THE WORLD OIL EQUATION AND THE FUTURE OF MIDDLE EAST OIL

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INTRODUCTION

In the early 1970's, the oil revenue per barrel obtained by the oil producers began to rise culminating in the large increases registered in the last quarter of 1973. The impact of this increase in oil price, and the subsequent large increase which occurred in 1979 had an enormous impact upon the oil producers and the world in general although one may debate the extent to which the impact on some of the oil producers has been real rather than illusory or short-term rather than long-term (1).

The present conventional wisdom is that the decades of the eighties and nineties will see more of the same at one level or another (2). The purpose of this discussion paper* is to turn that conventional wisdom on its head and argue exactly the opposite, namely that the value of oil revenues during the decade of the 1980's will decline sharply in real terms and that this will generate forces which will have an impact on the Arab oil producers at least as great as the impact of the increased revenue during the 1970's, and these forces in turn will have significant implications for the future of the international oil market and the price of oil.

The argument underlying this assertion can be divided into three parts. First, it is necessary to show that real oil revenues accruing to the Arab oil producers will fall sharply during the decade. To do this it must be shown that the oil price will stay constant in money terms until the late 1980's which, with continuing inflation, means a fall in real terms. If some of the arguments used to support this view are taken to their logical conclusion then in fact it would be reasonable to expect the money

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* This paper was presented to the Middle East Centre at the University of Durham in early December 1981, and again at an Energy Seminar at the University of Surrey in January 1982. The author would like to thank members of both seminars for their comments and suggestions.

price to fall. * However, for the price to fall in real terms is sufficient for the development of the argument. Second, it is necessary to show that the Arab oil exporters will be unable to cope with this decline in revenue. To achieve this it is necessary to examine the impact of a constant money price of oil on projections of government consumption expenditure and imports in order to deduce the implied budget deficit and balance of payments deficit and from this argue that, apart from some crucial exceptions, by the middle of the decade many of the Arab oil exporters will effectively 'run out' of money. Third, it is necessary to show that this will create forces which will generate problems and tensions within the Middle East which will in turn spill over into the international oil market. To do this the paper examines one possible scenario, namely that the situation described could lead to a change of government within Saudi Arabia.

A major problem which occurs when an attempt is made to overturn any conventional wisdom is that to have an impact, the argument often has to be either overstated or stated in extreme terms. As far as possible the paper tries to avoid this, but almost certainly in parts fails.

A final general comment is necessary. While the paper sees the outlined future to be discussed as probable, nothing is certain. Therefore the purpose of writing the paper is to provide a warning. Without doubt it would be better for the Arab world to avoid yet further disruption and upheaval. In enumerating why such an upheaval may arise, it is inevitable, at least implicitly, that means of taking avoiding action emerge. It is in this spirit that the paper has been written.

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* The paper was formulated in September 1981. Since then, the weakness in the oil market has resulted in a general reduction in money price of crude, in some cases even at an official level. At the same time in an interview given by Sheik Yamani in Middle East Economic Survey (MEES) Vol. XXV, No. 14, he indicated that Saudi Arabia would do nothing to defend prices. However, it is not clear whether this meant what it said or whether it was merely a ploy to create a bargaining position in the event of any emergency OPEC meeting. Rumours of such a meeting emerged in the second week of February.

The paper is divided into three parts. The first part examines the future price of oil by setting the market context and then examining supply and demand side factors. The second part examines the impact of declining real oil revenue upon the economies of the Arab countries and the implications for the oil market. Finally, the paper examines a recent development in Saudi Arabia in relation to the structure of the armed forces which suggests that the stability of oil supplies from that country could be vulnerable.

I. THE PRICE OF OIL DURING THE 1980's

The first stage in the argument is to show that the real price of oil will fall during the decade with the money price staying constant.

The world price of oil is determined by the interaction of supply and demand in a market context. Of course this does not preclude the impact of political events or the perceptions and objectives of governments in the process since these merely change the shape and position of the supply and demand curves. Nor is it in any way suggested that the market operates necessarily under competitive conditions. Two other statements are required to clarify further the context. First, it is assumed that apart from a couple of times early in the seventies, OPEC has been unimportant in determining the world price of oil and this situation will continue (3). This, at least for most people, is now no longer part of the conventional wisdom and for some never was.

The second statement concerns the motives of Saudi Arabia. It is assumed that Saudi Arabia will welcome this fall in real oil prices and will take action to encourage it. The formation and execution of Saudi Arabia's oil policy involves very complex interacting strands of short-term and long-term objectives (4). The official policy line has since 1973 been what may be described as the 'noble oil argument'. This argues that the substitution of oil as an energy source is a 'good thing' because it enables the oil to be used in more productive activities, i.e. greater value added, notably petrochemicals. Thus oil prices should be

set to encourage the reduction in the use of oil as energy. This portrays the policy makers as selfless and as men of long vision. The a priori arguments for expecting all policy makers to be like everyone else i.e. selfish and short-sighted, are considerable (5). If oil is substituted for by other energy sources it would lose much of its importance in international trade since very little crude is used in petrochemicals. * If oil lost its importance, so would Saudi Arabia whose population of around 5 million would put it alongside Rwanda and Upper Volta in the league of great powers. Since Saudi Arabia's very pre-eminent place in world affairs stems from the role of oil in international trade, it is very difficult to believe that they would encourage this move away from oil. Apart from a degree of political cynicism, the argument also makes a great deal of economic sense given the size of Saudi Arabia's oil reserves. At present production levels, these reserves give it a very long life indeed as an oil producer. Even considering the long-term future, conservation in Saudi Arabia is hardly an issue when the size of the potential is considered.

Since early 1980, there has been a surplus of oil in the market which has exerted a downward pressure on prices. Where prices have not acceded to that pressure the result has been a sharp decline in output which of course, at the end of the day, has a similar impact upon revenues. The results, for OPEC, can be seen in Table 1. In 1981 OPEC had an installed capacity of 40.6 million barrels per day (b.d.) and a sustainable capacity of 34.3 million b.d. In July 1981, OPEC was producing at 62 percent of sustainable capacity and in October - normally a high demand month because of seasonal factors - this had fallen to 53 percent. Of the OPEC countries, the worst hit were the Arab producers, thus in October Qatar was producing at 50 percent, Algeria 60 percent, UAE 52 percent and Libya 29 percent.

This downward pressure on prices was the result of a sharp decline in demand coupled with the action of Saudi Arabia in the maintenance of her production levels (both of which will be discussed in

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* In the USA, for example, about 7 - 8 percent of oil consumption goes into petrochemicals.

TABLE 1

OPEC Crude Oil Production and Capacity

(million barrels per day)

	Installed[1] capacity	Sustainable[1] capacity	Production[2] July 1981	Production[2] October 1981
Algeria	1.2	1.0	0.7	0.6
Ecuador	0.2	0.2	0.2	0.2
Gabon	0.2	0.2	0.1	0.1
Indonesia	1.8	1.6	1.6	1.6
Iran	6.5	4.5	1.4	0.85
Iraq	3.8	3.5	.9	0.85
Kuwait	2.9	2.5	1.0	0.8
Libya	2.5	2.1	0.7	0.6
Neutral Zone	0.7	0.6	.3	*
Nigeria	2.5	2.2	0.8	1.1
Qatar	0.6	0.6	0.4	0.3
Saudi Arabia	12.5	10.5	10.0	8.2
United Arab Emirates	2.6	2.4	1.4	1.25
Venezuela	2.6	2.4	1.8	1.7
Total	40.6	34.3	21.3	18.15

* included in Saudi Arabia and Kuwait

Note: installed capacity includes all aspects of crude oil production, including not only actual production but processing, transportation, interim storage and loading terminal capacities as well. Sustainable capacity denotes the maximum level of production, again of the total system, that can be sustained for at least several months.

SOURCE: 1: Energy in the 1980's: an analysis of recent studies. E.A. Deagle, Jr., B. Mossavar-Rahmani and R. Huff.
Group of Thirty, New York 1981

2: Petroleum Economist.

detail later). The next stage in the argument is to examine what assumptions are needed to show that this situation of a downward pressure on prices will continue throughout the current decade, bearing in mind the objective of this section of the paper to show only that money prices will stay constant. These assumptions can best be outlined within a supply and demand framework.

Supply side assumptions

There are two broad assumptions. The first is that the energy supply situation during the decade (excluding OPEC oil) will be a continuation of the experience of the last few years. The second assumption is that if there are any changes on the supply side, these will be in the form of pressures to increase supply and therefore reinforce the downward pressure on price.

The present energy supply situation is characterised by three underlying sub-assumptions. First, the paper assumes no supply disruptions of a major type along the lines of the Iranian revolution. At this stage in the analysis, this is more of a simplifying assumption rather than an expression of expected events since the paper will go on to argue that the tensions which will be generated by the falling oil price will lead to such a supply disruption.

The second assumption which underlies the 'business as usual' assumption on the supply side is that non-OPEC oil together with non-oil energy sources will continue to increase in availability in line with recent experience. Table 2 indicates what this experience has been and that there is nothing particularly daring about expecting the experience to continue since progress has been fairly modest. For example, non-oil energy supplies grew at 2.3 percent per year between 1974 and 1980 while non-OPEC oil grew at 3.4 percent per year between 1974 and 1981.

At first sight there is a fundamental contradiction in this assumption since if the real price of oil is expected to fall, then the supply response should be the opposite i.e. a reduction in the availability of both oil and non-oil energy supplies. I

TABLE 2

Energy Supplies

Oil production (million b.d.) [1]	1974	1981*	Compounded annual % increase
OPEC	30.7	24.0	-3.5
Non-OPEC (excluding Communist Bloc)	16.5	20.8	3.4
World (excluding Communist Bloc)	47.2	44.8	
World (excluding Communist Bloc) Non Oil Energy Sources (MTOE)[2]	1974	1980	
Natural Gas	837	875	0.6
Coal	830	1,001	2.7
Hydro-Nuclear+	356	502	5.0
	2,023	2,378	2.3

SOURCE: 1. Petroleum Economist
2. BP Statistical Review

* Based upon annualizing the figures for the first half of 1981.

\+ Defined as the amount of oil required to produce the equivalent electricity in an oil-fired plant.

would suggest four reasons to solve this contradiction.

First, there exists in the system what may be termed a sluggishness of perception. In other words once an idea is implanted it takes a long time to change that idea. For example, it is this author's belief that the increases in oil prices in 1973 were not really taken seriously by the consumers until later in the decade since they were regarded as the result of an aberration* which would last only a short time. Unfortunately, apart from a priori theorizing there is, as yet, no hard evidence on this view. However, if this sluggishness of perception exists, the fact that oil prices may fall will take some time before it begins to affect investment decisions.

Second, there is still perceived to be a very heavy premium being placed upon politically secure sources of energy and this will remain. This goes some way to explain why it is the Arab members of OPEC which have been hardest hit by the decline in demand as can be seen from Table 1.

A third reason why falling oil prices will still lead to increased non-OPEC energy supplies concerns the 'bygones rule'. Since the middle of the seventies, there has been very heavy investment in developing alternative energy sources. For example, witness the large-scale investment undertaken in the area of internationally traded coal (6). Once this fixed investment is made then the production decision hangs upon covering only variable costs which in most energy projects are relatively small. Therefore the price of crude would have to fall a very long way before such projects become uneconomic to the point of close-down.

Finally, the economic rent in oil prices is still large by any standard. Therefore the price could be very considerably shaded before this rental element ceases to be attractive. To what extent this will operate does depend however on the extent to which

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* This 'aberration' was in fact OPEC which was thought to be acting like a cartel and therefore would eventually crash restoring oil price levels to those of the 'good old days'. Henry Kissinger was a major contributor to the peddling of this view.

of the Iraq-Iran war. At a rough estimate, given maximum production by both sides, this could add some 7 million b.d. to the supply side of the equation. To put this in perspective, in the first half of 1981 total OPEC production was some 24 million b.d. Clearly this would have an enormous impact upon the oil equation. The likelihood of this depends upon three factors. The first factor concerns when the war will end and here one prediction is as good as another (8). Second, how much damage has been done to the fields and again no-one can be sure what the answer is, although it is worth remembering that it is a long-standing Bedu tradition that raiding parties may kill the men, burn the houses and steal the women but they may not cut down the date palms. The final question is how soon full production could be reached. Clearly reconstruction requirements will need maximum production and already there are signs in Iraq that the government is seeking assistance from the international oil companies. Even in Iran the official press has been talking in terms of taking a 'pragmatic view of oil policy' after the war (9). On this basis production could increase very rapidly, particularly if the companies were given attractive terms.

The third and final pressure on supply could be from developments in Mexico. There are indications that the Mexican potential in oil and gas is very large indeed and earlier estimates, which were thought to be overstatements, now appear to be understatements (10). Of course much depends upon the willingness of Mexico to produce and export but the revenue pressures could be enormous. The short-term impact of this could be to remove the United States from the world oil market as a demander of crude.

If any or all of these three 'reasons' translate into reality then it is almost certain that the money price of crude would fall.

These then are the supply side assumptions which will underlay the analysis. They are fairly conservative and probably represent almost a consensus of probability. The more controversial assumptions are on the demand side.

Demand side assumptions

The central demand side hypothesis is that the demand for oil in general and Arab oil in particular, will probably stay at around the 1980 level throughout the decade of the eighties and may well decline further. This arises in a sense because the ability of the industrialised countries to adjust to the new high price energy era has been grossly underestimated. The general picture is given in Table 3.*

The sub-assumptions upon which this central hypothesis is based are outlined below.

The key assumption and the most controversial is that a large part of the decline in oil demand is as a result of a fundamental structural change in demand in response to higher prices rather than in response to the recession experienced in the OECD countries. Furthermore, that a large part of the structural change in demand to date is in response to the rise in oil prices in 1973-74 rather than to that of 1979 which has yet to be worked out in further changes in energy conservation in general and oil conservation in particular coupled with an irreversible change in output structure.

The reason that this assumption is controversial is because it is seeking to explain a phenomenon which is of very recent origin i.e. dating from 1979-80. As a result hard evidence to prove or disprove the case is not yet available. Even if factual information were available it would still be difficult to separate the income effect from the price effect and then separate the 1973-74 price effect from the 1979 price effect. Consequently, the realism of the assumption is based on instinct backed by selective evidence. Instinct can be wrong and to prove a case by selective example is often misleading, which is why the assumption is controversial. Nevertheless there is some evidence to support it.

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* There are clear signs that the falling consumption has accelerated in 1981. OECD Quarterly Oil Statistics show that OECD net oil imports in the first half of 1981 fell by 15.8 percent compared to the first half of 1980 while net oil imports in 1980 were 12.5 percent down on 1979.

TABLE 3

World* Oil Demand
(Million barrels/day)

	1975	1976	1977	1978	1979	1980	% shares a) 1975	% shares a) 1980
USA	15.3	16.4	17.2	17.5	17.1	15.6	35.1	32.8
Canada	1.6	1.6	1.6	1.7	1.7	1.7	3.7	3.5
W. Europe	12.4	13.2	13.1	13.5	13.9	12.9	28.4	27.2
Australia	0.7	0.7	0.7	0.7	0.7	0.7	1.5	1.5
Japan	4.5	4.8	5.0	5.1	5.1	4.7	10.4	9.8
Industrialised countries	34.5	36.7	37.6	38.5	38.6+	35.6	79.1	74.8
Latin America	3.2	3.3	3.6	3.9	4.1	4.2	7.3	8.7
Africa and Mideast	1.8	2.1	2.3	2.6	2.7	2.9	4.0	6.0
Indian sub-continent	0.6	0.6	0.7	0.7	0.8	0.8	1.4	1.7
Other Asia	1.3	1.4	1.7	1.8	1.9	2.0	3.0	4.2
Non-industrialised countries	6.9	7.4	8.3	9.0	9.5	9.8+	15.8+	20.7+
Total inland demand	41.4	44.1	45.9	47.5	48.1	45.4	94.9	95.5
Bunkers	2.2	2.3	2.3	2.3	2.2	2.1	5.1	4.5
Total world demand	43.6	46.4	48.2	49.8	50.3	47.5	100.0	100.0

SOURCE: Petroleum Economist

* Excluding USSR, East Europe and China. Also excluding refinery use.

\+ Owing to rounding, these sub-totals do not match the sum of items listed.

a) Calculated from precise figures not shown here.

At a macro level, the evidence is based around what has happened to the output/energy consumption ratios in various countries. For example, the Eurostat Statistics show that for the EEC while GDP rose by 1.3 percent between 1979-80 with industrial production falling by 0.7 percent, total energy consumption fell by 4.5 percent. However, even more convincing evidence comes from examining the output/oil consumption ratio for specific countries. The evidence for Japan is shown in Figure 1. What this shows is that in 1980 each kilolitre of crude oil produced 43 percent more GNP than was the case in 1974. Japan is an important example because throughout the period there was no decline in GDP therefore the decline in oil consumption is entirely due to a price response, although the output structure has changed.

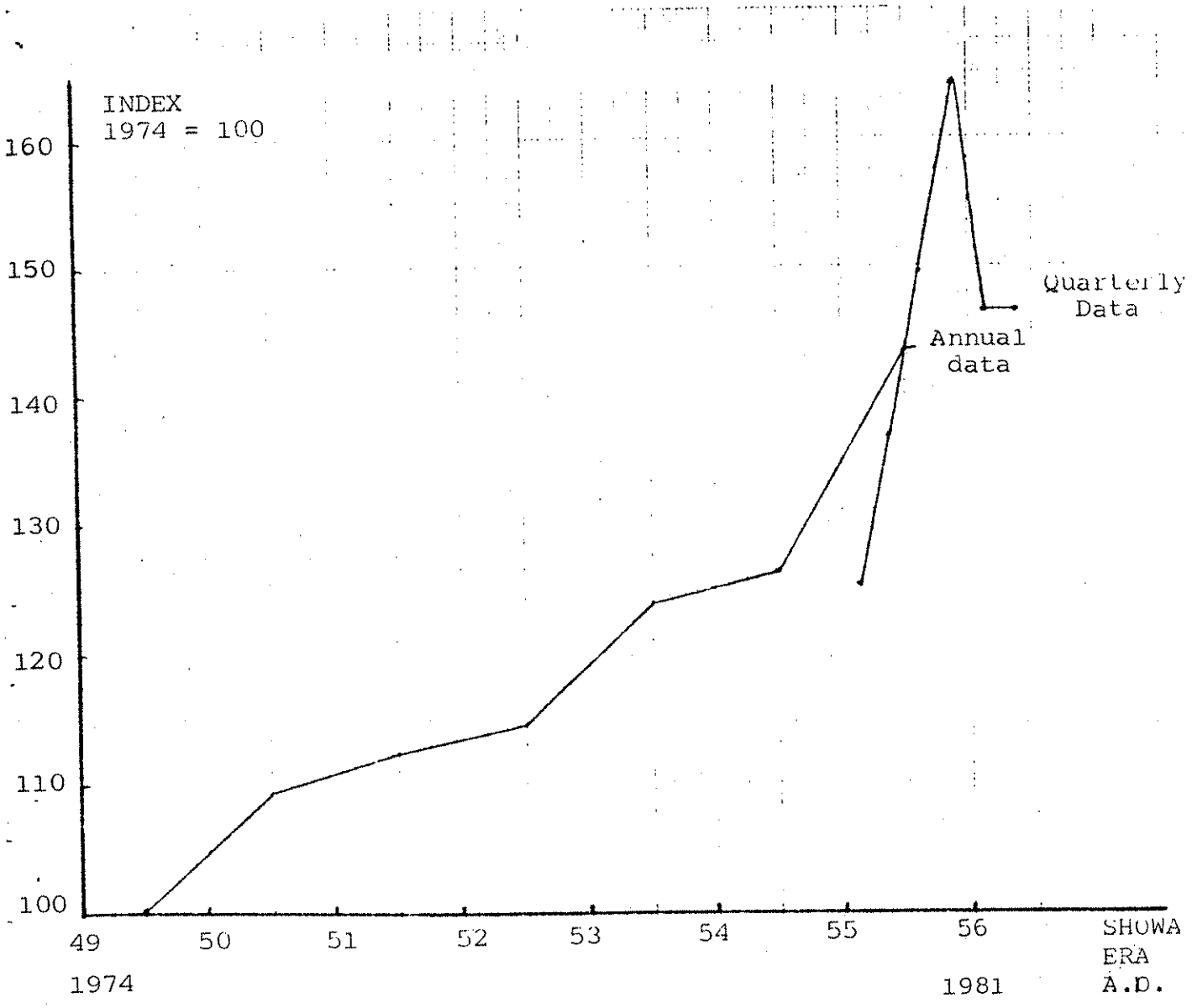
Another example is given in Figure 2 which shows the ratios for the UK. While this indicates limited success in reducing total energy use as measured by the GDP/Energy consumption ratio it shows that reduction of oil input per unit of GDP has been far more successful.

In addition to this macro evidence there is a growing body of micro evidence to support the argument for a fundamental change in the demand structure. For example in Japan, between 1973-80 the per unit energy cost of steel fell by more than 12 percent while the oil input per unit of output fell by 43 percent (11). Cement in Japan tells the same story with a fall in per unit energy input of 32 percent over the same period (12). A similar example from the United States concerns aluminium smelting where primary aluminium smelting can now be undertaken with up to one third less energy (13). Many other such examples could be cited (14). At the same time there has been a move away from energy intensive products largely as a result of design changes. For example, a concrete structure can now be made with one tenth of the concrete used in construction ten years ago (15).

The paper assumes that this process of reducing the energy intensity of output will continue over the decade for two reasons. The first concerns the relationship between the price of crude

FIGURE 1

Japan GNP/Oil Consumption Ratio
(49 (1974) = 100)



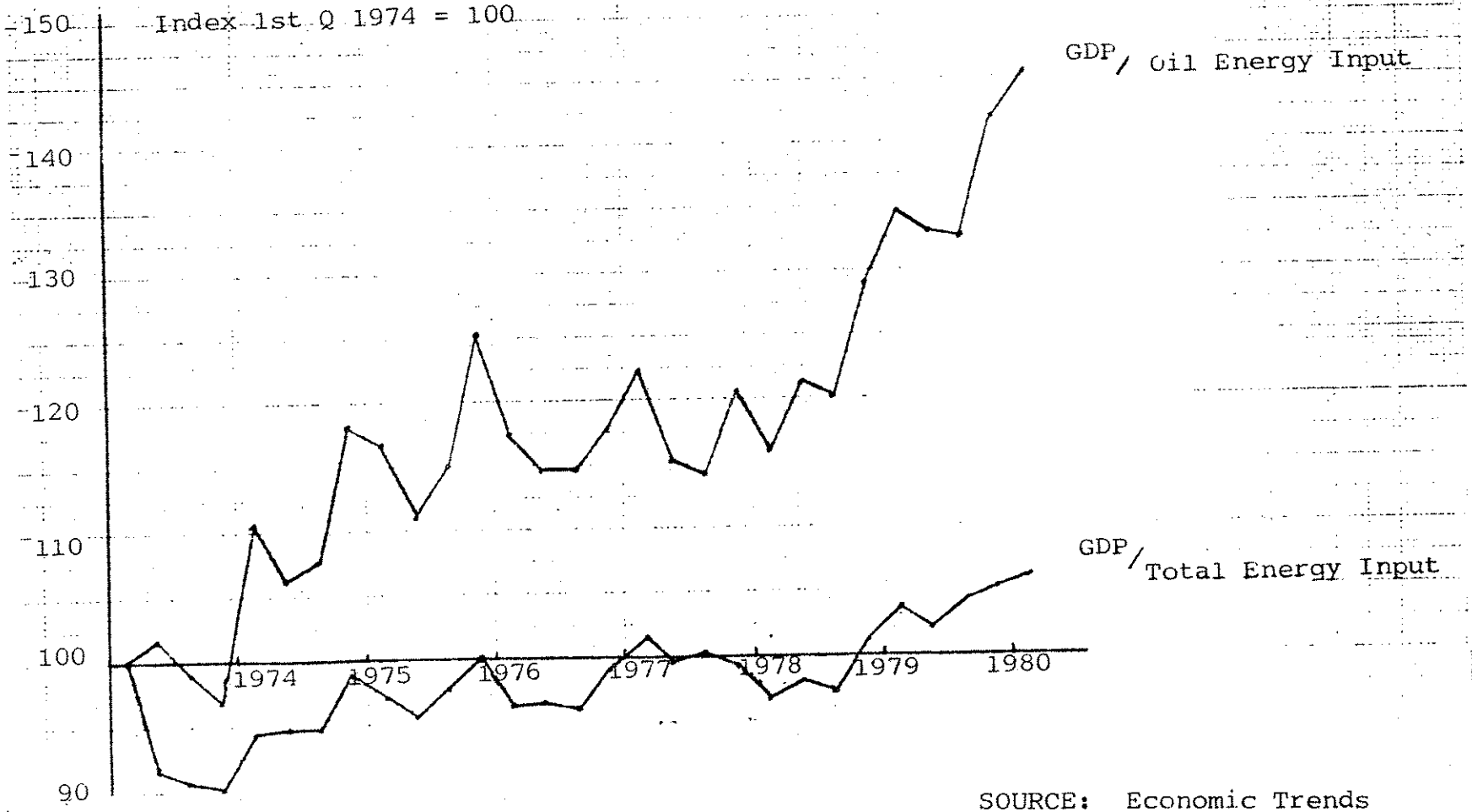
SOURCE: Monthly Statistics of Japan, Statistics Bureau, Prime Minister's Office.

Notes:

1. Gross National Expenditure - 1975 Base Prices - 100 million Yen.
2. Oil consumption - million kl. oil product imports have been excluded but there is no evidence to suggest much change in the balance between crude and product imports. In 49 (1974) product imports in value term was equivalent to 7.0% of crude imports in 55 (1980) the figure was 9.6%.
3. Index: $GNE/_{\text{Imported Crude}}$ 1974 = 100.

FIGURE 2

U.K. GDP/Energy Ratios 1st Q 1974 = 100



Notes

1. GDP, 1975 Prices, Factor cost, seasonally adjusted
2. Energy Input, million TOE, Annual rates (divided by 4) seasonally adjusted and temperature corrected.

SOURCE: Economic Trends
C.S.O. Annual
Supplement 1982

and the product price to the final consumer. It is only in the last few years that governments in the consuming countries have switched to the view that the best way to encourage moves to conservation in the area of energy is by means of the price mechanism. After the 1973-74 crude price increases, governments tried to cushion the consumer against increased energy costs in the belief that the price elasticity of demand for oil products was close to zero and higher energy prices would merely aggravate inflationary problems. This cushion was provided by allowing the consumer government tax take on oil products to fall (16). This can be seen from Table 4 which shows that between 1973-77 consumer government tax take fell on average for the typical product barrel from 48 percent of the final price to 36 percent. However during 1977-78 and after, views altered probably as a by-product of the growing popularity of 'monetarist'* ideas with the result that governments began to increase their tax take on products.** This is quite clearly documented in the IEA Publication 'Energy Policies and Programmes of IEA Countries'. For example, Table 5 reproduces the recent list of tax changes from the 1981 publication. The consequence of this is that while the real price of crude will fall, the real price to the consumer will be maintained. This tendency will be strengthened as demands for balanced budgets in government gain ground and governments seek more sources of tax revenue.

The second reason why the paper asserts that the demand structure for energy will continue to change concerns the present recession. The recession will speed up the change by the following mechanism. During a recession the productive base is 'shaken out' - some might argue positively rattled to pieces in a UK context. This

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* Used as a political rather than an economic categorization.

** Let me here nail a popular economic fallacy. Increased tax takes by the producer governments represent value added (albeit because of an increase in the rent element) and therefore increase that country's GDP. Increased tax take by the consuming government is a transfer payment and therefore does not increase the GDP. The former therefore is a net benefit to the country while the latter is not unless one goes on to argue along the lines of the impact upon trade restriction.

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TABLE 4

Consumer Government Tax Take On A
Typical Barrel of Refined Oil (Western Europe)

PERCENT

	1973	1974	1975	1976	1977
Producer Government Income	19.0	46.8	41.0	43.4	44.3
Industry Costs [1]	32.7	18.4	20.6	20.9	19.7
Consumer Government Tax Take	48.3	34.8	38.4	35.7	36.0
Total	100.0	100.0	100.0	100.0	100.0
Average consumer Price ¢ per barrel	13.65	22.55	27.10	27.20	29.20

[1] Including oil industry integrated margin on a replacement cost basis

SOURCE: Shell Briefing Service. Oil in Perspective. October 1978.

TABLE 5

Recent Changes in Oil Product Taxation in IEA Countries

Country	Date	
Austria	January 1981	VAT increased from 8% to 13% for fuels and electricity.
	January 1981	Additional tax of 2.4% on oil and oil products.
Belgium	1 October 1980	VAT increased from 16% to 25% on gasoline/diesel oil. VAT increased from 6% to 16% on diesel oil, domestic & heavy fuel oil, natural gas.
Canada	28 October 1980	All sales of natural gas & LPG, including ethane, are subject to a tax of 30¢/Mcf beginning 1 Nov. & increasing in stages to 75¢/Mcf beginning 1.1.83.
	1 May 1981	A "Canadian ownership charge" of $1.15/bbl. on oil and 15¢/Mcf on gas processed or used domestically was imposed in connection with the takeover of Petrofina Canada by Petro-Canada.
Germany	1 April 1981	Increased taxes on motor gasoline by 0.07 DM/litre and on diesel oil by 0.04 DM/litre.
Ireland	27 February 1980	Taxes on motor gasoline, diesel oil & LPG used in road transport increased by 20p per gallon.
	28 January 1981	Taxes on motor gasoline and diesel oil increased by 15p per gallon & LPG by 10p per gallon.
Italy	3 July 1980	VAT on gasoline increased from 12% to 18%. Between July 1979 & April 1981, taxes on gasoline, including VAT, rose from 361 to 536 lire per litre & on heating oil from 52,000 to 71,800 lire per tonne.
Portugal	December 1980	Tax increase imposed, raising petroleum product prices by at least 11%
Sweden	10 October 1980	Gasoline from 109.2 (April 1978) to 139 öre per litre; heating oil from 60 to 107 kr per m^3.
	1 January 1981	Gasoline from 139 (October 1980) to 164 öre per litre; heating oil from 107 to 186 kr per m^3.
United Kingdom	March 1980	Increased excise duty on all products except burning oil.
	March 1981	Increased excise duty - 20p (including VAT) per gallon for gasoline & diesel fuel, raising prices to £1.54 and £1.65; vehicle excise duty increased about 15%, 10% wholesale tax on cars extended to motorcycles and mopeds.
	April 1981	Increased tax on diesel fuel cut back to 10p per gallon.

SOURCE: IEA : Energy Policies and Programmes of IEA Countries 1980 Review, Paris 1981.

involves a very high scrap rate on plant and equipment. Inevitably, the first equipment to go will be the oldest and therefore the highest energy using. When (and if!) the upturn comes and capacity becomes tight, new plant and equipment which is more energy efficient will be installed. However, this argument is by no means all in one direction since the same mechanism does not apply to consumer durables since the tendency would be in a recession to postpone the decision to scrap. Therefore, the stock of (relatively) non-energy efficient consumer durables will remain during the recession. But on the upturn then it is possible that the scrapping rate would be very high as elderly equipment, whose life has been 'unnaturally' prolonged, is replaced by the new energy efficient (relatively) durables.

The second sub-assumption behind the central demand side hypothesis concerns the recession. Clearly part of the decline in energy demand in recent years is the result of the recession which has overtaken the industrialized countries. When this recession ends the impact will be felt upon the demand for energy. In the view of this author, a significant upturn is unlikely before 1984-85. However, it is worth pointing out that when the upturn occurs is of relatively minor importance in terms of the argument since the central thesis is that most of the decline in oil demand is the result of non-recessional factors.

The third sub-assumption concerns energy and oil demand in third world countries. The paper assumes that oil demand from the Third World will continue to grow but fairly slowly. This is a complex area since there are various a priori arguments to suggest a slow growth and others to suggest a faster growth. Predictions of energy demand growth in LDC's have tended to be on the high side (17) mainly because they are based upon the assumption of growth with minimal changes to the GDP/energy ratios. A major problem here has been the way in which these ratios are measured. The common view has always been that GDP in the Third World is much less energy intensive than in developed countries. However, this view is based upon the

conventional measurement of these ratios which has been extremely misleading. The energy consumption has always been based upon consumption of commercial energy which ignores the enormous importance of non-commercial energy in the Third World, especially the use of wood. For example A.V. Desai in an article (18) indicates that firewood in India accounted for more than 35 percent of energy consumption in 1970. For Kenya in the same year the figure was 72 percent and for Colombia 36 percent.

Secondly, the GDP figures have been converted into dollars for comparison purposes at inappropriate exchange rates (19). When these factors are taken into account the LDC's appear to have more energy intensive GDP's than the developed countries. This suggests the opportunity for conservation is even greater. However, it also assumes a degree of institutional flexibility which is generally not present. In addition, the dependence upon firewood which is in the short-term rapidly depletable suggests even greater oil imports. To counter this tendency is the constraint of the balance of payments which for most of the countries is insurmountable (20). Thus the rate of growth of oil demand in the Third World must be rather uncertain. In any case it represents a relatively small part of the equation. In 1980 the non-industrialized countries accounted for some 20 percent of oil demand (21).

A subset of the Third World which may see very rapid expansion in oil demand is the oil producers themselves whose consumption has accelerated during the 1970's (22). However, two factors suggest that this growth will not continue. First much greater attention is being paid to domestic energy pricing as a means of slowing demand growth since most of the oil producers have been pricing well below world prices (23). Secondly, much of the industrial development which was expected to use large amounts of energy has either been postponed or at least is delayed for various reasons (24).

The final sub-assumption concerns the role of the communist bloc countries in the world trading equation. This is a highly contentious area in which views vary widely. A survey of energy

forecasts since 1973 (25) provides an arithmetic mean of 0.2 million b.d. imports by the communist bloc during the decade of the 1980's. However, since this figure has a standard deviation of 140 its meaning is of limited value. The safest assumption seems to be that the communist bloc will have a neutral impact on the world equation.

On the basis of the supply and demand side assumptions outlined, the paper therefore argues that at a conservative estimate world oil prices in money terms will stay constant throughout the eighties, and there may well be a fall. However, whichever view is taken, with continued inflation real oil prices will fall. The next stage in the argument is to examine the impact of this upon the economies of the Arab oil exporters.

II. THE IMPACT OF A FALLING REAL OIL PRICE ON THE ARAB WORLD

The central role of oil revenues to the Arab Oil Producers needs very little elaboration (26). In terms of percentage contributions to both export revenues and government expenditures the figures in most cases are very high indeed.

To examine the impact of falling oil prices it is necessary to start with some projection of certain key macro economic variables for the Arab countries and then plug in a constant money oil price. To do this the paper draws heavily upon the Interdependence Study prepared by ENI and presented in April 1981 (27). The first point that must be stressed here and borne in mind throughout this section of the paper is that these projections should be treated as orders of magnitude rather than as specific, real figures. The ENI study is based upon dubious data* and upon assumptions which - like any assumptions - are arguable. In addition a fairly sophisticated interactive model is taken and one of the key assumptions (i.e. oil price) is changed while the rest of the results remain. Nevertheless, for reasons to be elaborated below, the exercise is still meaningful providing the warning about dealing in terms of orders of magnitude is remembered.

*This is in no way intended to reflect upon ENI but rather the generally poor state of statistics from most Third World countries.

For this reason in the paper only the graphs are shown rather than the detailed figures.

The ENI model gives projections up to 1990 for certain key macro economic variables in the OAPEC* countries within the framework of two scenarios. The 'high' scenario is based upon co-operation between the OAPEC and OECD countries. The 'low' scenario is based upon a situation of non-co-operation in other words a continuation of the status quo. For the projections used here I have concentrated upon the low scenario as being - regrettably - the more realistic one.

The 'low' case assumptions are as outlined in Table 6. What this paper does is to take the subsequent projections for Government Consumption Expenditure and Imports less non-oil exports and to use a constant money price of oil starting in 1980. This butchery of the model requires some justification, since to change a key assumption in an interdependent model would lead to changes in the other variables.

The two variables chosen, government consumption expenditure and imports have been chosen in order to derive the implications for the government's budget deficit and the balance of payments implications both of which will best illustrate the tensions to be discussed later. Although both of these are determined within the ENI model they are determined more by expectations than by macroeconomic variables. Thus in some sense they could be regarded as exogenous to the model rather than endogenous. In addition these expectations have been continually revised upwards. Most recently this followed the rise in oil prices during 1979 as a result of which government expenditure plans increased, an increase which is not accounted for in the model. For example, the Saudi Arabian budget allocations for 1980-81 were 53 percent up on the previous year. For Kuwait the increase was 43 percent and for the UAE 64 percent (28). More recently Algeria announced that government expenditure in 1982 would be 25 percent greater than in 1981.(29) Thus once these expectations have been set, it

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* Organisation of Arab Petroleum Exporting Countries.

TABLE 6

ENI The Interdependence Model

LOW CASE - Assumptions for 1990 Forecast

OIL SUPPLY (OAPEC)	ANNUAL GROWTH RATES
Export volumes	- 0.24%
Oil price (money value)	+12.7%
i.e. 1980 $31.2 p.b.	1990 $103.5 p.b.
ECONOMIC INDICATORS	
OAPEC	
Non-oil GDP	+ 6.5%
Import prices	+ 9.0%
Domestic inflation	+11.2%
Consumption	+ 7.4%
OECD	
GDP	+ 2.3%

would be very difficult for any government in the Arab world to fail to meet these expectations. Therefore the revised estimates from the model as a result of the endogeneity of government consumption and imports would not be relevant. This is why the exercise is one of 'orders of magnitude' projections rather than 'figures'.

A further comment is required on the assumptions about government budget deficits/surpluses and balance of payments deficits/ surpluses. The projections for government investment expenditure have been ignored. This is because while the model projects gross fixed capital formation (GFCF), it does not distinguish between investment from government and the private sector. In reality, for many of the oil exporters,a very large percentage of GFCF derives directly from government and thus the public GFCF figures are large. For example, the study gives 1980 government consumption expenditure for Algeria and Iraq as $15.4 billion while total GFCF is set at $30.7 billion. Therefore the government deficits implied in the figures below probably grossly understate the size of the deficit because government expenditure is grossly understated. This may be partly offset by the fact that it has been assumed that oil revenues form the only source of government income which means revenues are understated but for most of the countries not by a great deal.

As for the import figures, these of course reflect the figures for GFCF. If governments reduce investment as they can do without harming expectations too badly, then clearly imports would also be reduced and therefore the implied balance of payments deficits may be over-stated. Also the trade figures ignore financial flows within the auspices of the balance of payments but this will be examined later.

Finally, the constant money price of oil is based upon the 1980 price of $31.2 per barrel whereas by late 1981 oil prices had risen to $34 which means the revenue line would be slightly higher. However this is probably offset in all cases except Saudi Arabia by virtue of the fact that export volumes are very

much lower than anticipated in the ENI report.

The results are shown in Figures 3, 4 and 5. The country groupings are based upon the ENI study, although it is possible (as in Figure 5) to look at individual countries if 1977 is taken as the starting point rather than 1980. The actual forecasts are for 1985 and 1990 and therefore the joining of the points is for diagramatic effect although given the assumptions underlying the model the projections would be essentially linear.

Figure 3 shows the picture for Iraq* and Algeria. This suggests, bearing in mind the extensive qualifications listed earlier, that the two countries would run into balance of payments problems 1980-81 and government financing problems by 1984-85. Figure 4 shows a similar picture for Libya, UAE, Qatar and Bahrain where both problems emerge around 1985-86. Figure 5 looks at one country only - Libya - starting the projections in 1977 and illustrates problems emerging during 1983-84. Interestingly enough, early in 1982, Libya announced a 5 percent cut in the 1982 development budget (30). Thus the overall conclusion would be that these oil producers will face financial stringency in the near future which will force them to disappoint domestic expectations with respect to various items of government expenditure which are classed under consumption - for example, price subsidies on food, etc., health and education expenditure and so on.

Apart from the qualifications already mentioned about these projections, there has been so far an important omission, namely the net foreign assets held by the oil producers. How far will these cushion the impact outlined above? For Saudi Arabia** and Kuwait they certainly will provide a cushion which is why they have been omitted from the projections. For the others we first have to make some assessment of the size of these assets. As

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* Now, of course, outdated by the war.

** Saudi Arabia would also be cushioned by the very large current account surplus at present enjoyed.

FIGURE 3

Algeria and Iraq

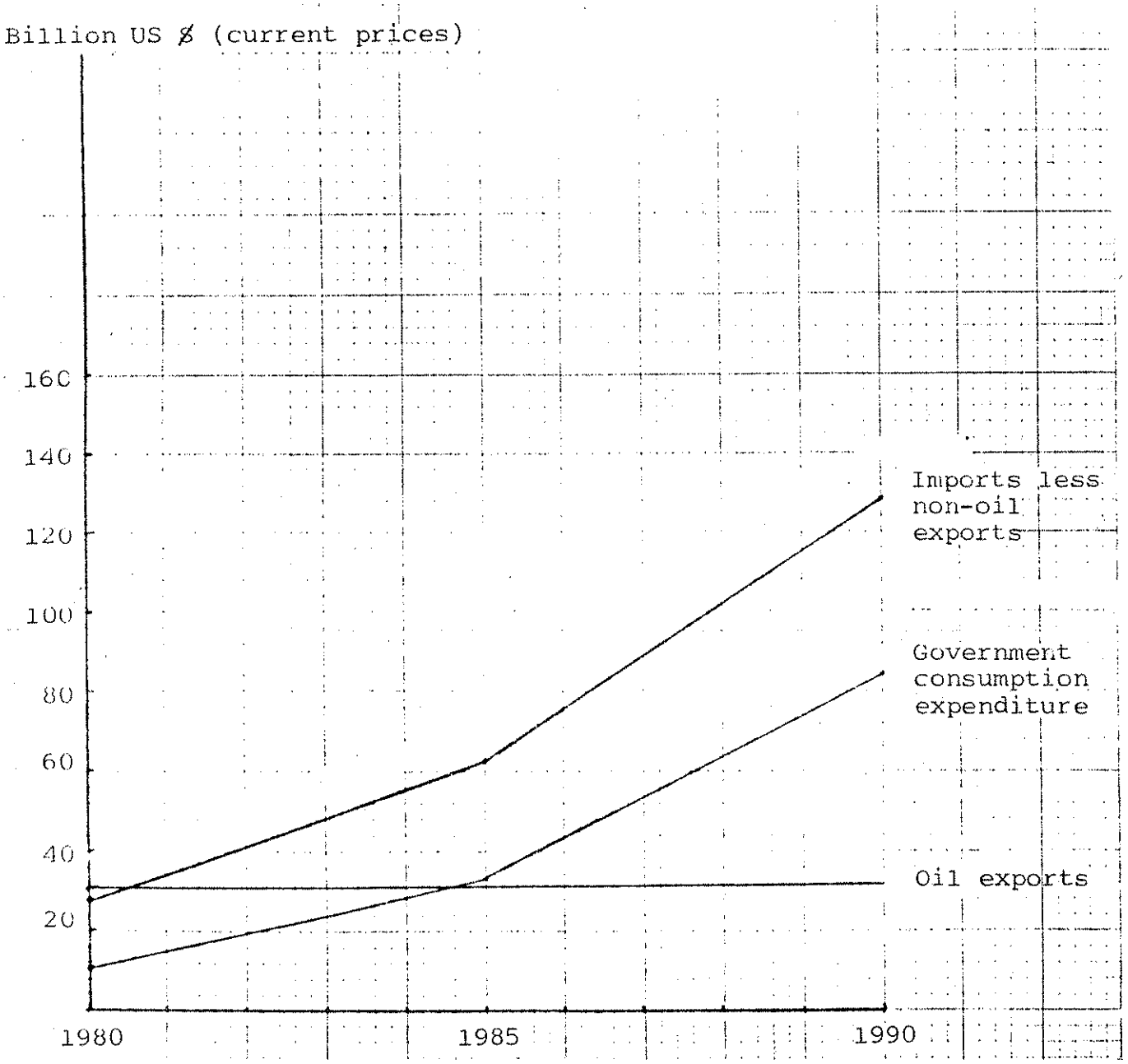


FIGURE 4

Libya, UAE, Qatar, Bahrain

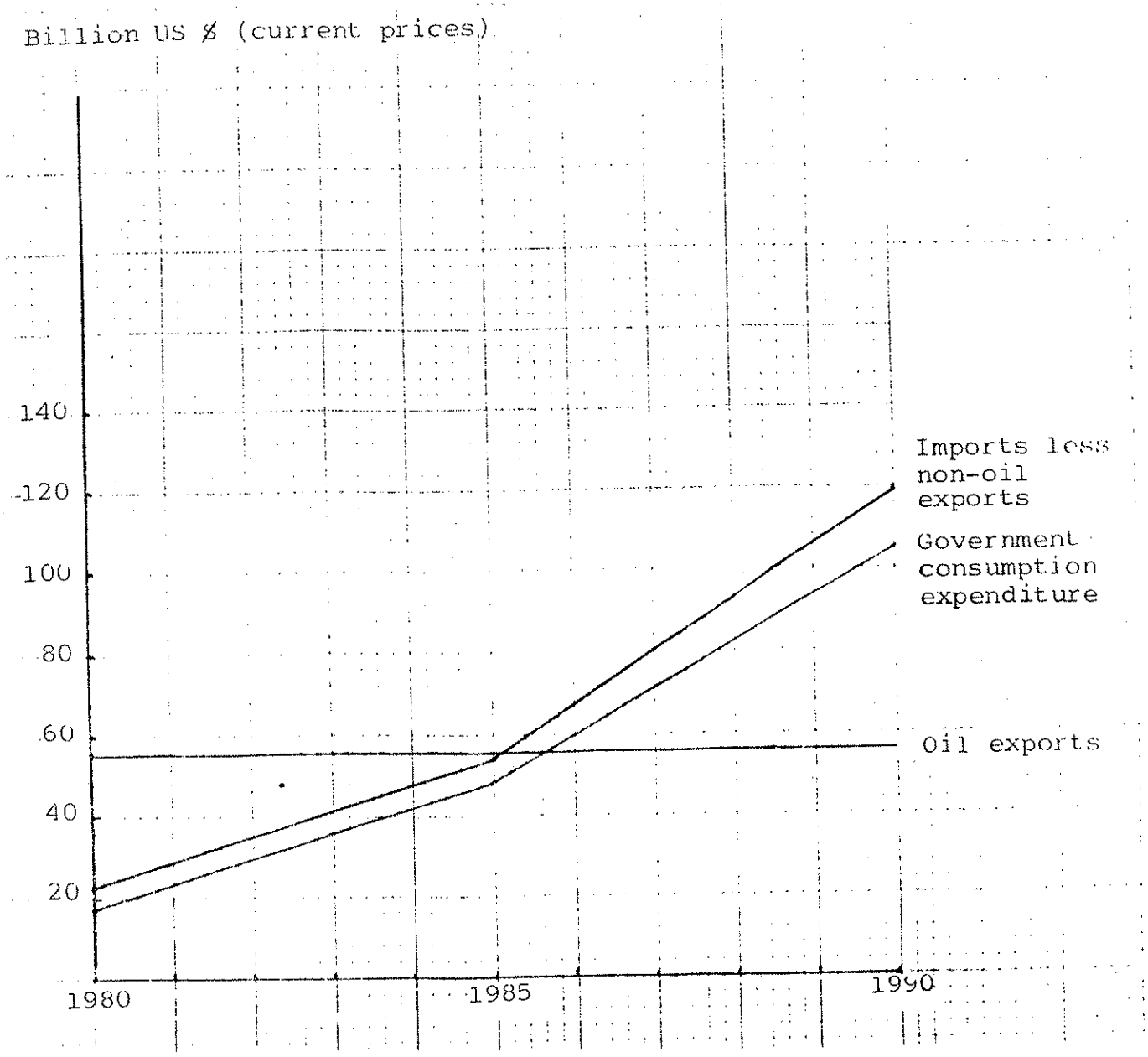
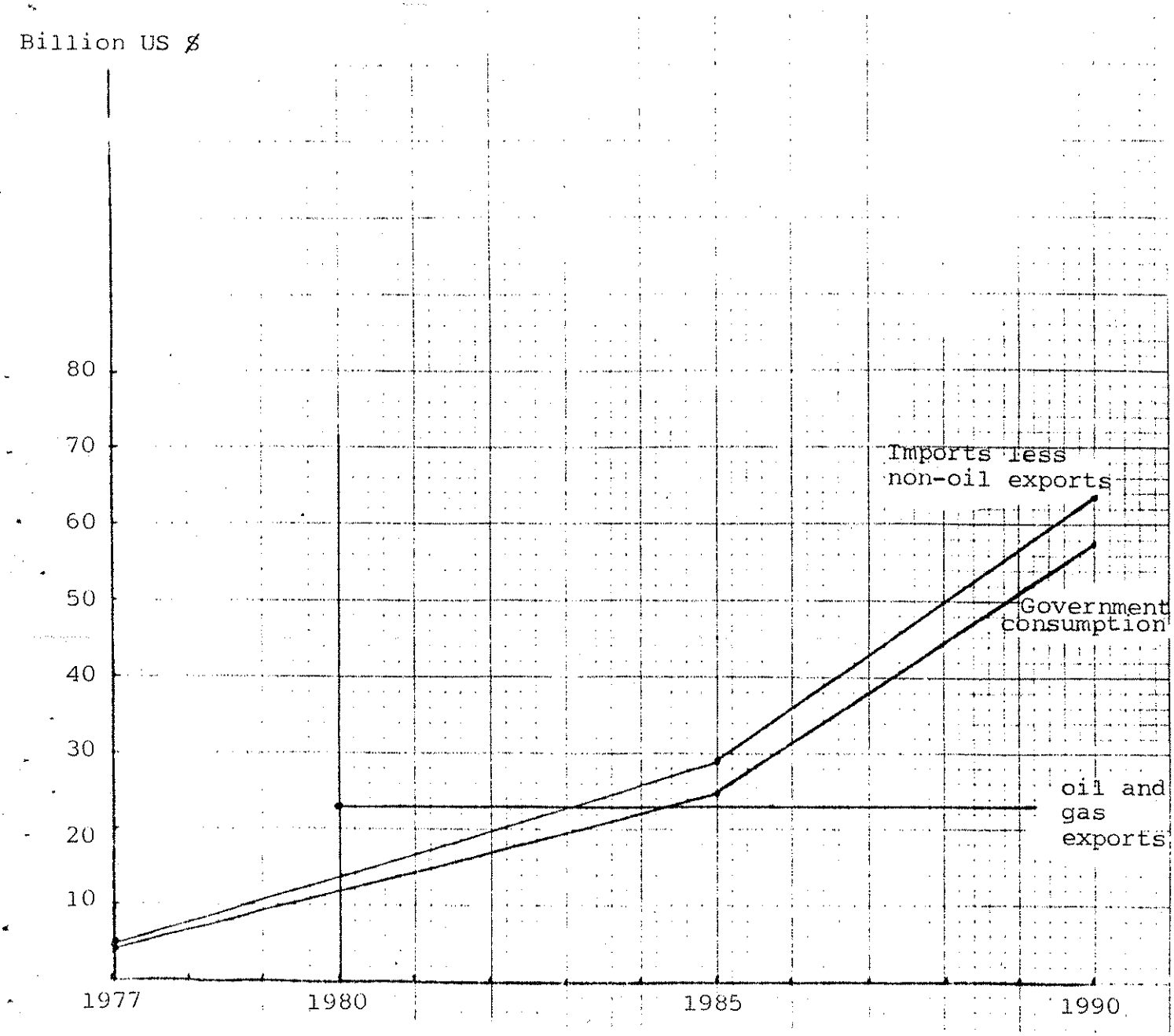


FIGURE 5

Libya



anyone who has attempted to carry out work in this area knows it is a positive nightmare of confusion and inadequate data. However, some guess must be made and for this reason the estimates of Dr. Aburdene have been used. They are produced in Table 7.

With this as a starting point one could then go on to discuss the extent to which these have been added to (e.g. current account surpluses during 1980) or subtracted from (e.g. Iraq's reserves must have fallen as a result of wartime factors). Nevertheless, it is clear that they would only postpone the problems for a year or so assuming they were run down close to zero. Of the reserves about half are in a form which could be used fairly immediately, the remainder exhibit various degrees of illiquidity (31).

Thus the conclusion of this part of the paper is that apart from Saudi Arabia and Kuwait, the governments of the other Arab oil producers will find themselves in increasingly difficult situations. Any attempt by them to cut crude prices in the hope of a supply response impact on revenues will merely aggravate the situation. In this context their wrath will fall upon Saudi Arabia as the following exposition outlines. Once again the emphasis is on orders of magnitude rather than specific figures.

IEA estimates put world* oil consumption in 1981 at 45 million b.d. of which the OECD countries accounted for some 36 million. Of this non-OPEC oil production accounted for 21 million b.d. which left OPEC producing 24 million b.d. out of a sustainable capacity of 34 million b.d. If it is assumed that Saudi Arabia continues to produce at a level of 8 million b.d. this leaves the rest of OPEC producing 16 million b.d. Therefore to push up the price, OPEC without Saudi Arabia would have to produce at less than this say 15 million b.d. This implies OPEC producing at around 63 percent of capacity.** However, this is not the

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* Excluding communist bloc countries.

** This is over-stated while the Iraq-Iran war continues.

TABLE 7

Estimates of Total Foreign Assets - end 1979 (billion $)

Saudi Arabia	75.0
Kuwait	40.0
Iraq	17.5
UAE	12.7
Libya	6.3
Qatar	4.3

SOURCE: Dr. Aburdene - reported in MEES XXIII 20, 28 April 1980.

end of the story. As argued earlier, Saudi Arabia would resist any such efforts to push up the price of crude and could therefore be expected to increase its output to the maximum to offset this move. Maximum production is a matter of some debate. There is some evidence to suggest that productive capacity is of the order of 14.5 million b.d. (32) but statements by both Dr. Taher (33) and Sheik Yamani (34) suggest that this is an overstatement. Taking 11 million b.d. as a conservative estimate this means that OPEC without Saudi Arabia would have to produce at 12 million b.d. i.e. 50 percent of capacity. Even if Iran and Iraq's capacity (8 million b.d.) is removed from the equation together with an assumed present joint production of 1.7 million b.d. this would still leave the rest of OPEC producing at about 65 percent of capacity. Given the obvious preference of the OECD countries to avoid what they see as politically unstable oil sources, this low capacity would fall far harder on the Arab producers than the others. Clearly in a situation where governments were desperate for revenues such a situation is untenable.

However, if Saudi Arabia were to change its view and produce at say 4 million b.d. in an effort to increase the oil price then this would leave the rest of OPEC producing at around 85 percent of capacity in a situation of rising prices. Therefore, in such a situation the solution for the Arab oil producers lies in changing the attitude of the government in Saudi Arabia which in turn implies changing the government. Part III of the paper examines the stability of the present government in Saudi Arabia.

III. THE STABILITY OF SAUDI ARABIA

Since the creation of the Kingdom, the government has been remarkably stable in the context of the area (35). There have, of course, been problems of one sort or another, but these have either been coped with or controlled. The question then arises as to whether there is anything new to the situation which suggests that this relative stability will be threatened? The answer to this question lies in recent developments affecting

the nature and equipping of the Saudi armed forces. A great deal has been written and discussed on the role of the military in Arab politics (36). From this the following generalization can be drawn. As weapons technology began to become more sophisticated - a process which began in the 1920's and 1930's - obtaining modern weapons required educated army officers. Therefore armed force modernisation proceeded alongside such education. The tendency was for these officers, as a consequence of that education, to become dissatisfied with the existing status quo and at the same time have the means at their disposal i.e. force, to bring about a change in that status quo. Hence what might be crudely termed the 'colonel syndrome'.

In Saudi Arabia, the modernisation of the armed forces began in 1964 with the accession of King Faisal (37). However, most of this modernisation was confined to the airforce. As has been well documented, there has been constant problems with the Saudi Airforce of a political nature resulting on occasions in complete grounding coupled with changes in the officer corps. For technical reasons, an airforce alone cannot carry out a coup d'etat (38) and this is aggravated in a large country like Saudi Arabia where the three power centres (Riyadh, Jeddah and Dhahran) are so far apart. However, the crucial point is that until recently Saudi Arabia has had virtually no armour and without tanks any coup attempt would be bound to fail. However, since the mid-seventies, Saudi Arabia has been acquiring armour at a rapid pace. The figures are shown in Table 8. Indeed, it was not until 1973-74 that the armed forces had an armoured brigade (39) yet by 1980 there were two armoured brigades and two mechanised divisions. This is certainly a new element in the situation.*

Fred Halliday in his book 'Arabia without Sultans' suggested that the probability of a coup in Saudi Arabia was unlikely pointing

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* This discussion omits any analysis of the implications of the structure of the Saudi Armed Forces given the division between the army and the national guard. This omission is because it is not a new element in the situation.

TABLE 8

Armour in Saudi Arabia

Tonnage Gun / Year Type Country of origin	1979-80	1979-78	1978-77	1976-77	1975-76	1974-75	1973-74	1970-71
36 105 mm 1967 AMX-30 France	480+	250	400	300	150	30	-	-
48 105 mm 1960 M-60 USA	150	75	75	-	-	-	-	-
25.4 76 mm 1951 M-41 USA	?	?	60	60	60	60	60	35
44 90 mm 1951 M-47 USA	?	?	?	?	25	25	25	55
* AML 69/90	250	200	?	?	200	200	?	200
14 20 mm * 1973 AMX-10P France	250	300	?	-	-	-	-	-

* Indicates armoured car rather than main battle tank

\+ Further 170 on order

? Indicates not mentioned in that years 'military balance'.

SOURCE: The Military Balance 155. Relevant years.

out that the ruling group was different from those in Egypt in 1952, Iraq in 1958 and Libya in 1969 since they were 'far more diverse, better organised and far richer' (40). While this is perfectly true it does not rule out a change of power within the House of Saud towards those (of whom there are many) who would wish to see present Saudi oil policy drastically changed towards much lower production levels. However, this indication of chaos in Saudi Arabia may well be the over-statement about which the reader was warned in the introduction.

CONCLUSION

The main conclusion which can be drawn from the above analysis is that the oil market in the 1980's will be a very different place from the 1970's. This view is reinforced when changes in the structure of the international oil industry are also taken into account (41). The main change will be a decline in price which will set up severe tensions in the Middle East which may well lead in turn to a major supply disruption which would cause another major step jump in oil price.

If the analysis is accepted as a possibility then it is logical to ask if action can be taken to forestall the problem. The only possible avoiding action would be for the Arab oil producers to consider their expenditures now. If financial cutbacks begin now in a relatively orderly fashion then perhaps many of the problems can be averted. If the warning signs are ignored then the financial problems will occur suddenly and the fall in expenditure will be equally sudden. It is this 'suddeness' which will create the tensions. In 1970, President Ghaddafi of Libya was reputed to have said in the context of government-company negotiations "The Libyan people who have lived for five thousand years without petroleum are able to live without it" (42). While that was probably true in many producing countries in 1970 it is almost certainly no longer true in 1982.

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