2 million is foreign. Their breakdown by nationality is shown in Table 1.15.

These figures suggest at least 500,000 more foreigners and nearly 1 million fewer Saudis in the labor force than the Saudi development plans report. It is hard to imagine such gross differences, especially with regard to the Saudi work force. It is probably fair to say that the Saudi estimates are somewhat downward biased as far as the numbers of foreign workers are concerned, since the Financial Times' estimates are more or less substantiated by Birks and Sinclair in their book, International Migration and Development in the Arab Region. On the other hand, domestic labor force estimates of near 1.4 million for 1980 do not seem unreasonable. Therefore, we would guess the foreign labor force component to be somewhat greater than 50 percent rather than the Financial Times' estimate of 75 percent.

Attempts to increase the rate of growth of the domestic labor force are hampered despite a relatively high growth rate of the indigenous population. First, the labor force participation rate for women is extremely low and is unlikely to grow appreciably in the near future

TABLE 1.15

NUMBER OF FOREIGN WORKERS IN SAUDI ARABIA, 1980

Country of origin	Number
Yemen	600,000
Egypt	250,000
Pakistan	200,000
Lebanon	180,000
South Korea	80,000
Philippines	80,000
Palestine	80,000
United States and United Kingdom	60,000
Other	?
Total of major groups	1,530,000

Source: *Financial Times*, April 28, 1980.

because of social customs which mitigate against women working outside the home. Secondly, labor force participation rates for young adult males has fallen in recent years due to increased emphasis on education. Finally, the participation rate for older males has fallen, which is only natural when higher income levels are attained.

In addition to a slow growth rate of the indigenous labor force, the Saudi government has experienced some difficulty in channeling available local workers into appropriate jobs. An inflated and inefficient bureaucracy which reserves too many posts for Saudis draws capable graduates away from the private sector. Furthermore, the Saudi natural aversion to physical labor, combined with numerous appealing and lucrative alternatives, makes it virtually impossible to find Saudis willing to work in the construction and manufacturing sectors.

A number of programs have been devised to draw more Saudis into the mainstream of productive activity and additional programs are to be funded by the third plan. They include: (1) programs to relax the restrictions on female participation in the work force. Women are currently employed only in the teaching and health professions. There is, however, considerable opposition to increased womens rights, especially among the males and the Royal Family, and there is little hope for increased labor force participation in the near future. (2) A shift in emphasis from the university to technical training. Although provisions in the third plan include increased budgets for Riyadh University, King Faisal University, and the Islamic University, a number of technical schools are also going to be expanded. In the past, attempts to attract students to vocational training centers have met with only limited success, and as long as overseas and domestic opportunities for university training exist, the less prestigious occupations will have limited appeal. (3) Legal restrictions on Saudi entry into some occupations are being relaxed and subsidies to keep Saudis employed in others are being offered. The latter practice tends to perpetuate inefficiency as, in many cases, the subsidies are teated as gifts for which work does not have to be provided in exchange.

While the third plan is placing renewed emphasis on expanding the skills and training of the indigenous labor force, many of the programs are similar to previous efforts which have not been particularly successful. Thus it is probably not unreasonable to believe that the work burden will continue to fall on foreign shoulders. The critical question is when the domestic political pressure will become great enough to create a cohesive effort to reduce the rate of growth in the economy.

The third plan contains a policy goal of reducing the proportion of foreign workers in the total work force. Projections of civilian employment presented in Table I.14 show a negligible rate of growth in foreign employment between 1980 and 1985, whereas Saudi employment is projected to increase at a rate of 1.9 percent per annum. This rate of increase in the foreign labor sector is in sharp contrast with the experience between 1975 and 1980 when the non-Saudi labor force grew at an annual rate of 16.5 percent per annum. It is difficult to see how this severe reduction in the rate of growth can be accomplished within the present political-economic environment without cutting back severely on the rate of growth in gross domestic product and government spending.

and we doubt whether this will happen. Thus our best guess is that the expatriate labor force will continue to grow and this growth will have only a limited impact on the planning goals of the government. One labor-saving bonus of the shift in development emphasis in the third plan will be a reduction in the construction industry., long a haven for expatriate labor, with more emphasis on other sectors where Saudis may participate more fully. However, without at least some crude input/output tables to detail the relative labor requirements of the different sectors, it is difficult, if not impossible, to make even a guess as to the magnitude of this labor savings. As in so many areas of the Saudi economy, lack of adequate data makes analysis very difficult.

b b. New Internal Constraints on Absorptive Capacity

In addition to the traditional constraints discussed above, a number of additional domestic considerations may reduce the flexibility of Saudi Arabia to absorb large amounts of surplus funds. These internal constraints include: (1) adverse movements in the distribution of income between urban and rural areas which might develop as a result of rapid industrialization; (2) inflationary pressures resulting from a large imbalance between aggregate demand and aggregate supply; (3) problems of urban congestion and noise and air pollution which accompany rapid urbanization of a developing country; and (4) social, cultural, and political instability which may result from rapid development and which are not directly associated with any of the items 1 through 3.

1. Distribution of Income

Almost no evidence exists regarding trends in the overall distribution of income in Saudi Arabia. We do know that the agricultural sector is now almost certainly worse off relative to other sectors of the economy wehn compared with pre-1972 income distributions. This is primarily because of the astronomical growth in the oil and associated sectors. Value added in agriculture, although growing rapidly, has not been able to keep pace with the phenomenal growth rate in these other sectors. The long-term implications of this trend may not be particularly ominous, however, as the agricultural sector has been shrinking rapidly (2.4 percent of non-oil GDP in 1978) and the government does provide numerous subsidies to the rural poor. Furthermore, the immense wealth provided by oil has had a trickle-down effect on the rural sector as well as making millionaires of many urban Saudis.

Still, dissatisfaction with the pattern of spending during the second five-year plan does exist within government circles, much of which impacts on the distribution of income. The largest sectoral increases in the 1980-1981 budget, 55 percent, is recorded in allocations to municipal facilities, which includes the budget of the Municipalities and Rural Affairs Ministry. The size of the increase possibly reflects the government's desire to ensure that the benefits of oil revenue reach the provinces and smaller towns. The emphasis upon education and the development of productive activities (as opposed to infrastructure) in the third development plan also shows attention to possible inequities which may be developing.

The Saudi government is also motivated to extend its influence and control throughout the countryside, no doubt as a response to the Mecca incident. While Juhaiman, the leader of the Mecca revolt, concentrated on the corrupting influence of economic development on Saudi society and especially the Royal princes and the ulema, he represented in a more fundamental way, a challenge to the Wahhabite creed, which is the foundation of the current regime's power. Since the Wahhabite hold weakens as we move from the Nejd, it is important for the government to maintain its economic as well as religious influence in these rural areas.

Despite increased spending in the current budget, development spending on agriculture and rural development is still small. Only about one percent of all development spending in the Third Five-Year Plan goes directly to agriculture. It is doubtful that this level of spending will be sufficient to reverse the flow of workers out of agriculture (a stated purpose of the government) or to improve the rate of growth in agricultural earnings. At the same time, it is unlikely that further deterioration in the distribution of income between rural and urban groups will introduce any binding constraints on Saudi absorptive capacity. Should political pressures build, the regime could very easily funnel additional funds into the agricultural sector, either to increase the development of mechanized agriculture or, perhaps more appropriately, to bolster the traditional sector which has tended to get lost in the Saudi Arabian rush to development since 1973.

Ibrahim (unpublished Ph.D. dissertation, University of Colorado, 1981) estimates that about 2.4 percent of the total development allocation or 12 percent of the production sector allocation is devoted to agriculture. This is up from 5.1 percent allocation in the Second Plan, but still small compared to the allocations for industry and other sectors (see table 12 from Ibrahim).

The sectoral distribution of agricultural credit also reflects the relative neglect of the agricultural sector. Agricultural loans represented only 3.6 percent of total loans granted by the government during the 1974/75 to 1977/78 period, as compared to 24.4 for manufacturing and 47.8 percent for real estate. (See table 1.16). Futhermore, the private sector has expressed almost no interest in agricultural investment. Less than one percent of total private credit was extended for agricultural purposes.

In addition, public investment in general tends to be biased toward urban development. The rural population in general has inadequate public services such as health, education, sanitation, safe water, and other municipal services. This contributes to the relative retardation in the growth of the rural sector and the continued presence of high illiteracy, poor health, and lack of skills and training.

While hard figures on income distribution are difficult to come by, Ibrahim has shown that the poorer regions of the South and North have substantially fewer education, medical, and other public services than other regions, and that illiteracy rates are substantially higher in these poorer regions. Furthermore, there is evidence of substantial utmigration from these regions. (See table 16 from Ibrahim). From this

TABLE 1.16

SECTORAL CREDIT BY PRIVATE AND PUBLIC SECTORS
(percent)

Sector	Commercial banks[a]	Government funds[b]	Total
Agriculture	0.6	3.6	2.4
Manufacturing & mining	13.4	24.4[c]	20.1
Utilities	2.6	15.6	10.4
Building & construction	23.8	0.4	9.7
Commerce	36.4	—	14.5
Transport	2.3	7.2	5.2
Real estate	—	47.8	28.8
Other	20.9	1.0	8.9
Total	100.0	100.0	100.0

[a]1975/77
[b]1974/75–1977/78
[c]Excludes Public Investment Funds (equity investment)

Source: Kingdom of Saudi Arabia, Ministry of Planning, Third Development Plan, 1400–1405 A.H. (1980–1985 A.D.), p. 278.

it seems reasonable to assume that these regions have substantially lower incomes per capita.

2. Inflation

Inflation has been a persistent problem in Saudi Arabia since 1973. Large increases in domestic government spending for development purposes led to large increases in the money supply and in aggregate demand, which were unmatched by commensurate expansion in the supply of real output. Rents and housing costs were especially vulnerable, with the housing component of the consumer price index (CPI) rising over three hundred percent between 1973 and 1976. The annual inflation rate reached over thirty percent in 1975 and 1976, but has fallen in recent years and is currently running at less than ten percent. (See table 1.17 for details.) The government has been sensitive to the problem of inflation and has taken steps to curtail its spending to relieve inflationary pressures. Rates of growth in government spending have been curtailed since 1978. While government consumption and investment grew at extremely rapid rates from 1974 though 1977, it has been reduced substantially from 1978 on. Furthermore, supply bottlenecks have been reduced and subsidies have been increased to reduce the impact of cost increases. Still, controlling inflation requires sustaining a moderate increase in government in accordance with the growth rate in real productivity. Since Saudi Arabia invests such a large proportion of GDP (30 percent in 1978 and an average of 16.8 percent from 1970 to 1978), productivity growth has been high. eal GDP per worker grew at a rate of 7.39 percent in the nonoil economy

TABLE 1.17

INFLATION AND COST OF LIVING INDICIES

Year	CPI (63 = 100)	% inflation
1964	102.8	
1965	103.2	0.4
1966	104.8	1.6
1967	107.0	2.1
1968	108.7	1.6
1969	112.5	3.5
1970	112.7	0.1
1971	118.2	4.9
1972	123.2	4.2
1973	143.1	16.2
1974	173.8	16.2
1975	233.9	34.6
1976	307.7	31.6
1977	342.8	11.4
1978	381.3	11.2
1979	394.6	3.5
1980	426.2*	8.0

*Preliminary

Source: Kingdom of Saudi Arabia, SAMA, Annual Report, 1979, p. 161.

during the Second Plan. (*Thrid Development Plan*, p. 33.) If the proportion of GDP investment remains in the 20-30 percent range, these increases may be sustained during the next several years. Government projections, however, have been more conservative, suggesting a five percent overall average productivity growth rate for the nonoil economy. (See table 1.18 .)

To analyze the potential inflationary effect of government spending in the future, we can compare the Second and Third Five-Year Plans. Budget development spending is projected to rise about 50 percent, from 150 billion dollars in the Second Plan to 235 billion dollars in the Third Plan. However, the total budget, which includes defense and foreign lending, is projected to rise about 85 percent, from 210 billion dollars to 391 billion dollars between the two plan periods. Certainly the unsettled situation in the Middle East has spurred increased defense spending and concern for security. The Saudis have recently entered into discussion with Kuwait regarding mutual security arrangements, and are attempting to consolidate their influence on the subcontinent in other ways. They also continue to pressure the United States government for high technology weapons systems which will add to their defense spending commitments in the near future.

While these percentage increases in government spending are substantial, they will be spread out over five years and should not contribute to renewed inflationary pressures in the economy, especially if productivity in the non-oil sector continues to increase. If the development plan is followed, there are unlikely to be large increases in spending over

TABLE 1.18

ANNUAL COMPOUND GROWTH RATES FOR EMPLOYMENT, GDP AND PRODUCTIVITY IN THE NON-OIL ECONOMY: 1980-1985
(in percent per year based on 1979/1980 prices)

Sector	Employment	GDP	Productivity	Components of productivity: Employment shifts[a]	Components of productivity: Cost/price effects
Producing sectors					
Agriculture	(2.46)[b]	5.35	8.0		
Other mining	6.07	9.78	3.5		
Other manufacturing	9.52	18.83	8.5		
Utilities	8.33	29.46	19.5		
Construction	(5.77)[b]	(2.48)[b]	3.5		
Subtotals					
Producing sectors	(1.48)[b]	2.18	3.72	(1.34)[b]	5.13
Excl. agriculture	(0.30)[b]	1.98	2.29	(2.53)[b]	4.94
Service sectors					
Trade	1.80	8.42	6.5		
Transport	5.05	12.93	7.5		
Finance	5.18	7.29	2.0		
Other services	0.94	2.95	2.0		
Government	5.57	7.16	1.5		
Subtotals					
Services	3.06	8.84	5.61	1.16	4.40
Excl. government	2.24	9.45	7.05	1.47	5.50
Total/average for non-oil economy	1.16	6.19	4.97	0.30	4.65

[a] Applicable to groups of sectos only.
[b] The rates represent annual rates of decline relative to 1979/1980.
[c]

Source: Kingdom of Saudi Arabia, Ministry of Planning, Third Development Plan 1400-1405 A.H. (1980-1985 A.D.), p. 94.

the 1982-1985 period since the pattern of spending will emphasize the early years of the plan. The Middle East Economic Digest suggests that as much as 30 percent of the allocations will occur in the first year. This spending pattern is partially reflected in the 1980-1981 budget which is 27 percent higher than the previous years and which allocates expenditures of 55.3 billion dollars to development projects. This represents just over 23.5 percent of the total development allocation in the Third Plan. While defense spending and inflation in foreign goods prices may swell spending above the planned total, there are unlikely to be serious domestic inflationary repercussions as a result of this proposed spending pattern.

3. Social, Cultural, and Political Stability

In the wake of the Iranian revolution of 1979, many observers have focused upon the similarities between Saudi Arabia and Iran and the possible implications that exist for continued high levels of development spending in the Kingdom. Henry Kissinger attributed the fall of the Shah to high levels of government spending and inflation. A similar scenario was predicted for Saudi Arabia unless the government made dramatic cutbacks in spending. The purpose of this section is to discuss the constraint which political and social factors place on the Saudi development effort and to assess whether continued high levels of domestic spending present a threat to the internal stability of the country.

While it is true that before the revolution Iran and Saudi Arabia were both Islamic monarchies, a number of differences exist which make it difficult to make casual transference of the Iranian scenario. The Shah for all of his faults was a modern twentieth century man whom the conservative religious hierarchy viewed with distrust and suspicion. By pursuing rapid social change while at the same time stifling dissent and allowing corruption, he succeeded in alienating not only the conservative religious leaders but also the modern middle class and the new left. His power base shrunk to a handful of politicians and part of the military. This proved not to be enough. On the other hand, King Khalid and the other members of the ruling family in Saudi Arabia appear to be much more in tune with the prevailing conservative sentiments of the majority.

There is no counterpart of Savak nor is there widespread use of violence to stifle dissent. Indeed there appears to be little organized dissent within the country now that the Mecca incident is finished. Clearly, the Mecca incident was sobering to the established regime, and a number of shifts in policy have been made in its wake. However, Juhaiman is not the Ayotollah and Saudi society seems to have returned to stability without substantial long-run impact. On the other hand, the Mecca incident points up the risks that Islamic dissidence bears for a government which rules the Moslem Holy Land. This is apparent not only from the strident opposition to the regime from Shi'ite Islamic revolutionaries in Iran but from the cosmopolitan make up of the small band of revolutionaries who were followers of Juhaiman. However, aside from some potential for unrest among the Shi'ite minority of the Eastern Province, as far as domestic unrest goes, there is little which remains of the Juhaiman revolutionary feve

Furthermore, unlike Iran, power in Saudi Arabia is diffused among a number of princes, 30 or so who are either full or half brothers of the King. The most important form a triumvirate: Crown Prince Fahd, the chief executive of the country; Prince Sultan, who is Minister of Defense, and controls the regular army which tends to be more scattered throughout the country; and finally, Prince Abdullah, commander of the National Guard, which is stationed near and around Riyadh and which gives him a military counter to Sultan. Such a circle of three has emerged now that King Khalid has been slowed by illness. Though the line of command is loosely agreed upon, with Fahd being followed by Abdullah, the remote possibility of a palace coup exists, although it is hard to imagine who would lead it. Furthermore, it is unlikely that such a coup would drastically change the present Saudi commitment to rapid development.

This is not to say that the rapid transformation of Saudi society which has occurred in the past ten years or so has not caused social stress. There is criticism of the Royal Family which tends to focus on the wild lifestyle of some of the princes and the size of contract commissions which have made many princes millionaires almost overnight.

The criticism is most vocal among the conservative religious leaders or <u>ulema</u>, but is shared to some degree by the young western-trained technocrats who are upset with the waste and corruption within the government. These young bureaucrats also bridle at the slow pace and conservative attitudes imposed by the <u>ulema</u>, but these views have not received much notice as yet since the Royal Family works closely with the <u>ulema</u>, which must approve all legislation. It is unlikely that their power and influence will wain in the near future. Unlike Iran before the revolution, the religious leaders already wield a substantial amount of poticial clout.

In response to recent criticism, Prince Fahd has committed himself to eradicating corruption and conspicuous consumption among the Royal Family. Furthermore, a nominated consultative assembly is expected to be set up in the near future and a constitution written. The Third Plan also has as one of its goals the elimination of wasteful spending and attempts to focus on the needs of the people to a greater degree than previous plans which stressed the development of physical infrastructure. While the change in focus of the Third Plan may not have occurred without the Mecca incident as a catalyst, it does indicate that the Saudi leaders recognize many of the potential problems they have to deal with.

4. Urbanization and Congestion

Rapid expansion of the major cities of Jeddah, Riyadh, Mecca, and Taif have put considerable stress upon the social infrastructure. Water and sewer lines and electrical supply have not kept up with demand resulting in overloaded sewage pipes and numerous brownouts. Abdul Aziz Wahed, director of Riyadh Electricity Company, estimates growth in electricity consumption at about 50 percent per year, the highest in the world, while Sert Jackson, a consultant for Jeddah, estimated the city to have a million inhabitants, up from an estimate of 596,000 in the 1975 census as estimated by Abdel R. Al-Madani and Muhamed Al-Fayez. However, these bottlenecks will probably be of only short run importance in assessing the constraints imposed by urbanization, congestion, and pollution.

Already sewage and water treatment facilities are being expanded in Jeddah and in Riyadh, in the latter case, substantial water must be imported to serve the needs of an estimated population of one million. Plans are made to construct a pipe to carry 135 million gallons of fresh water per day 466 kilometers from Jubail to Riyadh at a cost of 2.1 billion rials. Riyadh's consumption is now slightly below 50 million gallons per day but is expected to double by 1985. At the same time, power generating capacity is being upped and plans are to merge the firms supplying the four major cities and to begin work on a national grid.

In terms of size, urbanization per se is unlikely to present a problem in the short to intermediate run. Even at a growth rate of eight percent per year (the historical rate for Riyadh), the population of the capital would not reach 2 million until 1989. In and of itself, 2 million is probably not unusually large, although it is certainly enormous by historical Saudi standards.

A more difficult problem associated with the growth of urban areas is the provision of adequate housing and social services. We have already touched on water and electricity. Let us now turn to housing. Saudi Arabia is not immune to the problem of the urban slum so typical in both the developed and the developing world. Shanty towns exist to a greater or lesser degree in the major cities. Often they are occupied by immigrant laborers, but sometimes the slum presents the entry point for those from the rural areas. Hard figures on the exact number of substandard homes are difficult to come by. Sert Jackson estimates that of 173,000 housing units in Jeddah, about 28 percent were shanties, housing upwards 250,000 residents. Data for the other major cities are in short supply, though we might guess that the problem is of a similar magnitude in Riyadh.

If high rents and rapid urban growth persist, the urban housing situation may deteriorate even further, and the attendant problems of crime and social disruption may cause the government to reassess its policy toward urban growth. This is, however, an unlikely scenario and we attach a low probability to it. It is more likely that the government would simply build more housing and let the metropolitan area grow.

Water availability does present a persistent long run problem. Since the Kingdom receives almost no rainfall, water must be obtained either from underground acquifers or through desalination. In addition, recycling methods could be employed on a wholesale basis. Currently, there appears to be no unified approach to water management within the Kingdom. For example, the decision to pump water from Jubail to Riyadh was made on a rather ad hoc basis after it was realized that the local acquifers would not satisfy local demand in the long run. What is needed is a comprehensive assessment of the future potential of existing and future acquifer projects along with desalination and the potential for recycling. Then projects can be assessed in terms of their relative merits. As it now stands, acquifer use is by far the cheapest in nominal terms, but the fact that the resource is nonrenewable is now being fully considered. Hence, recycling and desalination are probably not being pursued as rapidly as they should be.

Whether the lack of water for urban use will present an absorptive capacity constraint in the near future is another question. Certainly it is considerably more difficult to supply water to rural regions once the acquifers have run dry than to centralize metropolitan areas. Once desalination and recycling facilities are expanded, sufficient water should be available to the urban dwellers of the Kingdom, albiet at substantially higher nomianl prices than is currently the case. However, there is no doubt that this price will be subsidized by the government and will serve as another method for encouraging in-migration from the rural areas. At the same time, the amount of desalination and recycling equipment which will be needed to supply water in the future will undoubtedly expand the absorptive capacity of the kingdom.

C. c. New External Constraints to Absorptive Capacity

Theoretical models have been developed by economists to determine the optimal rate of extraction of a nonrenewable resource. Using mathematical control techniques, they attempt to maximize the discounted present value over time of a stream of assets, subject to certain constraints. These models can be modified to take into consideration the possibility of extracting the nonrenewable resource and placing the proceeds into earning assets. Here the decision whether to buy the earning asset or leave the resource unexploited will depend upon the projected appreciation of the resource, the variance of that appreciation, the riskiness of the earning asset, and the projected appreciation of the asset. Obviously, f the return on the asset is projected to be greater over some finite time horizon then the resource will be exploited and the earning asset purchased.

A decision of this sort confronts Saudi Arabia as it contemplates whether to extract oil at more rapid rates and use the proceeds to either finance economic development or to buy earning assets from the Western countries. In the past, one widely used model of OPEC production and pricing decisions had Saudi Arabia categorized as the residual producer, the only OPEC member with production potential so great and domestic needs relatively small that it could change production levels substantially without upsetting its own economy. In this model, Saudi Arabia is willing to take up the slack in production when war or some other disruption casues a disturbance in the world oil market. For example, there is clear evidence that Saudi Arabia played such a role in supplying additional output during and subsequent to the Iran-Iraq war.

Given its awesome buildup of foreign exchange, it seems rather ridiculous to suggest that fears of expropriation, United States inflation, or the decline in the value of the United States dollar is holding down Saudi production.

In the process, she has alienated many of her friends in the Gulf and so far has been unsuccessful in achieving her goal. The Vienna meeting did not change the status quo a bit, as Saudi Arabia continues to undercut the other OPEC members, who are now forced to cut production in the face of reduced worldwide demand. This of course has brought a shower of riches to Saudi Arabia as outlined above.

In the long run, it is difficult to imagine how the Saudis can continue to amass such huge amounts of foreign exchange. Their placements are already straining the world's financial system. To this extent, then, concern for the absolute size of foreign asset holdings may have an effect on Saudi oil production.

FOOTNOTES

[1]International Monetary Fund, International Financial Statistics (Washington, D.C.: International Monetary Fund, June 1981), p. 337.

[2]Kingdom of Saudi Arabia, Saudi Arabian Monetary Agency (SAMA), Statistical Summary (1975/76), first issue, p. 18.

[3]Ragaei El Mallakh, Saudi Arabia: Rush to Development, draft copy, p. I.11.

[4]Kingdom of Saudi Arabia, Ministry of Planning, First Development Plan 1390-1395 A.H. (1970-1975 A.D.), p. 65.

[5]United Nations, Department of Economic and Social Affairs of the Secretariat, Selected World Demographic Indicators by Countries, 1950-2000, ESA/P/N, p. 55.

[6]The consumer price index was used as a deflator, Since consumer prices are subsidized, the real rate of growth was even lower.

[7]Note the proportion of GDP invested by rapidly growing developed countries.

[8]In fact, this was a decade wherein the First and part of the Second Five-Year Development Plans were carried out.

[9]Foreign asset holdings of the OPEC countries have accumulated rapidly in recent years and the Saudis hold a major share of these foreign assets. Bankers Trust Company of London estimates that OPEC foreign asset holdings grew from $15 billion in 1972 to $343 billion at the end of 1980. The Saudis hold approximately one-third of these OPEC foreign assets. The Bankers Trust estimated income on foreign assets earned by OPEC countries was $12 billion in 1978. Since foreign asset holdings of OPEC countries have more than doubled, and yields have increased sine 1978, we estimate that the income earned on these foreign assets have more than doubled since 1978.

[10] Fouad Al-Farsy, "Industrial Diversification: Rationale and Constraints," in a soon to be published lecture delivered at the Conference on the Third Development Plan of Saudi Arabia (1980-1985): Energy and Industrialization, sponsored by the International Research Center for Energy and Economic Development (ICEED), at the University of Colorado at Boulder, August 24-25, 1981.

Introduction

Given the dramatic increase in the price of oil and the rapid accumulation of oil revenues, an unprecedented and challenging opportunity confronts Saudi Arabia today. With long-term planning and effective utilization of its massive financial resources, Saudi Arabia has the chance to reduce its dependence on oil and to aim toward a diversified industrialized economy. The Third Development Plan: 1980-1985, issued by the Ministry of Planning, acknowledges these goals and outlines the policy measures to promote them.

However, the Saudi economy is still within the development stage and its ability to absorb the large oil revenues and meet these ambitious goals is limited. Thus, absorptive capacity is an important element in any development program. It not only affects domestic growth, but influences future oil production and export and pricing policies. Endowed with the world's largest oil deposits, Saudi Arabia's significant role in international industrial and financial markets cannot be denied.

Recognizing the importance of absorptive capacity and Saudi development, this study develops a macro-economic model of the Saudi economy in order to provide a quantitative perspective into the next decade. It is based on the Keynesian theory of aggregate demand, supply and income determination. Using national income statistics for the period 1962-1977, a set of structural equations is estimated and combined with economic identities to constitute a simultaneous system. Then, the study applies different scenarios for forecasting purposes by incorporating relevant constraints on absorptive capacity and policies and objectives from the Third Plan. The simulation period runs from 1978 to 1990 and provides insight into Saudi Arabia's development trends in the years to come.

II. Data

As with many developing countries, the availability of data for an empirical study is limited. Finding reliable and consistent figures for the economic aggregates was not an easy task. In the case of Saudi Arabia, annual series were located for the period 1962-1977.

In the data collection process, one of the major problem areas concerned government revenue and expenditure data. Here, the problem was not availability, but rather consistency, as several different sources quoted varying estimates for the sample period. In fact, one source reported a balanced budget every year but one. The reason for the discrepancies may be that several of the sources were reporting "proposed" levels of revenue and spending, while others stated "actual" figures. The series used in this study for estimation purposes was actual government revenue and expenditures, taken from Zain Barry's "Inflation in Saudi Arabia."[1]

Another problem encountered was locating labor force data. Foreign labor constitutes a significant portion of the Saudi work force and labor statistics, when available, may be questionable. The Second and Third Development Plans appeared to be the best sources for labor data. However, annual figures were reported only for 1970 and 1975, with anticipated rates of growth given for other years.

However, the apparent lack of labor data did not hinder the development of the model. Since Annual labor statistics were not available, Leontief/Harrod-Domar production relations were assumed for the non-oil supply sectors of the Saudi economy. Using the census data and rates of growth given in the *Third Plan*,[2] output labor ratios were calculated for 1977 and then used in specifying the respective production functions. In this manner, the model incorporates one of Saudi Arabia's main constraints on absorptive capacity -- manpower.

The remainder of the data for Saudi Arabia came from various issues of the following publications:

1) *Annual Statistical Bulletin: 1978*, from the Organization of the Petroleum Exporting Countries.
2) *International Financial Statistics*, published by the International Monetary Fund.
3) *Statistical Yearbook*, published by the Ministry of Finance and National Economy.
4) *World Tables*, from the data files of the World Bank.

Data was collected for many economic variables relevant for this empirical investigation. In the final model, there is a total of 39 variables -- 26 endogenous to the system, and 13 exogenous. A summary of these variables, in alphabetical order, is given in Table 1 that follows:

Table 1

Variables Appearing in the Study

Endogenous:

BOP	=	Balance of payments
CG	=	Government consumption
CP	=	Private consumption (lnCP = natural log form)
EX	=	Exports
GDA	=	Gross domestic aborption
GDI	=	Gross domestic investment
GDP	=	Gross domestic product
GDPA	=	GDP from agriculture (value-added)
GDPC	=	GDP from construction
GDPM	=	GDP from manufacturing
GDPN	=	Non-oil GDP
GDPO	=	GDP from mining (proxy for oil GDP)
GDPS	=	GDP from aggregate services (utilities, tranport, trade and finance, government)
GNP	=	Gross national product
GR	=	Government revenue
IM	=	Imports
MONY	=	Money supply (M1)
NGJ	=	Net government injections (GOEX-RNOL)
P	=	General price level (1970 = 100)
PDG	=	Price index of domestic goods (1970 = 100)
OILQ	=	Quantity of oil produced (million barrels per year)
OILX	=	Value of oil exports

Table 1 (Continued)

OIQX	=	Quantity of oil exports (million barrels per year)
ROIL	=	Government oil revenue
RNOL	=	Government non-oil revenue

Exogenous:

GOEX	=	Government expenditures
INDXi	=	Productivity-inflation index (i = 0 to 3: an index for each non-oil sector)
LA	=	Employment in agriculture
LC	=	Employment in construction
LM	=	Employment in manufacturing
LS	=	Employment in services
OILP	=	Oil price index (1975 = 100)
PIM	=	Index of prices for Saudi imports (1970 = 100)
NFY	=	Net factor income from (to) abroad
NOLX	=	Value of non-oil exports

II Specification of the Model

Narrowly defined, absorptive capacity is the ability to utilize investment capital efficiently. Theoretically, maximum absorptive capacity occurs when the interest rate--the price of capital--is just equal to the rate of return on incremental investment. Thus, the emphasis is on the marginal productivity of capital and the current market price of loanable funds.[3]

However, in the context of a developing country, such as Saudi Arabia, this investment approach to absorptive capacity is inappropriate. Not only are marginal productivity figures for investment difficult to determine, but other expenditures, i.e. government spending, consumption spending and import expenditures, are relevant and should be included in the analysis. The government of Saudi Arabia earns a high proportion of the national income, as it receives the bulk of the oil revenues. Thus, it plays a major role in the development of the economy, and its expenditures are vital in affecting absorptive capacity.[4] Furthermore, the standard of living for most of the population is low, and higher levels of consumption are potential sources of enhanced labor productivity and economic growth.[5] Imports form a significant share of both investment and consumption goods available to the Saudi economy and thus are crucial in determining absorptive capacity. It is this total expenditure approach to absorptive capacity that is developed in the model presented here. In the following sections we describe the various components of our model of the Saudi economy.

A. Gross Domestic Absorption

Gross domestic absorption is expressed as:

(1) GDA = CP + CG + GDI

Total consumption in the economy is attributed to consumption expenditures of the private sector (CP) together with government consumption (CG). Due to the unavailability of private investment figures, the investment component of domestic absorption is left in its aggregated form--gross domestic investment (GDI).

As mentioned before, the Saudi government is the central figure in the development of the economy and its absorptive capacity. Government policies and expenditures are major determinants of the level and composition of consumption and investment expenditures. Consequently, in the specification of consumption and investment functions, government expenditures (GOEX) is an important explanatory variable.

Private consumption (CP) in the economy is a function of disposable income. However, the traditional definition of disposable income (GNP less taxes) is not appropriate in this case. As with all the major oil producers, the majority of Saudi Arabia's gross domestic product comes from oil revenue which is claimed by the government. A more relevant measure of the private sector's purchasing power is income from the non-oil sectors (GDPN) plus net government injections (NGJ). Net government injections (NGJ) is defined as government expenditures minus non-oil revenue and captures the government's influence on private consumption. Since tax on labor income is insignificant, it need not be considered here. First using a double-log form to account for non-linearities, the private consumption function is specified as:

(2) $\ln CP = a_o + a_1 \ln (GDPN + NGJ)$

(3) CP = anti-log (lnCP)

Government consumption (CG) is assumed to be a linear function of total government expenditures:

(4) $CG = b_o + b_1 GOEX$

The level of government expenditures (GOEX) also affects gross domestic investment (GDI). In keeping with long-term goals, the Saudi government spends a large portion of its revenues on capital formation in developing the country's infrastructure. The level of gross domestic investment (GDI) is also assumed to depend upon the level from the previous year (GDI_{-1}).

(5) $GDI = C_o + C_1 GOEX + C_2 GDI_{(-1)}$

B. Foreign Trade

The quantity of oil exported (OIQX) is a large proportion of total oil produced (OILQ).

(6) $OIQX = d_o OILQ$

Since the price of oil is specified as an index (OILP), the value of oil exported (OILX) cannot be determined by a simple price times quantity relation. Instead, quantity of oil exported (OIQX) and the oil price index (OILP) are included as regressors in determining the value of oil exported (OILX):

(7) $OILX = e_o + e_1 OIQX + e_2 OILP$

The total value of exports for Saudi Arabia (EX) is given by the identity:

(8) $EX = OILX + NOLX$

where non oil exports (NOLX) is exogenous to the model.

Imports (IM) are a function of gross domestic absorption (GDA).

(9) $IM = f_1 + f_2 GDA$

The difference between exports (EX) and imports (IM) yields the balance of payments identity(BOP):

(10) $BOP = EX - IM$

C. Oil Output

A significant feature of this model is that the value-added from oil (GDPO), is a residual. In other words, it makes up the difference between total gross domestic product (GDP and non-oil gross domestic product (GDPN).

(11) $GDPO = GDP - GDPN$

Once again, because the price of oil is given as an index, a linear regression is specified rather than an identity to determine the total quantity of oil produced (OILQ). Thus, total quantity of oil (OILQ) is a function of the value-added in oil (GDPO) divided by the price index of oil (OILP).

(12) $OILQ = g_1 + g_2(GDPO/OILP)$

D. Non-oil Output

The flow of goods and services in the non-oil sector (GDPN) is equal to the sum of the value-added from four main areas: agriculture (GDPA), manufacturing (GDPM),construction (GDPC), and services (GDPS).

(13) $GDPN = GDPA + GDPM + GDPC + GDPS$

One of the main constraints on output in each of these sectors is the availability of labor. Saudi Arabia is faced with a limited work force and must import foreign laborers to meet output demands. With labor the constraining input, Leontief/Harrod-Domar production functions are used where output is proportional to quantity of labor employed.

However an important adjustment is included in order to account for inflation and possible productivity changes. Since the model presented here is in nominal terms, constant output/labor ratios are inappropriate--especially for simulation purposes. Therefore, an index (INDX) is incorporated within each supply relation to capture the effects of changes in inflations and productivity. This index, exogenous to the model, is based on assumptions regarding the movement of both prices and trends in labor productivity. For example, if prices are going up at 10% per year and real productivity gains are 3% per year then the index would lead to an increase in normal output of thirteen percent.

Value-added of each non-oil supply sector is thus specified by:

(14) $GDPA = h_0 LA(INDX_0)$

(15) $GDPM = h_1 LM(INDX_1)$

(16) $GDPC = h_2 LC(INDX_2)$

(17) $GDPS = h_3 LS(INDX_3)$

No distinction is made between the number of Saudi and non-Saudi workers as reliable statistics for the sample period, and projections for simulation are not available.

E. Government Sector

Government revenue (GR) comes from both the oil and non-oil sectors and can be expressed as an identity:

(18) $GR = ROIL + RNOL$

Revenue from the oil sector (ROIL) is a linear function of the value-added in oil (GDPO).

(19) $ROIL = i_o + i_1 GDPO$

Similarly, non-oil revenue (RNOL) is a linear function of the value-added in the non-oil sectors (GDPN).

(20) $RNOL = j_o + j_1 GDPN$

In this model, government expenditures (GOEX) are exogenous, since disaggregated data is not available to determine specific expenditure components. Furthermore, given the dominant role of the Saudi government and the availability of surplus funds, the breakdown of government expenditures are most likely to be influenced by current development goals--a factor difficult to quantify and one which, of course, changes from plan to plan.

Government expenditures (GOEX) minus revenue from the non-oil sectors (RNOL) determine net government injections into the non-oil economy (NGJ).

(21) $NGJ = GOEX - RNOL$

F. Monetary Sector

The importance of the Saudi government and its expenditure program is also reflected in the monetary sector. The money supply (MONY) is assumed to be a function of net government injections (NGJ).

(22) $MONY = k_o + k_1 NGJ$

Thus, an increase in government expenditures will have a positive effect on the money supply, and an increase in non-oil revenue (taxes, for example) can curtail its expansion.

Changes in the money supply (MONY) influence the price of domestic goods (PDG). Constructed as an index, the price of domestic goods (PDG) is also a function of the price of imports (PIM), which reflects foreign conditions.

(23) $PDG = \ell_o + \ell_1 MONY + \ell_2 PIM$

The overall price level (P) is then a weighted average of the price of domestic goods (PDG) and the price of imported goods (PIM). The weighting scheme is determined by the relative sized of gross domestic product (GDP) and the level of imports (IM), where m - IM/GDP, is averaged over the sample period.

(24) $P = (1-m)PDG + mPIM$

The monetary sector presented here appears simple in structure, but can be justified given the influence of the Saudi government and the impact of its expenditures. Furthermore, a simplified model such as this, works best for simulation purposes.

Originally, a more detailed system of monetary sector equations were specified, but, unfortunately, when simulation techniques were applied for forecasting, unsatisfactory results were obtained. Despite this outcome, it is worthwhile to report this specification of the monetary sectors. In this specification money is determined by the balance sheet items GVP, FA and OD, which are then explained by other explanatory variables.

$MONY = n_o - n_1 GVD + n_2 FA - n_3 OD$

where GVD = government deposits

FA = level of foreign assets

OD = other deposits

Footnote: Unfortunately, this submodel was particularly sensitive and in many instances yielded unacceptable simulation results.

$GVD = p_o + p_1 ROIL$

$FA = FA_{(-1)} + DFA$

where DFA = change in foreign assets.

$DFA = q_o - q_1 BOP + q_2 NFK$

where NFK = net capital flows

$NFK = r_o + r_1 GSUR + r_2 ROIL_{(-1)}$

where GSUR = the government surplus

G. Other Identities

To complete the specification of the model for Saudi Arabia, the following national income identities are included:

(25) GDP = GDA + BOP

(26) GNP = GDP + NFY

(NFY) is net factor income from (to) abroad and is exogenous in this model.

Estimation Results

Applying ordinary least squares regression techniques, the stochastic equations of the model were estimated. Three equations, however, were re-estimated using two-stage least squares, since they comprised the core of the simultaneous system. The nature of this system is discussed further in the next section on Simulation (V), but it is important to note here that, in order to get consistent estimates, the two-stage least squares procedure was used in estimating the following equations:

(6) $OIQX = d_o OILQ$

$$(7)\quad OILX = e_o + e_1 OIQX + e_2 OILP$$

$$(12)\quad OILQ = g_1 + g_2 (GDPO/OILP)$$

The results of the estimation for these and the other equations of the model are presented in Table 2, "The Forecasting Model," at the end of this section.

As is often the case with time series data, the problem of autocorrelation was present in estimating several of the equations. The Durbin-Watson statistics were often low, indicating positively autocorrelated errors. In order to correct for this, the Cochrane-Orcutt iterative procedure was applied, as indicated by a star beside the Durbin-Watson value in the table summary.

Another problem with the estimation was the limited degrees of freedom as a result of the small sample size. However, the available data itself was limited, and as mentioned before, sixteen years (1962-1977) was the largest sample period that could be constructed. Unfortunately for estimation and forecast purposes, this period was a time of significant structural change in the Saudi economy, especially with the jump in oil prices in 1974. As a result, many of the data series exhibit tremendous growth rates towards the end of the period--a factor difficult to incorporate into a linear regression. Dummy variables were used in the early stages of estimation, but were not significant or did not improve the fit much. In fact, without dummy variables, the R^2-values are all high, approaching unity in most of the cases. Despite this fact, however, large residuals are present within the last few years for several of the regressions. This heteroscedasticity is a problem that must be acknowledged, but which is difficult to eliminate due to the nature of the data. While heteroscedasticity introduces some inefficiency into the regression estimates, it does not bias the regression coefficient in the model. Therefore it is not critical that the problem be corrected in order for useful simulation results to be obtained. We did transform some of the data into logarithms, which seemed to help, especially in the consumption function.

In evaluating the estimation results, several observations are noteworthy. First of all, the private consumption equation (lnCP), being in double-log form, yields an elasticity of private consumption with respect to disposable income of .54. Disposable income, in this case, is represented by income from non-oil gross domestic product (GDPN) and net government injections (NGJ). Specifying the relationship in this form, implies that the elasticity is constant. Given the structure of the Saudi economy, an elasticity of private consumption with respect to income of .54 is not too unrealistic. It implies a .54% change in consumption given a 1% change in income. Since consumption changes by a much smaller proportion, this implies a high savings rate which may be in part attributable to a highly skewed uneven distribution.

The other components of gross domestic absorption (GDA), government consumption (CG) and gross domestic investment (GDI), depend largely on government expenditures (GOEX). Holding everything else constant, a given change in government expenditures seems to have a somewhat higher impact on government consumption than investment, as indicated by a larger coefficient (.400 vs .327).

Lagged government investment also has a significant effect on current government investment. Almost 99% of Saudi oil was exported during the sample period, indicating that the domestic requirements for oil for this period were minimal. It is projected that this trend will continue throughout the simulation period, although some plans call for up to 500,000 barrels to be consumed domestically by 1985.

In terms of imports, the estimation results yield a marginal propensity to import of .57, where the marginal propensity to import is defined as the ratio of the change in imports to a given change in gross domestic absorption. This is not surprising, since the economy of Saudi Arabia is still within the development state and must rely on imports to satisfy many of its needs. Furthermore, given the large amount of revenues generated, the import market is likely to be an important one as surplus funds are available for expenditure on foreign goods and services.

The first step in estimating non-oil output, was the determination of output-labor ratios for a specific year, 1977. To calculate this ratio for each component of non-oil output (agriculture, manufacturing, construction, and services), labor force data was compared to value-added in each respective sector for 1977. The labor force figure was determined by applying projected growth rates to 1975 census figures, both given in the Third Plan. The construction was the sector with the largest output/labor ratio. These output-labor ratios, based on 1977 figures, served as the basis for calculating increases in productivity over time. The index term included in each equation is designed to capture the effect of projected productivity and inflation increases.

For the monetary sector, estimation results show that net government injections (NGJ) is highly significant in influencing the money supply (MONY). Thus, although a detailed monetary sector has not been incorporated into the final model, this relationship, as specified by equation (22), provides a good basis for forecasting. It is also interesting to observe that the price of imports (PIM) has a noticeable effect on the price of domestic goods (PDG). In fact, the coefficient of PIM is much greater than that on the money supply itself (.410 vs .005). Since, on the average, the level of imports was 29% of the level of GDP, a weighting factor of .29 is assigned to PIM and .79 to PDG in determining the overall price level.

Table 2

The Forecasting Model

The estimated stochastic equations, along with the identities, are summarized below. In evaluating the results, note that:

1. t-values are given in parentheses.
2. *DW denotes that the Cochrane-Orcutt correction procedure was applied.

A. Absorptive Capacity

(1) GDA = CP + CG + GDI

(2) $\ln CP = .385 + .5357 \ln(GDPN + NGJ)$ — $R^2 = .99$
(3.58) (6.83) — *DW = 1.69 — F = 1381

(3) CP = anti-log(lnCP)

(4) $CG = 879.7 + .4005\ GOEX$ — $R^2 = .99$
(4.66) (62.58) — *DW = 2.23 — F = 1370

(5) $GDI = -444.4 + .327\ GOEX + .6215\ GDI_{-1}$ — $R^2 = .99$
(-2.14) (30.02) (18.96) — *DW = 1.63 — F = 14,807

B. Foreign Trade

(6) $OIQX = .9862\ OILQ$ — $R^2 = .99$
(142.3) — DW = .26

(7) $OILX = -13{,}521 + 5.10\ OIQX + 1099.3\ OILP$ — $R^2 = .98$
(-4.06) (1.69) (14.22) — DW = 2.15 — F = 443.78

Table 2 (Continued)

(8) $EX = OILX + NOLX$

(9) $IM = -1507 + .567\ GDA$, $R^2 = .99$
$(-5.95)\ (96.1)$
$DW = 1.26$
$F = 9235.79$

(10) $BOP = EX - IM$

C. Oil Output

(11) $GDPO = GDP - GDPN$

(12) $OILQ = -281.4 + 3.13\ (GDPO/OILP)$ $R^2 = .94$
$(-2.27)\ (17.84)$
*DW = 2.03
$F = 189.6$

D. Non-oil Output

(13) $GDPN = GDPA + GDPM + GDPC + GDPS$

(14) $GDPA = .0028\ LA\ (INDX_0)$

(15) $GDPM = .0919\ LM\ (INDX_1)$

(16) $GDPC = .1124\ LC\ (INDX_2)$

(17) $GDPS = .0371\ LS\ (INDX_3)$

E. Government Sector

(18) $GR = ROIL + RNOL$

(19) $ROIL = -3573.03 + .8801\ GDPO$ $R^2 = .96$
$(-1.29)\quad (18.02)$
*DW = 1.85
$F = 331.44$

(20) $RNOL = -721.12 + .2012\ GDPN$ $R^2 = .98$
(16.09)
*DW = 1.98
$F = 521.1$

Table 2 (Continued)

(21) NGJ = GOEX - RNOL

F. Monetary Sector

(22) MONY = 936.5 + .367 NGJ
(2.51) (30.55)

R^2 = .98
DW = 2.30
F = 933.53

(23) PDG = 46.02 + .0052 MONY + .410 PIM
(6.45) (14.54) (5.70)

R^2 = .98
*DW = 2.10
F = 415.6

(24) P = .71 PDG + .29 PIM

G. Other Identities

(25) GDP = GDA + BOP

(26) GNP = GDP + NFY

Simulation

Using the SIMULATE program developed at the University of Wisconsin, the forecasting model was used in simulation studies of the Saudi economy. Various scenarios were incorporated into the simulation runs in order to determine the impact on the endogenous variables through the forecast horizon, 1990. Before taking a closer look at these scenarios, however, it is worthwhile to analyze the nature of the simultaneous system itself and how the SIMULATE program proceeds to solve it.

First of all, this program is comprised of two parts: SIM A and SIM B. SIM A evaluates the structure of the system and determines the order in which the equations are solved. Then, using this "ordered" system along with projected values for the exogenous variables, SIM B solves for the endogenous variables for the years of the forecast period. By changing the assumptions regarding certain exogenous variables, SIM B is then used to forecast under alternative scenarios for the Saudi economy.

The forecasting model for the Saudi model contains twenty-six equations in twenty-six endogenous variables. Thirteen variables are exogenous to the system. In ordering the equations, SIM A determines whether the system has any recursive components. Through this technique, a complex system of equations can be broken down into sub-sets of simpler systems,facilitating the solution process.

As it turns out, the Saudi model presented here is a highly recursive system. The twenty-six equations collapse into one simultaneous block of seven equations with the remainder of the equations being solved one by one, in recursive fashion. The simultaneous block is as follows:

(8) EX = OILX + NOLX

(7) OILX = -13,520 + 5.1 OIQX + 1099 OILP

(6) OIQX = .986 OILQ

(10) BOP = EX = IM

(25) GDP = GDA + BOP

(11) GDPO = GDP = GDPN

(12) OILQ = -281.4 + 3.13 (GDPO/OILP)

Thus, although the model includes twenty-six equations, the simultaneous aspect of it is contained within the seven equations above.

The determination of the simultaneous block was not only important for forecasting, but was useful for estimation pruposes, also. Once the simultaneous set was isolated, estimation procedures, more appropriate for simultaneous equations, could be applied. In this case, the simultaneous block contained four identities and three estimated stochastic equations. The identities posed no problem, since, by definition, they are non-stochastic equations, where the disturbance term is zero and all the coefficients are known (plus or minus one). The stochastic equations, however, needed further consideration.

First of all, the order condition was verified for each equation by comparing the number of predetermined variables excluded from the equation (but within the simultaneous block) to the number of included endogenous variables, less one. Then, using a single-equation (but withing the simultaneous block) to the number of included endogenous variables, less one. Then, using a single-equation technique, two-stage least squares was applied in order to try to remove the correlation between the disturbance term and the explanatory variables, a characteristic of simultaneous systems. The instrumental variables used in each case were: OILP, NOLX, IM, GDA, and GDPN. Interestingly enough, the results of the re-estimation using two-stage least squares were very simular to the original ordinary least squares results. The final results, based on the two-stage least squares process, are the ones that are reported in Table 2 and in the simulatneous block above.

With the model correctly specified and the equation ordering determined in SIM A, the next requirement was to obtain the necessary projections for the exogenous variables for the forecast period, 1978-1990, for SIM B. Given thirteen exogenous variables and limited data, especially regarding future trends, it was necessary to make certain assumptions. These assumptions are outlined as follows:

(a) Given continued growth and development of the Saudi economy, it is assumed that the levels of non-oil exports (NOLX) and net factor income to abroad (NFY) will follow the same path as demonstrated within the sample period. Thus, the annual levels of NOLX and NFY are based on average historical rates of growth, over the sample period (1962-1977), 22.2 percent and 19.4 percent, respectively.

b) The price of Saudi imports (PIM) is also based on an average growth rate reflecting the historical trend. In this case, the annual rate of growth is 6.6%.

c) The labor force figures are determined from information given in the Third Plan. The number of workers in each sector (agriculture, manufacturing, construction, and services) is given for 1975, 1980, and 1985 with anticipated rates of growth for the interim years. Since no growth rates are specified for the 1985-1990 period, it is assumed the trend in each sector will continue, and the rates of growth given for 1980-1985 are applied. Thus, using these labor figures and growth rates, projections are made for employment in the non-oil output sectors: LA, LM, LC, and LS. It is interesting to note that the Third Plan projects a decline in the labor force in the agriculture sector (LA) throughout the forecast period, and in the construction sector (LX) during the 1985-1990 period.

d) The government expenditures series (GOEX) is also based, in part, on information from the Third Plan. (Given considerable oil revenues and ambitious policy objectives, the projected increase in government expenditures is very large--around 32%, averaged annually.)

Based on the Saudi Third Plan we examine two different scenarios. In one scenario, government expenditures increase annually at 32% from 1978 through 1980, then in 1981, the rate of increase is cut back to 15% per year. In the scenario, a more conservative stance is taken, and the annual rate of increase in government expenditures is assumed to be 10% from 1981 through 1990.

e) Different scenarios are also proposed for the projections for the price of Saudi oil (OILP). One assumption is that the price of oil will increase at the same rate as Saudi's imports, which increased 6.6% annually over the sample period. This is based on the fact that a substantial amount of the foreign exchange derived from the export of oil is spent on foreign goods and services. Thus, the price changes for oil initiated by Saudi Arabia should reflect the changes in prices it faces in the import markets. Two additional scenarios postulate an annual oil price increase at five percentage points higher (11.6%) and at ten percentage points higher (16.6%) from 1981 through 1990. Actual oil price data was used for 1978, 1979, and 1980 in the simulation experiments.

Footnote: It is relevant to note here that, originally, the Saudi oil price was endogenous to the model. Recognizing Saudi Arabia's potential role as a price leader, it was felt that a functional relationship to explain the price of oil should be included. In fact, attempts were made to formulate an entire oil sub-model to account for movements in the oil pirce. World supply figures and proxies for world demand and inflation were all included in several variations of this sub-model. However, given the complex and political nature of the system, results were disappointing and would have been difficult to adapt for simulation purposes. Consequently, it was decided to make OILP exogenous, but to incorporate several possible price scenarios to reflect a variety of possible future possibilities with regard to oil prices.

f) The final set of projections involve the "productivity-inflation" index ($INDX_i$) included in the non-oil sectors. Since the production functions, as specified, give value-added in nominal terms, the output-labor ratios must be adjusted over time to reflect inflation and productivity changes. Thus, the index term is included to "inflate" labor's output in each sector. Once again, three basic scenarios are assumed. In the first, the "base case," no account is taken at all of productivity and inflation so the index is entered as "1" in all years for all sectors and normal productivity remains constant throughout the forecast period. In the second case, the index is constructed so that productivity increases projected in the Third Plan, and inflation are incorporated into the simulation. In this second case, the combined effect of productivity advance and inflation on the index are as follows: 18% in agriculture and manufacturing, 13% in construction, and 16% in services. Finally, in a third case, a more conservative view of productivity is taken and a 13% annual increase is assumed for all non-oil sectors.

Entering these projections for exogenous variables into SIM B, the forecasting model could then be solved for the endogenous variables through the 1990 forecast horizon. The different projections for GOEX, OILP, and $INDX_i$ form the basis for alternative scenarios.

VI. Forecasting

To forecast possible situations for the Saudi economy, three main scenarios (A,B, and C) are defined in terms of assumptions regarding the price of oil. These scenarios are specified as follows:

Oil Price Scenario A: 6.6% Annual Increase

Oil Price Scenario B: 11.6% Annual Increase

Oil Price Scenario C: 16.6% Annual Increase

Then, six variations are included for each oil price scenario by changing productivity and inflation assumptions and the level of government expenditures. These six variations for oil price scenarios A, B, and C are outlined as follows:

1) Prior to 1981, government expenditures (GOEX) increase annually at 32%. Then, in 1981, this rate of change falls to 10% per year. No productivity or inflation assumptions are made.

2) The pattern in government expenditures is the same (32% through 1980, 10% from 1981 to 1990), but conservative productivity estimates (3%) are incorporated into each non-oil sector. A 10% rate of inflation is also assumed.

3) Again, the increase in government expenditures goes from 32% to 10% in 1981, but the productivity projections from the Third Plan are used (8% for agriculture and manufacturing, 3% for construction, and 6% for services). A 10% annual rate of inflation is still assumed for productivity purposes.

4) Government expenditures increase at 32% through 1980, but in 1981 the annual expenditure increase is reduced to 15% (not 10% as before). No assumptions are included for productivity and inflation.

5) The government expenditure pattern goes from a 32% annual increase to 15% in 1981. Conservative productivity estimates and 10% inflation are incorporated in the index in each non-oil sector.

6) Government expenditures, once again, grow at 32% a year until 1981, when the rate of increase is 15%. An inflation rate of 10% is assumed and the productivity estimates from the Third Plan are included in the non-oil sectors.

In summarizing, variations (1) through (3) are based upon the same level of government expenditures where the annual rate of increase falls to 10% in 1981. They differ by the assumptions regarding productivity and inflation.

Variations (4) through (6) are based upon the pattern of government expenditures in which the annual rate of increase is 15% from 1981 on. Then, once again, it is the productivity and inflation assumptions that change as the configurations progress from no productivity to high productivity situations.

Results from these scenarios, eighteen in all, are tabulated in tables at the conclusion of this paper. The remainder of this section is devoted to an analysis of these results.

First of all, in most cases, the level of oil production increases as the price of oil increases. Thus, an upward-sloping supply curve for oil is implicit here as oil quantity is positively correlated with price. However, in the cases where we do not adjust for changes in productivity and inflation, oil production actually declines as price rises. Since the quantity of oil (OILQ) is determined within the simultaneous block, the direct linkages from other sectors of the model are not clear. One possible explanation may be that, within the OILQ equation, GDPO is deflated by the price index of oil (OILP). However, since it is determined as a residual (GDPO = GDP - GDPN), GDPO may be smaller in value when no explicit account is taken of productivity increases and inflation. This may occur because increased productivity may lead to greater percentage changes in GDP (through GDA) than in GDPN. Dividing this "smaller" GDP value, by an increasing oil price may then yield smaller quantities of oil output in the simulation.

Within each oil price scenario (A,B, and C), adjusting for changes in productivity and inflation has a negative impact on oil production. This, too, is a consequence of the fact that value-added in oil, GDPO, is determined as a residual, GDP - GDPN. However, in this case, with oil prices fixed, GDPN increases at a faster rate than GDP, thereby causing GDPO to decline over time. This is more noticeable during the final years of the simulation period when the productivity increases and the inflation rate, compounded annually, become fairly significant. In the higher-price oil scenarios (B and C), however, the negative effect on oil quantity is not very substantial. Furthermore, in all cases, increased productivity brings down the rate of increase in the overall price level (P), as would be expected.

Increasing government expenditures from an annual rate of increase of 10% to 15% clearly has a positive impact on gross domestic absorption (GDA). Higher levels of government expenditures affects levels of consumption (both public and private) and investment, and thus becomes an important tool in influencing the level of gross domestic absorption. This higher level of gross domestic absorption, however, has negative implications for the balance-of-payments. Since imports are a function of GDA, a larger value of GDA yields higher import figures. When export values do not increase by the same percentage, a decline in BOP is observed. In fact, in Oil Price Scenario A, with only a 6.6% increase in the price of oil, the balance-of-payments actually becomes negative by the end of the forecast horizon. Thus, continued high rates of government spending could eventually result in a balance-of-payments deficit for Saudi Arabia, given modest increases in the price of oil. With increased government spending figures, there is also an increase in the rate of change in the price level. Thus, an increase in government expenditures may increase the absorptive capacity of the economy, but it can also have inflationary impacts.

It is interesting to note that although quantity of oil exported may decline by the end of the simulation period in some cases, the value of oil exports (OILX) always increases. This stems from the fact that the oil price increase is compounded annually and given its rather large coefficient (1099) in the OILX equation, it cannot avoid having a considerable positive influence on the value of oil imports.

Finally, it should be noted that changing the oil price has no effect on the level of gross domestic absorption. The annual forecasts are identical for all three oil price scenarios A, B, and C. This is because, although the price affects oil output, since GDPO is determined as a residual, there is no explicit feedback mechanism to the expenditure portion of the model. However, a link may be provided given that different oil pricing policies may imply different government expenditure patterns, a factor which has an immediate impact on gross domestic absorption. There is also no feedback, between the oil price and the general price level. The behavior of prices is the same in all three price scenarios, which implies increasing the price of oil does not have inflationary implications for Saudi Arabia's domestic market.

VII. Conclusion

In summary, the simulation results indicate several factors which are important in the development of Saudi Arabia and the expansion of its absorptive capacity. Government expenditures provide one tool to increase gross domestic absorption, but at the risk of being inflationary. At sustained high levels of government expenditure increases, a decline in the balance-of-payments may even result. Increasing productivity, however, within the non-oil supply sectors can increase gross domestic absorption without the inflationary repercussions.

In order to fully evaluate the inflationary aspects of the system, however, several refinements to the model may be necessary. Ideally, it would be instructive to have the model in real terms, but this presents a whole array of complications. One possibility, however, would be to feed the change in the overall price level back into the "inflation-productivity index" incorporated in each non-oil output sector. In the simulations presented here, an inflation rate of 10% is just assumed for each year in the forecast. The system would be more dynamic and realistic if the actual inflation rate could be filtered back through the supply and, perhaps even the expenditure, sectors. Several attempts were made in order to do this, but the results, at least in the preliminary stages, were not very promising. In one instance, the price of domestic goods was directly included in the index term in the non-oil production functions. However, this changed the entire structure of the system as the simultaneous block expanded and contained practically the whole model. As a result, solving the system became quite complex and in several instances, the system did not converge to a solution at all. With more time and perseverance, however, this possibility could be explored further.

Although the model presented here is limited in scope, it does provide relevant information regarding certain aspects of Saudi growth and development. It cannot be expected to predict political or social types of changes, but it can be used to evaluate the underlying economic structure of the system. Thus, it can be useful in taking a closer, more quantitative look at the development policies and objectives of the government of Saudi Arabia.

SAUDI ARABIA

Forecasting Results for Oil Price Scenario A: 6.6% Annual Increase

(millions of Saudi Riyals)

SCENARIO	YEAR	BOP	GDA	GDP	GDPN	GNP	P	IM
A_1 GOEX: 10% No Productivity Assumptions	1980	127,460	292,700	420,170	100,120	400,610	494	164,430
	1985	117,420	508,570	625,990	104,590	578,530	755	286,800
	1990	101,960	805,610	907,570	116,020	792,410	1,160	455,190
A_2 GOEX: 10% Conservative Productivity Estimates	1980	123,360	295,070	418,430	144,180	398,880	482	165,770
	1985	105,360	516,100	621,450	278,220	574,000	707	291,070
	1990	78,513	821,160	835,320	568,480	784,510	1,036	464,010
A_3 GOEX: 10% Productivity Estimates From Plan	1980	122,580	295,520	418,430	152,640	398,540	480	166,020
	1985	101,580	518,340	619,920	333,940	572,460	692	292,340
	1990	66,989	828,210	895,200	800,860	780,030	972	468,000
A_4 GOEX: 15% No Productivity Assumptions	1980	127,460	292,700	420,170	100,120	400,610	494	164,430
	1985	62,215	609,480	671,690	104,590	646,230	891	344,000
	1990	-113,650	1,195,700	1,082,100	116,020	966,910	1,652	676,350
A_5 GOEX: 15% Conservative Productivity Estimates	1980	123,360	295,070	418,430	144,180	398,880	482	165,770
	1985	50,459	616,440	666,900	278,220	619,440	843	347,950
	1990	-135,850	1,209,000	1,073,200	568,480	958,010	1,528	683,890
A_6 GOEX: 15% Productivity Estimates From Plan	1980	122,580	295,520	418,100	152,640	398,540	480	166,020
	1985	46,760	618,540	665,300	333,940	617,850	827	349,150
	1990	-146,930	1,215,300	1,068,300	800,860	953,170	1,464	687,420

Continued: Oil Price Scenario A (6.6%)
(millions of Saudi Riyals)

SCENARIO	YEAR	GR	ROIL	OILQ (million barrels)	OIQX (million barrels)	OILX	EX
A_1 GOEX: 10% No Productivity Assumptions	1980	297,520	278,100	3,551	3,502	291,510	291,890
	1985	475,630	455,310	4,254	4,195	403,190	404,220
	1990	715,700	693,080	4,721	4,656	554,340	557,160
A_2 GOEX: 10% Conservative Productivity Estimates	1980	266,090	237,800	3,003	2,961	288,750	289,130
	1985	353,770	298,510	2,704	2,667	395,390	396,430
	1990	401,560	287,910	1,812	1,787	539,710	542,520
A_3 GOEX: 10% Productivity Estimates From Plan	1980	260,050	230,060	2,897	2,857	288,220	288,600
	1985	314,590	248,120	2,206	2,176	392,890	393,920
	1990	239,870	79,456	314	310	532,180	534,990
A_4 GOEX: 15% No Productivity Assumptions	1980	297,520	278,100	3,551	3,502	291,510	291,890
	1985	515,850	495,530	4,652	4,588	405,190	406,220
	1990	869,280	846,660	5,824	5,743	559,890	562,700
A_5 GOEX: 15% Conservative Productivity Estimates	1980	266,090	237,800	3,003	2,961	288,750	289,130
	1985	393,770	338,510	3,100	3,057	397,380	398,410
	1990	554,260	440,610	2,908	2,868	545,220	548,040
A_6 GOEX: 15% Productivity Estimates From Plan	1980	260,050	230,060	2,897	2,957	288,220	288,600
	1985	354,530	288,060	2,601	2,565	394,870	395,910
	1990	392,240	231,830	1,409	1,389	537,680	540,500

SAUDI ARABIA

Forecasting Results for Oil Price Scenario B: 11.6% Annual Increase (millions of Saudi riyals)

SCENARIO	YEAR	BOP	GDA	GDP	GDPN	GNP	P	IM
B_1 GOEX: 10% No Productivity Assumptions	1980	127,460	292,700	420,170	100,120	400,610	494	164,430
	1985	218,020	508,570	726,590	104,590	679,130	755	286,800
	1990	415,410	805,610	1,221,000	116,020	1,105,900	1,160	455,190
B_2 GOEX: 10% Conservative Productivity Estimates	1980	123,360	295,070	418,430	144,180	398,880	482	165,770
	1985	207,610	516,100	723,710	278,220	676,250	707	291,070
	1990	397,450	821,160	1,218,600	568,480	1,110,340	1,036	464,010
B_3 GOEX: 10% Productivity Estimates From Plan	1980	122,580	295,520	418,100	152,640	398,540	480	166,020
	1985	204,360	518,340	722,700	333,940	675,250	692	292,340
	1990	388,760	828,210	1,217,000	800,860	1,110,180	972	468,000
B_4 GOEX: 15% No Productivity Assumptions	1980	127,460	292,700	420,170	100,120	400,610	494	164,430
	1985	162,390	609,480	771,860	104,590	724,410	891	344,000
	1990	197,720	1,195,700	1,393,400	116,020	1,278,300	1,652	676,350
B_5 GOEX: 15% Conservative Productivity Estimates	1980	123,360	295,070	418,430	144,180	398,880	482	165,770
	1985	152,290	616,440	768,730	278,220	721,270	843	347,950
	1990	181,020	1,209,000	1,390,000	568,480	1,274,900	1,528	683,890
B_6 GOEX: 15% Productivity Estimates From Plan	1980	122,580	295,520	418,100	152,640	398,540	480	166,020
	1985	149,120	618,540	767,670	333,940	720,210	827	349,150
	1990	172,770	1,215,300	1,388,000	800,860	1,272,900	1,464	687,420

SAUDI ARABIA

Continued: Oil Price Scenario B (11.6%)
(millions of Saudi riyals)

SCENARIO	YEAR	GR	ROIL	OILQ (million barrels)	OIQX (million barrels	OILX	EX
B_1	1980	297,520	278,100	3,551	3,502	291,510	291,890
GOEX: 10%	1985	564,170	543,840	4,022	3,966	503,780	504,820
No Productivity Assumptions	1990	991,560	968,940	4,134	4,077	867,790	870,610
B_2	1980	266,090	237,800	3,003	2,961	288,750	289,130
GOEX: 10%	1985	443,760	388,500	2,800	2,762	497,640	498,680
Conservative Productivity Estimates	1990	682,270	568,610	2,317	2,285	858,650	861,460
B_3	1980	260,050	230,060	2,897	2,857	288,220	288,600
GOEX: 10%	1985	405,050	338,580	2,408	2,375	495,670	496,700
Productivity Estimates From Plan	1990	523,050	362,640	1,381	1,362	853,950	856,760
B_4	1980	297,520	278,100	3,551	3,502	291,510	291,890
GOEX: 15%	1985	604,020	583,690	4,335	4,275	505,360	506,390
No Productivity Assumptions	1990	1,143,300	1,120,700	4,823	4,757	871,260	874,070
B_5	1980	266,090	237,800	3,003	2,961	288,750	289,130
GOEX: 15%	1985	483,380	428,130	3,112	3,069	499,210	500,240
Conservative Productivity Estimates	1990	833,140	719,480	3,002	2.960	862,090	864,910
B_6	1980	260,050	230,060	2,897	2,857	288,220	288,600
GOEX: 15%	1985	444,620	378,150	2,719	2,682	497,230	498,270
Productivity Estimates From Plan	1990	673,610	513,200	2,065	2,037	857,380	860,200

SAUDI ARABIA

Forecasting Results for Oil Price Scenario C: 16.6% Annual Increase
(millions of Saudi riyals)

SCENARIO	YEAR	BOP	GDA	GDP	GDPN	GNP	P	IM
C_1 GOEX: 10% No Productivity Assumptions	1980	127,460	292,700	420,170	100,120	400,610	494	164,430
	1985	339,010	508,570	847,590	104,590	800,130	755	286,800
	1990	887,310	805,610	1,692,900	116,020	1,577,800	1,160	455,190
C_2 GOEX: 10% Conservative Productivity Estimates	1980	123,360	295,070	418,430	144,180	398,880	482	165,770
	1985	329,850	516,100	845,950	278,220	798,490	707	291,070
	1990	872,640	821,160	1,694,800	568,480	1,578,600	1,036	464,010
C_3 GOEX: 10% Productivity Estimates From Plan	1980	122,580	295,520	418,100	152,640	398,540	480	166,020
	1985	327,000	518,340	845,350	333,940	797,890	692	292,340
	1990	865,640	828,210	1,693,800	800,860	1,578,700	972	468,000
C_4 GOEX: 15% No Productivity Assumptions	1980	127,460	292,700	420,170	100,120	400,610	494	164,430
	1985	283,070	609,480	892,540	104,590	845,090	891	344,000
	1990	668,380	1,195,700	1,864,100	116,020	1,748,900	1,652	676,350
C_5 GOEX: 15% Conservative Productivity Estimates	1980	123,360	295,070	418,430	144,180	398,880	482	165,770
	1985	274,210	616,440	890,660	278,220	843,200	843	347,950
	1990	654,970	1,209,000	1,864,000	568,480	1,748,800	1,528	683,890
C_6 GOEX: 15% Productivity Estimates From Plan	1980	122,580	295,520	418,100	152,640	398,540	480	166,020
	1985	271,450	618,540	889,990	333,940	842,530	827	349,150
	1990	648,420	1,215,300	1,863,700	800,860	1,748,500	1,464	687,420

SAUDI ARABIA

Continued: Oil Price Scenario C (16.6%)
(millions of Saudi riyals)

SCENARIO	YEAR	GR	ROIL	OILQ (million barrels)	OIQX (million barrels)	OILX	EX
C_1 GOEX: 10% No Productivity Assumptions	1980	297,520	278,100	3,551	3,502	291,510	291,890
	1985	670,660	650,330	3,846	3,793	624,780	625,820
	1990	1,406,900	1,384,300	3,783	3,731	1,339,700	1,342,500
C_2 GOEX: 10% Conservative Productivity Estimates	1980	266,090	237,800	3,003	2,961	288,750	289,130
	1985	551,340	496,090	2,873	2,833	619,890	620,920
	1990	1,100,500	986,820	2,619	2,583	1,333,800	1,336,700
C_3 GOEX: 10% Productivity Estimates From Plan	1980	260,050	230,060	2,897	2,857	288,220	288,600
	1985	512,990	446,520	2,560	2,524	618,310	619,340
	1990	942,760	78,235	2,020	1,992	1,330,800	1,333,600
C_4 GOEX: 15% No Productivity Assumptions	1980	297,520	278,100	3,551	3,502	291,510	291,890
	1985	710,230	689,900	4,096	4,040	626,040	627,070
	1990	1,557,500	1,534,900	4,224	4,166	1,341,900	1,344,700
C_5 GOEX: 15% Conservative Productivity Estimates	1980	266,090	237,800	3,003	2,961	288,750	289,130
	1985	590,690	535,440	3,121	3,078	621,140	622,170
	1990	1,250,300	1,136,600	3,058	3,016	1,336,000	1,338,900
C_6 GOEX: 15% Productivity Estimates From Plan	1980	260,050	230,060	2,897	2,857	288,220	288,600
	1985	552,280	485,810	2,808	2,769	619,560	620,590
	1990	1,092,200	931,820	2,458	2,424	1,333,000	1,335,800

FOOTNOTES

1. Zain A. Barry., "Inflation in Saudi Arabia" (Ph.D. Dissertation, University of Colorado, 1980), pp. 60, 63.

2. The Third Development Plan: 1980-1985 (Kingdom of Saudi Arabia: Ministry of Planning).

3. Ragaei El Mallakh, et al., Capital Investment in the Middle East (New York: Praeger Publishers, 1977), p. 15.

4. Donald A. Wells, Saudi Arabian Development Strategy (Washington, DC: American Enterprise Institute for Public Policy Research, 1976), pp. 15, 16.

5. El Mallakh, op. cit., p. 16.

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