THE EFFECTS OF THE RECENT INCREASES IN OIL PRICES ON DEVELOPING COUNTRIES

The Experiences of
India, Pakistan and Kenya

by

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Thesis
Submitted for the Degree of M. Litt.
at the
University of Glasgow

Research Conducted in the
Department of International Economic Studies
Faculty of Social Sciences

September 1979

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

I owe a special debt to my supervisors, Mr. George C. Abbott and Dr. Max G. Mueller, who have guided me throughout the course of this research. Their constant encouragement and constructive suggestions have been invaluable in the completion of this work. I am thankful to Professor Alec Nove for allowing me to undertake this work in his department.

In the course of my research, I have received cooperation from a number of people. My thanks to all of them, in particular Dr. Joe Latham for the interest he has shown in my research and for his help on the computing aspects. I am also grateful to Mr. Mark Partridge, Mr. Gus O'Donnell and Mrs. Margaret Giles for their help on the quantitative aspects. I would also like to express my gratitude to Mr. Emil Rado, the Adviser to Graduate Students in Social Sciences, for his help and cooperation.

I would like to acknowledge the kind assistance given to me by the staff of various libraries, particularly the Adam Smith Library, the library of Glasgow University and the British Library of Political and Economic Sciences.

For financial support, I am grateful to the Egyptian Government and, in this connection, the cooperation from the Egyptian Education Bureau deserves special mention.

Finally, I wish to thank Miss Margaret Mahon for correcting language mistakes. The speedy and efficient typing assistance received from Mrs. Pauline Connelly and Mrs. A.M. Baran is acknowledged with thanks.

LIST OF TABLES

LIST OF FIGURES

SUMMARY

This study deals with the impact of the four-fold increase of world oil prices during 1973/74 on the developing countries, taking the developments in India, Pakistan and Kenya in 1974 and 1975 as examples. A review of the literature partaining to the relationship between oil consumption and economic development supports the hypotheses that (1) with rapid economic growth, involving structural changes in the economy, oil consumption tends to grow faster than aggregate output, and (2) oil demand is determined more by the level of economic activity than by changes in the price of oil. Furthermore, the large sudden rise in the cost of oil was superimposed on an already existing balance of payments deficit in India, Pakistan and Kenya, whose export potential was further detrimentally affected by the severe world recession during 1974/75. The relevant data for this study were obtained primarily from official sources and publications of international institutions.

For each of the three countries, the pattern and trends of consumption and imports of oil as well as other sources of energy are analysed by means of ratio, correlation and regression analyses. The effects on the terms of trade, income transfer, and external balances are assessed, and the oil-induced changes in economic activity in the rest of the world are examined in relation to their effects on the growth and variability of the export potential of these countries, and the consequences on their foreign exchange reserves.

The significance of oil in total energy consumption varies among the three countries, reflecting the general situation in other low-income

developing countries. In India, a coal-orientated economy, it amounted to 25 per cent in 1973, whereas in Pakistan it was 42 per cent; only in Kenya was it predominant, at 92 per cent of total energy consumption. While Kenya has to import all of her oil, the imports of crude and refined oil into Pakistan and India accounted for 91 and 71 per cent, respectively, of their consumption in 1973, reflecting the general, heavy reliance on oil imports of the low-income countries.

During 1973-1975, while the absolute amount of energy consumption increased in all the three countries, the share of oil in the total declined to about 23 per cent in India and 40 per cent in Pakistan, counter-balanced by a rise of indigenous non-oil fuels, whereas in Kenya the share of oil actually increased to 93 per cent due to absolute decline in imported coal.

The effects of the rise in oil prices on the terms of trade, oil costs and income transfers were substantial. Deterioration of the commodity terms of trade was sharp, declining during 1973-75 from 107 to 70 for India, from 108 to 73 for Pakistan, and from 86 to 72 for Kenya (with 1970 = 100). By 1975, the increase in net oil import bills had risen three and a half times for India, four times for Pakistan and four and a quarter times for Kenya. The resulting income transfer pre-empted a large proportion of the realised growth, especially in the case of Kenya.

The deterioration in the current account of the balance of payments and the widening of the foreign exchange gap were larger than can be attributed solely to the rise of the price of oil,

because changes in import control policies and non-oil deficits also played a crucial role. Market share analysis shows that decreases in export earnings, caused by the oil-related recession in the OECD market, affected Pakistan and Kenya more severely than India. To some extent, these adverse affects were mitigated, except in the case of Kenya, through additional access to the OPEC market whose demand for imports was greatly boosted by the sudden and large increases of oil revenue.

Although the post-1973 events in India, Pakistan and Kenya were different in some important respects, they do suggest that these three countries, and the low-income countries as a whole, had very limited manoeuvrability in the face of the oil crisis, because of their need to secure their minimum oil requirements on the one hand, and the underlying vulnerability of their external balances on the other.

CHAPTER I

INTRODUCTION

The radical changes in the world oil market in the last quarter of 1973 had introduced changes in the world economy as a whole. The unilateral decision of the oil-exporting countries to raise the posted prices of crude petroleum to four-fold the levels which prevailed before October 1973 entailed transfers of incomes on the current accounts of the balance of payments from the oil-importing countries to the members of OPEC (the Organisation of the Petroleum Exporting Countries). The effects on the industrial countries did not become intolerable burdens as their strength and resilience made it possible for their economies to adjust and absorb the effects of the immediate shock. Moreover, they could mitigate the effects of the rise in oil prices within the framework of the economic and financial co-operation and co-ordination, on the one hand among themselves and, on the other hand, with OPEC.(1)

As far as developing countries were concerned, although the oil price increases hit their economies harder than the developed countries, the poorest among them received special attention from national and international institutions as well as from the economists concerned with economic development in the Third World. There was a widespread consensus that the low-income group with per capita income of less than $200 per annum were hit harder by the oil price increases than any group among the oil-importing developing countries.

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(1) See J. Tumlir, "Oil Payments and Oil Debt and the Problem of Adjustments", in T.M. Rybczynski (ed.), The Economics of Oil Crisis, Trade Policy Research Center, London, 1976, pp. 39-61; K. Farmanfarmaian, A. Gutowski and S. Okita et al., "How Can the World Afford OPEC Oil?". Foreign Affairs, Vol. 53, No. 2 (January 1975), pp. 201-22; G.A. Pollack, "Are the Oil Payments Deficits Manageable?", Essays on International Finance, No. 111, Princeton University, Princeton N.J., 1975.

1. The Situation in the Low-Income Developing Countries

With the advent of the oil crisis, several studies were initiated by various national and international bodies to assess the impact on developing countries of the developments in oil and commodity prices in order to provide urgent relief for the most seriously affected countries. Accordingly, affected countries were listed on the basis of various criteria which were traditionally used as indicators of the stage of economic development and income levels, the performance of the export sector, the level and burden of international indebtedness, the dependence on concessional capital inflows, foreign exchange reserves, the position of the overall balance of payments and the estimated additional costs of oil imports.

According to the "Special Programme" incorporated into the "Programme of Action on the Establishment of a New International Economic Order" to study the problem of raw materials and development, the Secretary General of the United Nations identified in August 1974 thirty two countries as the most seriously affected. These included twenty six low income countries with per capita income, $200 or less. What is more, from another nine countries which were added in April 1975, seven were considered very poor.(1)

Considering the countries in urgent need of concessional aid among developing countries whose extra oil bills exceeded $1 million in 1974, the Ministry of Overseas Development in U.K.(2) concluded that "most countries on the United Nations original list of twenty five least developed countries were certain to be included in any internationally

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(1) M.J. Williams, Development Co-operation - Efforts and Policies of the Members of the Development Assistance Committee (DAC), 1974 Review, OECD, Paris, 1975, pp. 57.

(2) Memorandum submitted on behalf of the Ministry of Overseas Development: "The Impact of Oil Price Rise on Developing Countries and the Implications for British Overseas Development Policy", in British Government, The Oil crisis and Third World Development: Implications for United Kingdom policy, Report from the Select Committee on Overseas Development, Vol. I, Session 1974, H.M.S.O., London, 1974, pp. 1-8.

agreed list of the most seriously affected among the oil-importing developing countries." The Table of Countries submitted by the Ministry to the U.K."Parliamentary Select Committee on Overseas Aid and Development" was used by R. Jolly(1) who detected twenty one countries as the (MSA) by using, inter alia, the gains from trade as a decisive criterion. He found that at least fourteen countries from this table were considered very poor according to the 1973 World Bank's Country Classification.(2)

Finally, F. Ellis(3) ranked the developing countries according to a rough assessment of the extent to which they were affected by the events in oil and commodity markets by using, inter alia, the additional oil costs, as a proportion of total import bills, as the most important index. He found that among the eighteen countries in urgent need for special assistance, there were thirteen countries which came from the low-income group.(4)

As a result, the above-mentioned studies identified those countries seriously affected by oil crisis not only on the basis of the additional oil costs but also according to their capacity to meet such bills; a matter which depended on their income levels and gains from trade. Thus, R. Jolly defined the MSAs as follows:

> "Oil importers hardest hit are the countries of middle and lower per capita income without major offsetting trade gains or military assistance" (5)

However, this does not mean that oil prices are responsible for the poverty of the low income groups. The cheap oil in the past has not achieved considerable economic growth nor has the new expensive oil today

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(1) See R. Jolly, "Assessing the Economic Impact on Developing Countries and Some Policy Suggestions", in F.Ellis (ed.), Oil and Development, Institute of Development Studies Bulletin, Vol. 6, No. 2, University of Sussex, Brighton, October 1974, pp. 97-108.
(2) Ibid, Table 2, p. 101.
(3) See F. Ellis, "Statistical Background", in F. Ellis (ed.), Oil and Development, Institute of Development Studies Bulletin, Vol. 6, No. 2, University of Sussex, Brighton, October 1974, pp. 16-45.
(4) Ibid, pp. 39-40.
(5) Jolly, op.cit., p. 99.

considered the only barrier which would hinder the economic development of these countries. They are neither major consumers of energy nor large importers of oil. These countries are simply very poor so that their fragile economic structures are vulnerable to any external shock. According to the World Bank Report(1), the low-income group consisted of 34 countries whose per capita GNP was $250 or less in 1976 dollar. Their population in 1976 amounted to 1.2 billions which accounted for 58 per cent of the Third World population (the population of low and middle income group) and 30 per cent of the world population. In the same year, their GNP in market prices amounted to $145 billions which accounted for 14 per cent of Third World's GNP and 2 per cent of the World GNP.(2) Their low income per capita and narrow economic base were the results of a long-term sluggish economic growth combined with relatively rapid growth rates of population. During 1960-70, the growth rate of GDP amounted to 3.6 per cent per annum, slowing down to 2.9 per cent per annum during 1970-76, whereas GDP of the middle-income group grew by 5.7 and 6.0 per cent per annum during these two periods.(3) The average annual growth of GNP per capita of the low-income group amounted to only 0.9 per cent while that of the middle-income group amounted to 2.8 per cent.(4) According to DAC Review, one-half of these countries recorded growth rates of GNP per capita during 1960-72, of less than 1 per cent per annum or even negative; about one-third recorded growth rates between 1 and 3 per cent per annum; while only one-seventh recorded growth rates at 3-4 per cent per annum.(5)

The long-term low growth rates of income have been associated with a tendency towards low saving rates which are holding down their capacity to make productive investments and hindering further, in turn, the growth

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(1) The World Bank, World Bank Report, 1978, The World Bank, Washington, D.C., 1978, Annex.
(2) Calculated from World Bank, 1978 World Bank Atlas, The World Bank, Washington, D.C., 1978.
(3) The World Bank, World Bank Report, 1978, op. cit. Table 2, pp. 78-9.
(4) Ibid, Table 1, pp. 76-7.
(5) M.J. Williams, Development Co-operation - Efforts and Policies of the members of the Development Assistance Committee (DAC), 1975 Review, OECD, Paris, 1976, Table III-1, p.53.

of income. In 1975, both gross domestic savings and investments accounted for 15.6 and 19.1 per cent of GDP, respectively, compared with 22.1 and 26.4 per cent in the case of middle-income group.(1) Moreover, it was found that in 1972 one-half of the low-income countries had saving ratios of less than 10 per cent of GNP and about four-fifths could only save 10-15 per cent of GNPs.(2) The President of the World Bank drew a picture of the general situation of the economies of low-income developing countries in his 1975 "Address to the Board of Governors"(3) when he pointed out that GDP per capita was expected to grow at 1.2 per cent per annum during 1976-80, on the basis of optimistic assumptions about capital inflow to the low-income group from all sources", a growth rate which was still less than one-half GDP per capita growth rate in the middle-income group.

In general, the low-income group is characterised by a low level of industrialisation, labour productivity and literacy; scarcity of skilled manpower, an underdeveloped infrastructure, predominance of subsistence of production and dependence on a very narrow range of primary commodities. In 1976, while agriculture accounted for 45 per cent of GDP, industry only represented 19 per cent, compared with 21 and 32 per cent respectively in the middle-income group.(4)

Moreover, export sectors have failed to serve as an engine of growth. The average annual growth rate of exports, which amounted to 3.6 per cent during 1960-70, declined to -0.4 per cent during 1970-76, compared with 5.2 and 3.8 per cent respectively, in the case of the middle income group.(5)

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(1) The World Bank, World Bank Report, 1978, op. cit., Table 8, p. 6.
(2) Williams, 1975 Review, op.cit., Table III-2, p. 53.
(3) R. MacNamara, Address to the Board of Governors, The World Bank, Washington, D.C., September 1st, 1975, Table 1, p. 5.
(4) World Bank, World Bank Report, 1978, op.cit., Annex, Table 3, pp. 80-1.
(5) Ibid, annex, Table 6, pp. 86-7.

Moreover, 94 per cent of low-income group's export earnings in 1975 came from primary commodities and 6 per cent from manufactures, compared with 82 and 17 per cent, respectively, in the middle-income countries.(1) Furthermore, terms of trade declined by 0.2 per cent per annum during 1960-75, compared with increases of 1.9 per cent in the terms of trade of the middle-income group.(2)

Despite their low levels of energy consumption, which are associated with low levels of income, the energy consumption of the low-income group has grown very fast, even faster than national output; a phenomenon which characterises developing countries which are proceeding along the path of economic development.(3) During the period 1960-70, while GNP of the low income countries ($100-$200 per capita) was growing at 5.2 per cent per annum, energy consumption grew at 8.0 per cent per annum. In the case of the high income countries, the growth of GNP had paralleled the growth of energy consumption during the same period.(4) H. Richardson pointed out that U.S. and Europe will experience deceleration in their energy consumption during the next decade, while the poor countries will accelerate their growth rates of energy consumption.(5) Therefore, to the extent that the poor countries depend on petroleum to generate national output, they would face the dilemma of securing the minimum requirements of oil imports and the capacity to pay for them.

It can be concluded from the above-mentioned discussions that the low-income countries had not achieved a high economic growth mainly for structural reasons. Consequently, oil price increases would merely be

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(1) Ibid, Annex, Table 7, pp. 8-9
(2) Ibid, Table 16, p. 10.
(3) For detailed discussion of the consumption of oil in developing countries, see M. Tanzer, The Political Economy of International Oil Industry and the Underdeveloped Countries, Temple Smith, London 1970, Chapter 9. This point will be discussed in Chapter III.
(4) T. Kristensen, Development in Rich and Poor Countries: A General Theory with Statistical Analysis, Praeger, New York, 1974, Table 5-12, p. 60.
(5) H.W. Richardson, Economic Aspects of the Energy Crisis, D.C. Heath & Co., New York, 1973, p. 12.

an additional element to their long-term internal and external disequilibrium, rather than a primary cause.

2. The Effects of Oil Price Increases - An Outline

The effects on the availability of foreign exchange have been considered to be crucial for any assessment of the consequences of oil price increases on the economies of the poor countries. Such consequences are basically derived from the impact of oil crisis on the important items of the balance of payments. This approach is based on the very widely held view that the critical bottleneck restricting the capacity of developing countries to import, invest and to generate economic growth is the shortage of foreign exchange. The intellectual roots of the "foreign exchange constraint" doctrine stem from the experiences of most developing countries and the focus of development circles.(1)

The key effect of the rise in oil prices is the new oil-related deficit on the current account of the balance of payments which is primarily attributed to the additional costs of oil imports. It seems that the term "oil-deficit" is used broadly to describe the deficit on the current accounts of the oil-importing countries, as a group, with the OPEC countries. In his model for allocating the current account deficits among OECD countries, John Williamson defined oil deficits, algebraically, as the differences between changes in oil imports into OECD and the changes in their exports to OPEC.(2) On the other hand, additional costs of oil imports of an individual oil-importing country can be considered as its oil-deficit before making any allowance for the increases in its export to

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(1) See H. Chenery and A. Strout, "Foreign Assistance and Economic Development", American Economic Review, Vol. 56, No. 4 (September 1966), pp. 679-733.

(2) J. Williamson, "The International Financial System", in E.R. Fried and C.L. Schultze (eds.), Higher Oil Prices and the World Economy - The Adjustment Problem, Brookings Institutions, Washington, D.C., 1975, p.212.

OPEC countries. Sperry Lee[1] defined the incremental oil deficit for a country as "that component of its present current account deficit attributable to the sudden oil price increases of 1973/1974". The effect of such deficit on the balance of payments is described by Crockett[2] and Ripley as the "oil impact effect", by Corden[3] as the "primary-current-account deficit" and by MacBean[4] as the "direct effect". Throughout the study, the term "direct effect" will be used to describe the effect of the additional costs of oil imports on the current account of the balance of payments. While such effect is regarded, externally, as a permanent adverse change in terms of trade, it can be considered, internally, as an excise tax which involves a transfer of real resources away from an oil-importing country to OPEC members. This means that a diversion of significant proportions of income would stream out of the immediate consumption and investment, both public and private.

Each oil-importing country incurred oil-related income transfers whose relative size depended on the combined effects of various factors such as the stage of economic development, the structure of the economy and the pattern of economic growth, the availability of indigenous sources of energy other than petroleum, the dependence on oil as a source of energy and the changes in the oil-intensiveness of the economy, and the degree of the reliance on oil imports to satisfy domestic consumption.

Oil deficit, as defined above, may be valid in describing the collective deficit of the oil-importing countries as a group, vis-a-vis the oil exporters since the deficit of the former is the counterpart of

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(1) S. Lee, Higher Oil Prices: Worldwide Financial Implications - A Policy Statement, British-North America Committee, London, October 1975, p. 6.

(2) A.D. Crockett and D. Ripley, "Sharing the Oil Deficit", IMF Staff Papers, Vol. 22 (1975), p. 285.

(3) W.M. Corden, "Implications of the Oil Price Rise" Journal of World Trade Law, Vol. 8, No. 2 (March/April 1974), p. 136.

(4) A.I. MacBean, "Trade Prospects for Developing Countries after the Rise in Oil Prices", in T.M. Rybczynski (ed.), The Economics of Oil Crisis, Trade Research Center, MacMillan, London, 1975, p. 74.

the surplus accumulated on the current account of the latter. However, its validity is waning when it is used to describe the deficit of an individual oil-importing country. In this case, the effect on the balance of payments is not limited to oil deficit created in the first instance by the additional oil costs, but is extended to include the effect of the repercussions resulting from the impact of oil crisis on the world economy as a whole. While the rise in oil prices partly induced contractions of economic activity and income in the industrial countries, it boosted income in the oil-exporting countries. The transmission of such an impact to developing countries, through trade, generated what are called the "indirect effects".

Izzo and Spaventa[1] distinguished between two notions of oil deficits: a narrow and a broad one. According to their view, the narrow oil deficit is only confined to the additional costs of oil imports. In contrast, the broad one is extended to allow for the deterioration of current accounts caused by the fall of exports when some oil-importing countries accepted the deflationary effects of oil prices, induced further contractionary effects in an attempt to protect their balances of payment or to achieve a surplus on the current account of the balance of payments to pay for their oil imports.

The world bias towards deflation had been intensified due to the fact that all the oil-importing countries had experienced massive shifts in their trade balances, occurring in a sudden and rapid manner. Such circumstances increased the possibilities of pursuing inconsistent and competitive policies which could result in conflicting and unco-ordinated objectives among the individual countries. By 1974, most of the industrial

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(1) L. Izzo and L. Spaventa, "Some Internal and External Effects of the Rise in the Price of Oil", Banca Nazionale Del Lavoro, Vol. 27, No. 108 (March 1974), pp. 19-20.

countries had adopted new import restrictions or measures to artificially stimulate export though they committed themselves on May 30, 1974, to a standstill pledge which was further renewed on May 29, 1975.(1) The danger of such policies was seriously considered by the Committee of Twenty in January 1974 whose Rome Communique recognised the inevitability of large current-account deficits and they agreed that ".... in managing their international payments, countries must not adopt policies which would merely aggravate the problems of other countries". The Committee particularly stressed the importance of avoiding "Competitive depreciation and the escalation of restrictions on trade payments."(2)

The importance of such effect on developing countries stems from the fact that the industrial countries - the members of the Organisation for Economic Co-operation and Development (OECD) - represent the principal market for their exports, accounting for about 70 per cent of the developing countries' exports. Thus, the decline or even the slowing down of economic activity in OECD area leads to a weakening of the export market, deterioration of the terms of trade and considerable losses in foreign exchange earnings. The World Bank estimated that each one per cent reduction in GNP growth rates of OECD countries would induce reductions of 1.5 per cent in the growth rates of export volume of developing countries and deteriorations of 0.2 per cent in their terms of trade.(3) R. Green portrayed the situation of the poor countries as follows:

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(1) Pollack, "Are the Oil-Payments Deficits Manageable?", op. cit., pp.18-9.
(2) Quoted from T.D. Willett, The Oil-Transfer Problem and International Economic Stability, Essays in International Finance, No. 113, International Finance Section, Princeton University, Princeton, N.J., 1975, p. 16.
(3) W. Tims, "The Developing Countries", in E.R. Fried and C.L. Schultze (eds.), Higher Oil Prices and the World Economy - The Adjustment Problem, Brookings Institution, Washington D.C., 1975, pp. 186-7.

> "For the poorest developing countries, oil price increases were not, by and large, the single most serious exogenous blow to their economies over the period, ... but the severity of their problem relates more to the general state of their commodity exports than to oil prices taken separately." (1)

Against the effects of the oil-related recession in the OECD area, the developing countries could expand their exports to the OPEC market which was boosted by the newly acquired spending power generated from the large rise in oil revenue. Exports to OPEC were treated by Fried and Schultze as the positive exogenous variable in their model to estimate the "initial shock effects" of the rise in oil prices on the industrial countries.(2) Nevertheless, the developing countries could not significantly expand their exports to OPEC countries owing to the latter's special pattern of imports and the marginal propensities to spend on different goods and services since their imports from the non-oil developing countries during 1973-75 only averaged 13 per cent of total imports.(3)

However, it is not expected that developing countries' export earnings from OPEC market could either compensate the decline of their exports to OECD market or achieve a balance of the current account with OPEC countries. They could simply modify the final effects rather than correct them. It is also expected that developing countries which can expand their exports to OPEC are those which have access to OPEC markets through traditional relations, historical, cultural and religious.

The net effects of the slackened world demand on the export earnings of an individual developing country depends on the structure of exports,

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(1) R.H. Green, "Petroleum Prices and African Development: Retrenchment or Reassessment?", International Journal, Vol. 30, No. 3 (1975), p.392.

(2) E.R. Fried and C.L. Schultze, "Overview", in E.R. Fried and C.L.Schultze, (eds.), Higher Oil Prices and the World Economy - The Adjustment Problem, Brookings Institution, Washington, D.C., 1975, pp. 12-4.

(3) Calculated from IMF, Direction of Trade, 1970-76, Annual, No. 12, IMF, 1977, pp. 22-27.

the different incomes and price elasticities of the demand for various commodity groups, the net demand curve facing each individual country, the domestic supply conditions of exportables and the movements of commodity prices in the international markets.

Both direct and indirect effects of the rise in oil prices were superimposed on an existing balance of payments problem attributed to the inflated value of imports caused by the world inflation which persisted during the 1974/75 recession. External deficits were financed by running down reserves accumulated during the 1973 boom and drawn from IMF facilities. Reserve drains, reducing reserve holdings, undermined the creditworthiness both inside and outside the Fund, and threatened the liquidity position.

3. The Selection of the Countries Under Study

It is not intended to use either one specific country or the entire low-income group to study the effects of the oil price increases on their economies. Rather, a representative number of countries has been selected. These countries are India, Pakistan and Kenya. The three countries are chosen to represent collectively the low-income countries in terms of the principal economic characteristics such as population, GNP, consumption and imports of petroleum and the international trade flows as shown in Table 1-1.

The three countries are selected so as to satisfy a number of conditions. Firstly, as a thesis devoted to the study of the effects of oil price increases, the countries are chosen because their consumption and imports of oil are collectively and individually significant in absolute as well as relative terms. Consumption and imports of oil of the three countries

account, collectively, for about 75 and 69 per cent of the total group, respectively. Oil consumption of India, Pakistan and Kenya accounts for about 60, 11 and 4 per cent, respectively, of the total group, and their imports represent about 48, 12 and 9 per cent of total imports of the group, respectively.

Table 1-1

Population, GNP, Consumption and Imports of Petroleum and International Trade Flows of India, Pakistan, Kenya and the Non-OPEC Low-Income Developing Countries in 1976 (a)

	(1) Population (in millions)	GNP at (2) Market Prices (in Millions of U.S. $)	Petroleum Crude and Products (b) (in million metric tons)		International Trade (5) Flows (in millions of U.S. $)	
			Consumption (3)	Import (4)	Exports f.o.b.	Imports c.i.f.
India	620.4	87850	18.516	15.866	5916	6533
Pakistan	71.3	13150	3.345	3.950	1143	2213
Kenya	13.8	3460	1.263	2.876	793	973
Total	705.5	104460	23.124	22.692	7852	9719
The Group	1080.3	154850	31.019	32.778	13806	18375
Sample as % of the Group	65.3	67.5	74.5	69.2	56.9	52.9

Source: (1) World Bank, 1978 World Bank Atlas, op. cit., p. 8.
(2) Ibid., p. 14,16.
(3) United Nations, World Energy Supplies, 1972-76, Series J, No. 21, U.N., New York, 1978. Table 10, pp. 88-100.
(4) Ibid., Table 6, pp. 58-67; Table 10, pp. 88-100.
(5) International Monetary Fund, Direction of trade, 1970-76, Annual, No. 12, I.M.F., Washington,D.C., 1977, pp. 4-7.

Note: (a) The Low-income developing countries consist of 34 countries, according to the World Bank classification, with GNP per capita of $250 or below in 1976. Indonesia, as an oil-exporting country is excluded.
(b) Consumption and imports of oil consist of energy petroleum products. Data on oil imports are gross.

Secondly, the three countries selected come into line with the consensus of the national and international institutions as well as the agreement among economists as to the specification and definition of the most seriously affected countries, as discussed above.

Finally, the three countries are selected in such a way as to reflect diversified cases among the low-income group which could influence the impact of oil prices increases and modify their final outcome. Therefore, the countries came to differ in the size of their economies, their economic structures, the shape of their energy sectors and their external positions and participation in international trade. For example, despite the fact that these three countries are the largest oil-importers among the group, the effects of oil price increases on their economies would vary, depending on a number of factors such as the relative importance of oil in the pattern of energy consumption, the availability of indigenous sources of energy, the degree of dependence on imported oil and the oil-intensity of the pattern of economic growth.

4. The Plan of the Study

In addition to this introductory chapter, the study consists of six other chapters. Chapter II examines the relative importance of oil in the economies of India, Pakistan and Kenya within the context of a review of the pattern and trend of energy consumption during the period 1960-75. During that period, the degree of dependence on imports of petroleum crude and refined oil products is examined. Throughout the analysis, a comparison is made between each of the three countries and the general situation in the other low-income countries, and a special attention is directedto examining the effects of the rise in oil prices

on the changes of imports and consumption of oil and the reaction of the consumption of non-oil indigenous fuels during 1974 and 1975.

Chapter III investigates the association between oil consumption and economic growth in India, Pakistan and Kenya during the period 1960-75, emphasising the impact of the pattern of sectoral growth on the changes in oil-intensity of the economy and, in turn, on the consumption of oil. It also tries to estimate a dynamic model of the demand for oil in India, Pakistan and Kenya to identify variables determining oil demand in the low income countries in general.

Chapter IV is devoted to studying the direct effects of the rise in oil prices on India, Pakistan and Kenya in 1974 and 1975. It examines the changes in the oil import bills and estimates the additional oil costs whose effects on terms of trade, income transfer, current account and resource gap are assessed within the context of an analysis of the overall external balances of the three countries.

Chapter V provides theoretical background for the indirect effects of the rise in oil prices on developing countries. Through a review of the changes in the world economy during the first half of the 1970s, this chapter establishes the link between oil crisis and variations in the levels of economic activity and incomes in the various economic regions of the world and the channels through which such variations are transmitted to developing countries through export sectors. It emphasises the characteristics of the external demand and its effects on prices, volume and export earnings of developing countries.

Chapter VI is devoted to assessing the effects of oil-induced changes in world economy on the export earnings of India, Pakistan and

Kenya and the implications for their external balances and their capacity to finance additional payments for oil imports in 1974 and 1975. This involves an analysis of the changes in price, volume and export earnings by the main commodity group and by export market and the implications for trade balances with the economic regions of the world and the capacity of exports to finance the additional oil costs. This chapter also examines the position of foreign exchange reserves, their adequacy and their sufficiency to meet oil payments.

In Chapter VII we will attempt to sum up the results achieved from this exercise.

5. The Sources of the Data

The relevant data for this study are obtained primarily from official publications published by the governments of India, Pakistan and Kenya and from the publications of various international organisations, particularly the United Nations (UN), International Monetary Fund (IMF), World Bank, the Organisation for Economic Co-operation and Development (OECD) and the Organisation of Petroleum Exporting Countries (OPEC).

The analysis carried throughout the study and the conclusions reached must be considered within the limitations imposed by the degree of consistency and accuracy of the available data and their comparability within each country and among the three countries. In general, some problems arise from the different ways in which data have been compiled in the three countries, the scopes and periods which are covered and in the levels of aggregation. In addition to the lack of some data in the required details, sudden changes in domestic conditions for political and economic reasons disturb the compatibility of the data, particularly in Pakistan. Finally, since the study started in 1975, shortly after the

oil crisis had occurred, up-to-date data, at that time, consisted either of provisional estimates or had not yet been published, and thus had to be revised at a later date.

The three countries were also found to be compiling their data on the basis of different financial years and computing the indices of various economic variables according to different base years. For the sake of meaningful comparisons among the three countries, even though it may slightly upset the data accuracy, the study had to adjust all the required data of the three countries for the calendar years and to move all the base years to 1970 as an unified base year. In the case of Kenya, data on international trade, which were compiled differently according to the requirements of the East African Community, had to be reorganised for the purposes of the comparison with those of both India and Pakistan.

Nevertheless, there are still some other problems which could not be solved. Data on the consumption of refined oil products, taken from the United Nations publications, are not reported in the relevant details, and those on the supply of crude oil and also on consumption of oil are recorded as "apparent", and thus they are not adjusted for these changes in stocks, whose data are not available.

Pakistan data, covering the period 1960-71, represent all Pakistan (West and East Wings), while data covering the period 1972-75, only represent West Pakistan after Bangladesh was separated in 1970. The data are adjusted to make, at best, the data for the period 1970-75 representative of West Pakistan. Moreover, since the data of the three countries are converted from national currencies to U.S. dollars, the large variations

in exchange rates, particularly those of Pakistan, during the first half of the 1970s affects the comparability of the data and the analysis. Finally, in the case of Kenya, data for the period 1960-63, except those on energy and oil, are not available, since official publications show only the post-independence data.

CHAPTER II

THE IMPORTANCE OF PETROLEUM IN THE PATTERN OF COMMERCIAL ENERGY CONSUMPTION

The pattern of energy consumption in a country is usually geared to various factors which govern its energy policy. Indigenous sources of energy should be favoured, against foreign sources, in order that a country's natural resources should be fully utilised. Such a policy, being integrated into economic development programmes, has made energy consumption biased in favour of domestic fuels. Nonetheless, petroleum, as a foreign fuel, has been a most exceptional case. Whether partyly or totally imported, the use of petroleum has escalated particularly in countries lacking energy resources.

The use of petroleum has spread and its demand has always been met since the international oil industry made it available to any part of the Third World. The sophisticated structure of the industry, combined with its huge financial, managerial and technical resources has always been ready to invest in the operations of production, refinery, transportation and marketing wherever the market is located and whatever its size.(1) Moreover, the physical characteristics of oil and the flexibility of its uses represent significant advantages over other energy sources as it is cleaner and more convenient to use. Oil has supplanted coal in transportation and residential uses and has made inroads into electric

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(1) P.R. Odell, Oil and World Power: Background to the Oil Crisis, 3rd Ed., Penguin Books, 1974, pp.145-46.

power generators as well as to numerous industries where it is used as a basic feedstock.(1) The expansion of agriculture implies an extensive use of mechanisation, fertilizers and pesticides which are largely oil-intensive products. Also, the gradual and continuous movement of population from the rural to the urban sector, involving changes in life-style, has induced not only a shift towards the consumption of petroleum products but also a rise in the level of its consumption owing to the increase of income.

Additionally, oil has been a cheap source of energy and its price declined from the end of the Korean War until the late 1960s relative to the prices of other fuels and production factors. The effects of price movements on oil consumption will be discussed in detail in chapter three.

1. The Relative Importance of Petroleum in the Pattern of Energy Consumption

In order to indicate the relative importance of petroleum in the pattern of energy consumption, Table 2-1 shows the shares of oil, coal, natural gas and primary electricity in total energy consumption in India, Pakistan and Kenya for selected years during the 1960s and for the period 1970-75. The growth trends of the consumption of each source as well as of total energy during the same period for each of the three countries are shown in Table 2-2.

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(1) Tanzer, op. cit., pp. 107-17.

Energy consumption is shown here by the source of primary energy rather than by the source of final consumption. The difference between the two approaches lies in the basic classification of energy sources according to whether they are of primary or secondary origin, and arises mainly from the treatment of electricity when produced or extracted directly, e.g. electricity where generated through the harnessing of falling water of streams and rivers, is of primary origin. It is of secondary origin when produced by means of another fuel, e.g. electricity generated by thermal stations utilizing oil or coal. In this case, the amounts of coal and oil shown are those which are used directly for energy consumption and not those which are converted into electricity. Indeed, the primary classification which is followed, here , permits the full representation of each energy source whether it is directly consumed or indirectly converted into another form of energy.

The data of Pakistan prior to 1970 are related to the whole of Pakistan including Bangladesh (the East and West Wings), while data, covering the period 1970-75, are related to West Pakistan only. For the years 1970 and 1971, an attempt is made to present data of consumption of oil and energy for West Pakistan. For that purpose, data of consumption of oil and energy of Bangladesh for the years 1972 and 1973 are considered as approximates for her consumption during 1970 and 1971 and they are deducted from the total consumption of all Pakistan.

The Indian economy, which is characterized by a very diversified pattern of energy consumption, has a high appetite as an energy consumer. As a coal-orientated economy, India is not a heavy user of oil which provided only about 15 per cent of her total energy consumption at the

beginning of the last decade. Nevertheless, the most striking feature of the Indian ecohomy is the accelerated growth of oil consumption which . . more than doubled by 1970 and its share amounted to 22 per cent of total energy consumption.In 1973, the share of oil increased to 25 per cent and its consumption increased to 3 times the 1960 level, though total energy consumption only increased to 1.8 times. In 1975, its share declined to 23 per cent, though the consumption continued to increase to 3.2 times following the small decline in 1974.

Losing ground to oil, the share of coal, which accounted for 83 per cent in 1960, continued to decline throughout the 1960's and reached its lowest point of 70 per cent in 1973. During that period, while total energy consumption increased to 1.8 times the 1960 level, coal consumption only increased to 1.5 times. By 1975, the share of coal rose to 73 per cent as its consumption had increased rather quickly amounting to 1.9 times the level of 1960, though this was still slower than total energy consumption which increased to 2.2 times the 1960 level.

Nevertheless, coal holds a strong position in the Indian economy and provides for most of the energy requirements of the key economic sectors. Of the 78 million tons of coal consumed in India in 1973-74, 16.7 per cent were used in railways, 3.2 per cent in collieries, 26.9 per cent in thermal power stations, 18.8 per cent in steel industry and coke ovens, 30.9 per cent in industry, other than iron and steel, agriculture, commercial and government, and 3.5 per cent in preparing soft coke.(1)

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(1) Calculated from P.D. Henderson, India - The Energy Sector, World Bank, Oxford University Press, London, 1975, Table 15, p.39.

Table 2-1

The Patterns of Commercial Energy, Consumption of India, Pakistan and Kenya, 1960-75.
(in percentage shares)

	1960	1965	1968	1970	1971	1972	1973	1974	1975
India									
Petroleum	15.3	17.1	20.4	22.1	24.1	24.8	25.3	23.5	22.7
Coal	82.9	80.4	76.3	73.7	71.6	71.1	70.4	72.5	73.0
Natural Gas	-	0.2	0.6	0.7	0.7	0.8	0.7	0.8	0.9
Primary Electricity	1.8	2.3	2.7	3.5	3.5	3.3	3.6	3.2	3.4
Pakistan									
Petroleum	52.4	51.1	52.5	48.5	47.7	45.4	41.7	41.5	39.9
Coal	32.4	21.0	14.5	11.8	10.6	8.5	7.3	6.9	6.6
Natural Gas	13.8	25.1	28.8	36.5	37.5	41.7	46.0	46.2	48.3
Primary Electricity	1.4	2.8	3.2	3.2	4.2	4.4	5.0	5.4	5.2
Kenya									
Petroleum	91.8	91.4	92.5	90.0	90.4	92.3	91.5	92.6	93.2
Coal	6.1	4.6	3.1	5.4	4.9	2.5	3.8	3.0	2.0
Natural Gas	-	-	-	-	-	-	-	-	-
Primary electricity	2.1	4.0	4.4	4.6	4.7	5.2	4.7	4.4	4.8

Source: From 1960 to 1973 is calculated from United Nations, World Energy Supplies, 1950-1974 Series J, No.19,U.N., New York, 1976, Table 2, pp.12-123. From 1974 to 1975 is calculated from United Nations, World Energy Supplies,1972-1976, Series J, No. 21, U.N., New York, Table 2, pp.6-35.

Table 2-2

Trends of the Consumption of Commercial Energy of India, Pakistan and Kenya, 1960-75. 1960 = 100

	1965	1968	1970	1971	1972	1973	1974	1975
India								
Petroleum	154	204	232	266	286	301	294	323
Coal	131	139	140	143	149	152	165	188
Natural Gas	4900	13050	16250	19025	21175	20475	23875	30400
Primary Electricity	194	264	353	372	361	400	383	457
Total Energy Consumption	136	152	158	167	174	180	189	215
Pakistan								
Petroleum	150	202	154	142	159	154	160	160
Coal	99	94	72	41	49	44	43	43
Natural Gas	279	414	453	395	558	647	676	735
Primary Electricity	321	458	439	521	588	701	790	790
Total Energy Consumption	154	198	172	149	184	194	202	210
Kenya								
Petroleum	102	115	127	140	139	158	190	202
Coal	128	95	193	191	93	165	156	107
Natural Gas	-	-	-	-	-	-	-	-
Primary Electricity	120	145	173	195	210	218	243	280
Total Energy Consumption	104	116	131	144	140	160	191	221

Source: Calculated from data shown in footnote of Table 2-1.

Production and consumption figures of coal in 1973/74 of about 78 million tons mean that the size of India's coal reserves would be adequate for between 350 and 400 years not allowing for potential reserves and further explorations. According to estimates published by the "Geological Survey of India",(1) it was estimated that total reserves of all types of coal are now put at some 81 billion tons of which just over one-quarter comes into the category of proved reserves . Out of the proved reserves of some 21 billion tons, about 42 per cent consist of coking and 58 per cent of non-coking coal. The share of non-coking coal in other reserves , both indicated and inferred, exceeds 80 per cent, so that all forms of reserve coking coal account for about one-quarter and non-coking coal for three-quarters. In so far as it become worthwhile to mine coal at greater depth than those depths upon which these estimates were built, these figures give a somewhat conservative picture.

However, the low current rate of coal production in India reflects the unfavourable conditions under which reserve deposits are formed and the problems of working and marketing coal which have discouraged its uses. A large proportion of coal reserves is of inferior variety with limited uses. The figures referring to all forms of coal include coal with such a high content of ash and moisture that so far it has not been generally worked. Out of the total of 12 billion tons of the proved reserves of non-coking coal only about three-quarters can be assigned to grades with an ash content of less than 40 per cent which has normally been the maximum acceptable figure. Moreoever, not all its situ reserves, even of acceptable quality, can be actually worked. As far as coking coal is

(1) Henderson, op.cit., pp. 7-12.

concerned, the reserve position appears rather less favourable since the reserves of the prime coking coal, a critical factor with which the other coking coal must be blended for metallurgical use, represented a small proportion. Furthermore, seams tend to be very thick, some times exceeding 45 meters.

On the other hand, the coal deposits of India are distributed very unevenly between different regions of the country. Most are concentrated in the eastern part of the country. There are no coal fields in the northwest regions, nor in the west, except for the small fields in the eastern part of Maharashtra ,and the lignite deposits of Neyveli in Tamil Nadu. Therefore, supplying coal to these regions involves high transport costs and produces considerable strains on the railway network.

Natural gas is hardly considered a competitor to oil, despite the large increases in its consumption. The share of gas increased from 0.2 per cent in 1965 to 0.7 per cent in 1973, but was still under 1.0 per cent in 1975. The natural gas industry is still in its infancy as the amount discovered so far is not very large. Moreover, in view of the long distance between the producing areas and the market in Calcutta, the construction of pipeline is still economically unattractive. It is estimated, therefore, that 40 per cent of output is flared because of the absence of local demand.(1)

Only a small part of the total production is now consumed by the tea plantations and local industries around the Nahorkatiya gas field. Also part of the production is used by the Namrup fertilizer plant, the Assam

(1) See Henderson, op.cit., Table 4, p.16.

State Electricity Board, the Assam Gas Company, and the Assam Oil Company. The output from Gujart and Ankleswar gas fields, which are near the market, is carried through pipelines to the Uttartan thermal power stations and the State Fertilizer Corporation as well as to Baroda. Gas from Comby is also carried to the Dhuwaran power station.

Consumption of electricity generated from water resources and nuclear power has increased more than four and a half times during the period 1960-75. However, the share of electricity is relatively small, amounting to 3.5 per cent of total energy consumption. Electricity acts as both a competitor and consumer of oil at the same time. The growth of electricity consumption may reduce the consumption of kerosene as an illuminant, and diesel and furnace oil as industrial fuels. On the other hand, the use of electricity is also expected to increase the demand for oil as input into electric generators.

As a result, despite the fact that India is a light oil user, oil consumption has grown fast, even faster than total energy consumption. This became a matter of concern even before the oil crisis when the "Fuel Policy Committee of 1970" forecast rising oil product requirements to 34 million tons by 1978/79, an increase of nearly 50 per cent over present consumption levels in a space of five years.(1) This created a difficult situation after 1973 which led the authoritative "1975 Energy Committee Survey" to express serious doubts about providing more petroleum imports.

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(1) The Economist Intelligence Unit, Oil and economic growth, QER Special, No.15, The Economist Intelligence Unit Ltd., London, 1974, pp. 23-31.

Like India, Pakistan has a diversified pattern of energy, consumption, but less appetite for oil consumption. The position of oil within the pattern of energy consumption has been threatened by the increased role played by the indigenous natural gas in the economy. The share of oil consumption declined from 52 per cent in 1960 to 49 per cent in 1970 since the increases in its consumption during that period amounted to 54 per cent, whereas the increases in total energy consumption was 72 per cent. By 1973, the share of oil in total energy consumption declined further to about 42 per cent, since its consumption fluctuated, while the increases in total energy consumption amounted to 94 per cent. By 1975, the share of oil declined to 40 per cent, though the consumption amounted to 1.6 times the 1960 level. However, in this year, total energy consumption, rising faster than oil, amounted to 2.1 times the 1960 level. In 1974/75, petroleum provided 40 per cent of the energy used in agriculture, 16 per cent in industry, 55 per cent in domestic and commercial and almost all the energy requirements of transport.(1)

Along with oil, the share of coal declined dramatically from 32 per cent in 1960 to 12 per cent in 1970 and further to 7 per cent in 1973. During that period, coal consumption declined absolutely by 56 per cent, compared with the 1960 level. By 1975, the share declined to just under 7 per cent and the decline in its consumption amounted to 57 per cent of the 1960 level. Coal produced in Pakistan, being of inferior quality, is mostly used in the brick-kilns industry. Moreover, the decline in its relative importance is partly attributable to the low level of production

(1) Government of Pakistan, Annual Plan, 1975-76, Planning Commission, Karachi, July 1975, p. 214.

and the static availability of coal due to "the absence of a comprehensive operational plan dealing with production and transportation."(1)

The decline in the relative importance of both oil and coal has accompanied a marked change in Pakistan's pattern of energy consumption through which natural gas has emerged as the most important fuel in the economy. The share of gas increased from just under 14 per cent in 1960 to over 36 per cent in 1970 and its consumption increased 4 times during that period, whereas total energy consumption only increased by 72 per cent. The share of gas rose to 46 per cent in 1973 and further to about 48 per cent in 1975 when its consumption increased to 7.4 times the level of 1960, whereas total energy consumption was little more than doubled. Natural gas satisfies the energy requirements of the energy-intensive sectors of the economy. Gas provides 41 per cent of the energy requirements of the industrial sector and 11 per cent of the needs of the domestic and commercial sector.(2) Of the 104, 478 million cubic feets of gas consumed between July 1975 and March 1976, 31 per cent was consumed by the power sector, 17 per cent by cement industry, 15 per cent by fertilizer plants, 30 per cent by general industries, 3 per cent by commercial sector and 5 per cent by domestic users.(3)

The growing domestic market has been a powerful incentive to raise the domestic production of natural gas and to search for additional

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(1) Government of Pakistan, Annual Plan, 1975-76, op.cit., p.213.

(2) Ibid, p.214.

(3) Government of Pakistan, Pakistan Economic Survey, 1976-77, Finance Division, Economic Advisor's Wing, Government of Pakistan, Islamabad, 1977, Table 11.5, p.168.

reserves in new areas of the country. Natural gas reserves have been located at 13 different places and the total reserves are estimated at 16.74 trillion cft, among which Sui and Mari are the oldest and largest of the six gas fields under production.(1) Sui gas field's recoverable reserves were estimated originally at 8.62 trillion cft, and its output, since entering production in 1955, has exceeded one trillion cft. Its 19 wells are now producing more than 400 million cft a day. The second most important field is Mari discovered in 1957. Its recoverable reserves were originally estimated at 3.94 trillion cft and the production is now averaging more than 50 million cft a day. Besides, gas is also produced from Dhulian and Meyal oil fields in association with oil. The reserves of Dhulian are estimated at 0.15 trillion cft and that of Meyal at 0.19 trillion cft. The rate of production is approximately 40 million cft per day.

Additionally, a further eight fields have been established and are thought to contain recoverable reserves of some 4 trillion cft. These fields are: Kather, Sari Sing, Hundi, Uch, Khairpur, Mazarani, Zin and Kandhort. In September 1974, the government's Oil and Gas Development Corporation reported a new commercial find at Radho, Khan district, which tested 4 million cft per day.(2)

Along with natural gas, the consumption of electricity has increased just under eight times, raising its share from only 1.4 per cent to just over 5 per cent in 1975. Part of that consumption is supplied by nuclear electricity which was introduced in 1971.

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(1) Government of Pakistan, Pakistan Basic Facts, 1975-76, 14th Ed., Economic Advisory's Wing, Ministry of Finance, Government of Pakistan, Islamabad, 1977, Table 9.4, p.98.
(2) Petroleum Economist, Vol.42, No.5 (May 1975), p.185.

Kenya is a striking example of a poor country which is not well endowed with natural energy resources. Although Kenya lacks vast deposits of coal, reserves of oil and natural gas or sites for gigantic hydro-electric developments, it is witnessing today a fairly steady rise of her energy consumption. Of all the sources of energy ulilized in Kenya, petroleum, with its versatile use, assumes a preponderant role, accounting for more than 90 per cent of total energy consumption. The share of oil in total energy consumption fluctuated slightly around 90 per cent during the 1960 s. During that period, oil consumption increased by 27 per cent which was smaller than total energy consumption which rose by 31 per cent. By 1973, the share of oil accounted for just under 92 per cent and its consumption increased by 58 per cent, compared with the 1960 level, which came in line with the increase in total energy consumption. By 1975, oil accounted for just over 93 per cent of total energy consumption and its consumption had doubled over the whole period, though it was less than total energy consumption which increased by 2.2 times its original amount.

Coal is not produced domestically and the quantities required must be imported from abroad. Moreover, coal is not considered by any means as a competitor to oil since its uses are not of particular significance in Kenya. Its share declined from 6 per cent in 1960 to just over 5 per cent in 1970 and further to 2 per cent in 1975. Imports of coal and, in turn, its consumption fluctuated widely from 41.3 thousand tons in 1960 to 66.7 thousand tons in 1974. Therefore, the increase of coal consumption, by 1975, amounted to 7 per cent above 1960 level. It is mostly used by the East African Railway Corporation as well as in a limited number of industrial processes.

Electricity is by far the only source of commercial primary energy which is presently produced in Kenya. It can be considered as a possible competitor to oil inspite of its small share in energy consumption. The share of electricity increased from 2 per cent in 1960 to just over 4 per cent in 1970; and the increase in consumption amounted to 73 per cent of the 1960 level. In 1975, although the share of electricity was still just under 5 per cent, its consumption increased to 280 per cent, whereas total energy consumption increased to 221 per cent over the period 1960-75.

Being practically the sole source of domestically produced commercial form of energy, Kenya leads the community(*) in the domestic use of electricity which make up some 21.6 per cent of its total consumption in 1972, whereas industrial and commercial sectors together accounted for 77.3 per cent of the total in the same year.(1) Among the industrial users of electric energy are: the textile industry, the food industries, the saw-milling and plywood industries, the non-metallic mineral products industries, the basic metal industries and the manufacturing of basic industrial chemicals.

Nonetheless, part of Kenya's consumption of electricity is supplied by Uganda through the inter-states trade of the East African Community. In 1974, Kenya imported about 27 per cent of its total consumption of electric energy which represented just over 30 per cent of Uganda's gross electric power production.(2) In fact, Kenya has reduced the

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(1) East African Community, "Energy balance in EAC, 1966-72," Economic and Statistical Review, East Africa Statistical Department, No. 50 (March 1974), Nairobi, p.xxiii.

(2) Calculated from Republic of Kenya, Statistical abstract, 1974, Statistical Division, Ministry of Planning and Development, Nairobi, 1975.

(*) The East African Community.

heavy reliance on imported electricity which accounted for about 33 per cent of total electricity consumption in 1972. Kenya recorded the most significant strides among the countries of East Africa in augmenting its installed capacity of thermal power which was more than doubled during 1966-72.(1)

The above-mentioned analysis of the relative importance of petroleum in India, Pakistan and Kenya, arising from the review of patterns and trends of commercial energy consumption shown in Tables 2-1 and 2-2, respectively, can be compared with the low - income developing countries as a whole whose pattern and trend of energy consumption during the period 1960-74 are shown in Table 2-3. In the low-income developing countries, in aggregate, oil is still a secondary source of energy. Between 1960 and 1973, the share of oil in total energy consumption increased from 32 to 42 per cent and its consumption increased by 150 per cent which is larger than the increase in total energy consumption, which amounted to 93 per cent. In comparison with the low-income group, India is not a heavy user of oil, though its oil consumption grew faster than the rest of the group.

Pakistan's share of oil consumption remained the same as in the low-income group, but its relative importance showed a continuous decline since the consumption of Pakistan grew more slowly than the group as a whole; whereas the trend of total energy consumption remained in line with the group. Kenya came as the heaviest user of oil not only among the other countries but also in relation to the low income countries, though the increase in its consumption of both oil and total energy lagged behind the trend of the low-income group.

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(1) East African Community, Energy balance in EAC, 1966-72, op. cit., p. xxii.

Table 2-3

The Pattern and Trend of Commercial Energy Consumption of the Low-Income Group of the Non-OPEC Developing Countries, 1960-74

	1960	1965	1968	1970	1971	1972	1973	1974
The Pattern of Consumption								
Petroleum	32.4	33.8	37.3	41.4	40.9	42.4	41.9	39.8
Coal	65.0	61.7	51.1	51.9	52.2	50.1	50.0	51.7
Natural Gas	1.0	2.2	3.0	3.5	3.6	4.3	4.9	5.1
Primary Electricity	1.6	2.3	2.6	3.2	3.3	3.2	3.2	3.7
The Trend of Consumption								
Petroleum	100	142	190	221	227	241	250	245
Coal	100	129	144	138	143	141	149	158
Natural Gas	100	297	494	610	638	783	914	1009
Primary Electricity	100	188	251	323	346	351	371	397
Total Energy Consumption	100	136	164	172	179	184	193	198

Source: Calculated from A. Lambertini, Energy and Petroleum in Non-OPEC Developing Countries, 1974-1980, World Bank Staff Working paper, No. 229, World Bank, February, 1976, Table 1, p.3.

The pattern of energy consumption of the low-income countries came very close to that of India, though it did change in a way which more or less resembled the changes in the three countries. As in the case of India, coal is the single largest source of energy in the low-income countries and accounted for 65 per cent of total energy consumption in 1960. Because of the slow growth of coal consumption, its share declined to 50 per cent in 1973. In the low-income countries, as in the three countries, coal has lost ground as a source of energy, particularly to oil in India and Kenya, and to gas in Pakistan.

The response of oil consumption in the low-income countries to the high price of oil was similar to India where oil consumption declined absolutely in 1974, whereas consumption in both Pakistan and Kenya continued to increase, though the three countries as well as the low-income group, in aggregate, experienced increases in their total energy consumption.

The levels of oil and energy consumption in India, Pakistan and Kenya can be compared on a per capita basis. This is generally recognised as an indicator for international comparisons. Table 2-4 shows, for India, Pakistan and Kenya, per capita consumption of petroleum products and commercial energy in 1960, 1970 and 1975, expressed in kilogrammes of coal equivalent, and the average annual growth rates of these per capitas during the periods 1960-70 and 1970-75.

India is relatively the highest energy-intensive economy among the three countries, though it is the lightest user of oil. In terms of coal equivalent, per capita energy consumption, which was 142 kg in 1960, increased to 181 kg in 1970 and further to 221 kg in 1975. Per capita oil consumption amounted only to 22 kg of coal equivalent in 1960 and increased to 41 kg in 1970 and to 53 kg in 1975.

Table 2-4

Per Capita Consumption of Petroleum Products and Commercial Energy in 1960, 1970 and 1975, and their Average Annual Growth Rates[a] during 1960-75 in India, Pakistan and Kenya.

(per capita consumption expressed in kilogrammes of coal equivalent)[b]

	India		Pakistan		Kenya	
	Petroleum products	Commercial Energy	Petroleum products	Commercial energy	Petroleum products	Commercial energy
Per capita Consumption in						
1960	22	142	33	61	139	142
1970	41	181	49	98	126	135
1975	53	221	77	183	167	174
Average Annual Growth						
1960-70	6.4	2.5	4.0	4.9	-1.0	-0.6
1970-75	5.3	4.1	9.5	13.3	5.8	5.2

Source: Compiled and calculated for the years 1960 and 1970 from United Nations, World Energy Supplies, 1950-1974, op.cit., Table 2, pp.12-123, Table 10, pp. 280-335 and for the year 1975 from United Nations, World Energy Supplies, 1972-1976, op.cit., Table 2, pp. 6-35, Table 10, pp. 88-100.

Note: (a) Average annual growth rate (r) = $\sqrt[t]{\frac{Pt}{Po}} - 1$, where Po is the consumption in year 0 and Pt is the consumption in year t.

(b) Per Capita Consumption of petroleum products is converted to coal equivalent by using conversion factors provided by United Nations, World Energy Supplies, 1972-1976, op.cit., Figure II, p. xxii.

Though Pakistan is the smaller consumer of energy relative to India, its consumption of oil exceeds India. Between 1970 and 1975, its energy consumption per capita increased from 98 kg to 183 kg and oil consumption from 49 kg to 77 kg. While Kenya is the heaviest oil consumer among the sample, it is the smallest consumer in terms of total energy. Per capita oil consumption, which amounted to 139 kg in 1960, decreased to 126 kg in 1970, and recovered at 167 kg in 1975. Per capita energy consumption declined from 142 kg in 1960 to 135 kg in 1970, but increased to 174 kg in 1975.

The comparison between India, Pakistan and Kenya on the basis of the long-term growth trend indicates that while per capita oil consumption has grown faster than per capita commercial energy consumption in India and Kenya, it has lagged behind in the case of Pakistan. During the period 1960-70, per capita oil consumption in India was growing at 6.4 per cent per annum which was more than twice as fast as per capita consumption of energy. Although per capita oil consumption growth slowed down to 5.3 per cent per annum during 1970-1975, it still grew faster than per capita consumption of energy which was growing at 4.1 per cent per annum. Growing at 4.0 per cent per annum during 1960-70, per capita oil consumption in Pakistan was slower than per capita energy consumption which was growing at 4.9 per cent per annum. Even when the growth of oil consumption doubled during 1960-75 to 9.5 per cent per annum, the growth of energy consumption tripled to 13.3 per cent per annum during the same period. In the case of Kenya, since oil dominates the pattern of energy consumption, growth rates of per capita energy consumption reflected, more or less, the trend of oil consumption. During the period 1960-70, per capita energy consumption, which declined

by 0.6 per centper annum, remained in line with per capita oil consumption which declined by 1.0 per cent per annum during the same period. During 1970-75, while per capita oil consumption had grown at 5.8 per cent per annum, per capita energy consumption had grown slightly slower at 5.2 per cent per annum.

In the short-run, it seems that the availability of indigenous non-oil sources of energy had helped to ease the adjustment of their economies during 1974 and 1975, in the face of the October 1973 oil price increases, where there was a long-term process of adapting the technologies used in the different sectors for indigenous fuels. Table 2.5 shows the year-to-year changes in the consumption of petroleum and other commercial energies during the period 1970-75. Following the large increase in India's consumption of oil in the early 1970s, oil consumption was halted at 5.1 per cent in 1973, before it absolutely declined by 2.2 per cent in 1974, though it recovered again at 9.7 per cent in 1975. Non-oil energies had responded immediately as their consumption had increased by 8.1 per cent in 1974, and 14.4 per cent in 1975. Consumption of coal had increased by 8.6 per cent in 1974 and 14.0 per cent in 1975. These recorded increases had not happened before. Indeed, Indian economy had merely reacted by accelerating the switch to coal, a policy which had previously been decided.(1)

Additionally, following the 3.3 absolute decline in 1973, consumption of natural gas had increased by 16.6 per cent in 1974 and further by 27.3 per cent in 1975. Consumption of Primary electricity had increased by 10.7 per cent in 1973 which was followed by a decline of 4.1 per cent in 1974, but recovered again in 1975 at 19.2 per cent.

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(1) The Economist Intelligence Unit, op. cit., p. 24.

Table 2-5

The Year-to-Year Changes in the Consumption of Petroleum Products, Coal, Natural Gas and Primary Electricity in India, Pakistan and Kenya, 1970-75.

(in percentages)

	Petroleum products	Other Commercial Energies			
		Total	Coal	Natural Gas	Primary Electricity
India					
1970/71	14.7	2.6	2.3	17.1	5.6
1971/72	7.6	3.7	3.9	11.3	-3.0
1972/73	5.1	2.2	1.9	- 3.3	10.7
1973/74	- 2.2	8.1	8.6	16.6	-4.1
1974/75	9.7	14.4	14.0	27.3	19.2
Pakistan					
1970/71	- 7.3	-18.4	-43.5	12.7	18.7
1971/72	12.0	34.7	19.0	41.4	12.8
1972/73	-3.5	12.1	-10.3	15.9	15.2
1973/74	3.7	4.4	- 1.1	4.5	16.7
1974/75	-0.1	6.8	- 0.5	8.7	0.0
Kenya					
1970/71	10.2	5.3	- 1.3	-	13.0
1971/72	-0.8	-22.5	-51.2	-	7.7
1972/73	13.4	27.4	77.5	-	3.6
1973/74	20.7	3.8	- 5.6	-	11.5
1974/75	6.0	-3.7	-31.3	-	15.5

Source: Calculated from data sources mentioned in footnote of Table 2.1.

The 3.5 per cent decline in oil consumption in Pakistan in 1973 was compensated by 12.1 per cent rise in the consumption of other sources of energy which is mainly attributed to the 15.9 per cent increases in the consumption of natural gas. In 1974, oil consumption increased by 3.7 per cent which was accompanied by 4.4 per cent increases in other energy consumption which basically came from the 4.5 per cent increases in gas consumption. In that year electricity consumption continued to increase at 16.7 per cent. In 1975, oil consumption slightly declined 0.1 per cent which was compensated by an increase of the consumption of other sources of energy by 6.8 per cent which came from the 8.7 per cent increases in the consumption of natural gas. In general, during the first half of the 1970s, the decline of coal consumption was accompanied by a great increase in gas consumption which started by the 41.4 per cent in 1972. However, consumption of gas does depend not only on the market demand but also on the capacity of the pipelines transmitting gas from the producing fields to consuming areas. The existing pipeline is unable to meet the pace of growing demand of industrial, commercial and domestic consumers in areas such as Punjab.(1) The second pipeline of 305 miles was recently completed, in 1976, connecting the new discovered fields and carrying gas from the Sui field to Karachi.

Unlike India and Pakistan, Kenyan economy is ill-endowed with natural resources of energy, even electricity, which is partly imported from Uganda. Therefore, increases in non-oil energy consumption must come from electricity which increased by 11.5 per cent in 1974 and 15.5

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(1) Government of Pakistan, Pakistan Economic Survey, 1976-77, op.cit., p. 169.

per cent in 1975,since coal consumption had continued to decline throughout these two years. However, oil consumption, which increased by 13.4 per cent in 1973, had accelerated at 20.7 per cent in 1974, but halted at 6.0 per cent in 1975.

2. The Pattern and Growth of the Consumption of Petroleum Products

Consumption patterns of petroleum products are influenced not only by a country's stage of economic development but also by the way in which petroleum is mostly used. Demand for oil starts to rise when a society emerges from an immobile subsistence level-type economy and moves towards modernisation. People moving from rural areas to the crowded slums of the emerging urban centres tend to replace the non-commercial energy by kerosenes or, at a later stage, by electricity for lighting and cooking. As the economy becomes more dynamic, the movements of goods and people involves the expansion of transportations which are highly oil-intensive. Additionally, industries established to make use of a country's resources create a completely new demand for fuel oils. Therefore, the pattern of consumption of petroleum products seems to be concentrated on these products which are closely linked with essential uses in the household sector and in the economic activities of the productive sectors. Table 2-6, classifying energy petroleum products into four main groups: liquified petroleum gases, gasolines, kerosenes and fuel oils, shows the pattern of consumption in 1960, 1970 and 1975, and the average annual growth rates during the periods 1960-70 and 1970-75 for India, Pakistan and Kenya.

Consumption of petroleum in India is dominated by the fuel oils, the share of which had increased from 53.6 percent in 1960 to 62.2 per cent in 1970 and further to 71.6 per cent in 1975. The use of heavy oil in the industrial sector was motivated by the narrow price differential

during the 1960s and early 1970s between coal and oil, in view of the inferior quality of the Indian coal, on the one hand, and the fact that furnace oil is 50 per cent more efficient.(1) Oil can satisfy, on the other hand, the energy requirements of the industries located in Western India where coal supplies are usually disrupted by the shortage of railway wagons. The high correlation, of 0.86, between the industrial production index and furnace oil illustrates the strength of the relationship.(2) The leading consumers of fuel oils are: power generation (25.9%), textiles (10.5%), transport (10.0%), and iron and steel (8.3%).(3) Consumption of fuel oil grew faster than total petroleum consumption. During 1960-70, fuel oils were growing at 10.9 per cent per annum while the annual growth rate of total oil consumption was 8.8 per cent. It continued to grow at 9.1 per cent per annum during 1970-75 when total oil consumption was growing at 6.9 per cent per annum.

The relative importance of gasolines is declining as long as the high priority given to public transport at the expense of private transport in national plans will not be reversed. The relatively modest growth of 2.9 per cent per annum during 1960-70 led to the decline of its share from 14.6 per cent in 1960 to 12.0 per cent in 1970; and even to 6.2 per cent in 1975 when the consumption decelerated at 0.9 per cent per annum during 1970-75. Gasolines had lost ground to the high speed diesel (middle distillates), the demand of which had increased because of the rapid growth of the diesalized trucks and buses for long-distance traffic roads, the dieselization of railway locomotives, power generators and irrigation pumps.

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(1) B. Dasgupta, The Oil Industry in India - Some Economic Aspects, Frank Cass & Co.Ltd., London, 1971, p. 104.
(2) Henderson, op.cit., pp. 53-4.
(3) Dasgupta, op. cit., p. 103.

Table 2-6

The Patterns and Average Annual Growth Rates[a] of the Consumption of Energy Petroleum Products of India, Pakistan and Kenya, 1960-75.

(in thousand metric tons and percentages)

	Liquified Petroleum Gases	%	Gasolines	%	Kerosenes	%	Fuel Oil (distillates & residuals)	%	Total
India									
Pattern in:									
1960	11[c]	-	879	14.6	1918	31.8	3232	53.6	6040
1970	178	1.2	1165	12.0	3602	24.6	9112	62.2	14057
1975	320	1.6	1217	6.2	4040	20.6	14081	71.6	19658
Growth Rates during:									
1960-70	36.2		2.9		6.9		10.9		8.8
1970-75	12.4		0.9		2.3		9.1		6.9
Pakistan[b]									
Pattern in:									
1960	-	-	232	11.0	295	14.0	1577	75.0	2104
1970	-	-	385	11.8	710	21.8	2157	66.4	3252
1975	3	0.1	327	9.8	715	21.4	2300	68.7	3345
Growth Rates during:									
1960-69	-		3.5		14.3		4.7		6.7
1970-75	-		-3.2		0.1		1.3		0.6
Kenya									
Pattern in:									
1960	1[d]	0.1	121	17.2	65	9.2	517	73.5	704
1970	6	0.7	170	19.3	214	24.2	492	55.8	882
1975	15	1.1	255	18.1	241	17.1	899	63.7	1410
Growth Rates during:									
1960-70	29.2		3.5		12.7		-0.5		2.3
1970-75	20.1		8.4		2.4		12.8		9.8

Source: Calculated for the period 1960-70 from United Nations, World Energy Supplies, 1950-1974, op.cit., liquified petroleum gases, Table 11, pp. 336-74; gasolines, Table 12, pp. 375-429; Kerosenes, Table 13, pp. 430-84; Fuel oils, Table 14, pp. 485-540; and for the period 1970-75 from United Nations, World Energy Supplies, 1972-1976, op.cit., liquified petroleum gases, Table 11, pp. 101-9; gasolines, Table 12, pp. 110-21; Kerosenes, Table 13, pp. 122-33; Fuel oils, Table 14, pp. 134-47.

Note: (a) Average annual growth rate (r) $= \sqrt[t]{\frac{P_t}{P_o}} - 1$, where P_o is the consumption in year (0) and P_t is the consumption in year (t)

(b) Growth rates of Pakistan for the period 1960-69 cover the whole of Pakistan, including Bangladesh, while those for the period 1970-75 refer to the area now comprising the former West Pakistan.

(c) Consumption of liquified petroleum gases in 1961

(d) Consumption of liquified petroleum gases in 1963.

Kerosenes constituted just under one-third of total consumption of petroleum products in 1960. In addition to its uses in household lighting and cooking, kerosenes were illegally used until 1973 in vehicles to supplement high speed diesel oil, the prices of which were higher than kerosenes owing to the differential duty rates.(1) The moderate annual growth of 6.5 per cent led to the decline of its share to 24.6 per cent in 1970. As the growth of its consumption slowed down to 2.3 per cent per annum during 1970-75, its share had declined further to 20.6 per cent in 1975. In view of the new demand for kerosenes as an aviation fuel, the slowdown of its consumption can be attributed to the household sector which is increasingly dependent on electricity particularly for lighting.

Consumption patterns in Pakistan are, largely, similar to those of India in the sense that fuel oils were predominant in the early 1960s.

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(1) Henderson, op.cit., p. 53.

However, the share of fuel oils had declined from 75 per cent in 1960 to 66.4 per cent in 1969 as their consumption had grown at 4.7 per cent per annum which was slower than that of total consumption (6.7 per cent per annum) during 1960-69. Most of these increases had been generated from the consumption of distillates in roads and railways transports, since natural gas had replaced furnace oils and other heavy distillates in industrial uses. The share of fuel oil had increased to 68.7 in 1975, and although it grew slowly at 1.3 per cent per annum during 1970-75 this was faster than total consumption during the same period (0.6 per cent per annum).(1)

Gasolines which had grown slowly at 3.5 per cent per annum during 1960-69 had kept their share constant at about 11.0 per cent until 1970. However, their share had declined to 9.8 per cent in 1975 as the consumption had declined annually at 3.2 per cent. The share of kerosenes had increased from 14.0 per cent in 1960 to 21.8 per cent in 1970 as the consumption had grown quickly at 14.3 per cent per annum during 1960-69; declining slightly to 21.4 per cent in 1975 as consumption grew slowly at 0.1 per cent per annum during 1970-75.

Kenya's pattern of petroleum consumption is slightly different from both India and Pakistan for reasons attributable to its recent independence and economic transformation. Nonetheless, fuel oils had dominated the consumption pattern, representing 73.5 per cent of total consumption in 1960. Its share had declined to 55.8 per cent in 1970 as the consumption had decreased annually at 0.5 per cent during 1960-70 while total consumption had grown slowly at 2.3 per cent per annum. It quickly increased

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(1) Data on 1970 and 1971 are not reliable because of the disruption of the economy during the Civil War.

at 12.8 per cent per annum which even was faster than the increase of total consumption (9.8 per cent per annum) during 1970-75, raising its share to 63.7 per cent in 1975. This can be attributed to the intensive uses of fuel oils in the industrial sector, road transport and railways.

The source of growth of petroleum consumption during the early period in Kenya came from kerosenes, the consumption of which had been induced by the movements of population from rural to urban areas. The 12.7 per cent annual increases in its consumption during 1960-70 had raised its share from 9.2 per cent in 1960 to 24.2 per cent in 1970. Kerosenes had found strong competition from electricity. This had led to a decrease in its share to 17.1 per cent in 1975 as the consumption had only grown at 2.4 per cent per annum during 1970-75.

Gasoline consumption in Kenya is relatively more important than in both India and Pakistan, a matter which could be attributed to differences in income distribution, on the one hand, and the increases in tourist activity and foreign businessmen, on the other. Its share had increased from 17.2 per cent in 1960 to 19.3 per cent in 1970 as its consumption had grown at 3.5 per cent per annum which was faster than that of total petroleum consumption. However, its share had declined slightly to 18.1 per cent in 1975 as its consumption, growing at 8.4 per cent per annum during 1970-75, had increased more slowly than that of the total petroleum consumption (9.8 per cent per annum).

The above-mentioned discussions have indicated that fuel oils (distillates and residuals) and kerosenes had dominated the consumption pattern of petroleum products in the three countries during 1960-75. The importance of fuel oils stems from their link with economic activities of productive sectors (industry and public transportation). Increases in the

consumption of kerosenes had been induced by the movements of populations from subsistance sectors to urban centres; as kerosenes are essential in uses of cooking and lighting. Fuel oils may find competition from coal in India and gas in Pakistan within the industrial sectors only. Also, though kerosenes find competition from electricity in household uses, they have been in demand for other relatively new uses such as aviation. The shares of gasolines are not only small but also declining, except that is, in Kenya.

In view of the link between the pattern of petroleum consumption and economic activities in the three countries, the responses of consumption of products to the post-October 1973's oil price increases are analysed in Table 2-7 which shows the year-to-year changes in consumption by products during 1970-75. The immediate shock in 1973 to the Indian economy was reflected in the 11.6 per cent declines in kerosenes consumption below the previous year, leaving fuel oils growth at 12.3 per cent, though the growth of total consumption had slowed down to 5.4 per cent relative to the previous year. In Pakistan, the 3.4 per cent decline in total consumption had mainly originated from the large decline of 21.8 per cent in gasoline consumption, since fuel oil had only declined by 1.4 per cent and kerosenes had slightly increased by 0.7 per cent. In Kenya, the 13.2 per cent increases in total consumption had originated from the increases in consumption of both kerosenes and fuel oils, while gasolines were declining by 6.6 per cent.

In 1974, the 1.9 per cent decline in total consumption of oil in India had been composed of the large declines of 21.7 per cent and 17.9 per cent in gasolines and kerosenes respectively, as fuel oil had continued to increase at 5.7 per cent. Like India, the 3.8 per cent increases in total consumption in Pakistan came basically from the 5.9 per cent increases

Table 2-7

The Year-to-Year Changes in the Consumption of Energy Petroleum Products of India, Pakistan and Kenya, 1970-75. (a)

(in percentages)

Country/item	1970/71	1971/72	1972/73	1973/74	1974/75
India					
Liquified petroleum gases	9.6	14.6	14.1	7.3	15.1
Gasolines	27.1	5.9	4.3	-21.7	- 5.1
Kerosenes	12.0	11.7	-11.6	-17.9	23.5
Fuel Oils (Distillates and Residuals)	14.2	6.0	12.3	5.7	7.5
Total products	14.6	7.6	5.4	- 1.9	9.6
Pakistan					
Liquified petroleum gases	-	-	-	-	-
Gasolines	0.5	6.8	-21.8	1.9	0.3
Kerosenes	27.3	21.2	0.7	-1.7	1.4
Fuel Oils (Distillates and Residuals)	-22.1	34.3	- 1.4	+5.9	- 0.7
Total products	- 7.6	12.9	- 3.4	3.8	- 0.1
Kenya					
Liquified petroleum gases	50.0	11.1	10.0	27.3	7.1
Gasolines	10.0	12.8	- 6.6	32.5	-2.3
Kerosenes	35.0	2.9	49.7	10.8	-9.7
Fuel Oils (Distillates and Residuals)	31.1	- 6.5	7.1	20.6	14.7
Total products	10.8	- 1.0	13.2	20.7	6.3

Source: Calculated from data mentioned in footnote of Table 2-6.
Note: (a) Data do not include non-energy petroleum products.

in fuel oils, while kerosenes had declined slightly by 1.7 per cent and gasolines, still at low level, had increased slightly by 1.9 per cent. In Kenya, the 20.7 per cent in total consumption had been composed of the 20.6 per cent increases in fuel oils and the 32.5 per cent recovery in gasoline consumption, though the increases in kerosenes had halted at 10.8 per cent.

In 1975, the 9.6 per cent recovery in total consumption in India came basically from the increases in consumption of both fuel oils and kerosenes by 7.5 per cent and 23.5 per cent respectively, since gasoline had continued its decline at 5.1 per cent. The slight decline of 0.1 per cent of Pakistan's total consumption came from a small decline in fuel oils and slight increases in both kerosenes and gasolines. Kenya's attempt to slow down the increases in total consumption had resulted in cutting the consumption of both gasolines and kerosenes by 2.3 per cent and 9.7 per cent respectively, while maintaining the increases of fuel oils consumption at 14.7 per cent which was higher than that of total oil consumption (6.3 per cent).

As a result, in their attempt to reduce their petroleum consumption in the face of oil price increases, the countries generally tried to maintain the level of consumption of products linked to productive sectors at the expense of products related mainly to private uses.

3. The Degree of Dependence on Petroleum Imports

The international petroleum industry is a good example of the strong departure from the free competition on which international trade theory has been based. As an international cartel, the Organisation of

the Petroleum Exporting Countries (OPEC) has controlled oil supply and decided the prices unilaterally. Therefore, the conditions of the world oil market would impose on the oil-importing developing countries serious problems, depending on the extent to which a country relies on petroleum imports. Moreover, the non-OPEC developing countries are in a vulnerable position, having no influence on the conditions of oil supply, because of their rather weak leverage in the international economy. Even if the future supply of crude petroleum is assured - which is by no means certain - the recent increasesin crude oil prices have threatened to play havoc with the developing countries' foreign exchange reserves and to jeopardise their industrial developments.

India and Pakistan can cover part of their oil requirements from the indigenous production of crude oil, while Kenya, where oil has not yet been discovered within her boundaries, has to import all her oil requirements.

The reliance on the imports of petroleum products depends on the extent to which a country has developed its oil refinery industry and where the domestic production of products is substituted for imports. The oil refineries of India, Pakistan and Kenya were built as wholly-owned subsidiaries of the international oil companies. The situation surrounding the construction of these refineries, as a case of multi-national investments, had many points in common where investments in small, market-orientated refineries . . were used as a market-defence strategy by the "major" oil companies and a market-entry strategy by the "newcomers" or "independents".(1)

(1) For detailed discussions concerning the establishing of oil refineries in India, Pakistan and Kenya, see Dasgupta, op.cit., Chapter 9; E.Penrose, The Large International Firms in Developing Countries - The International Petroleum Industry, Allen and Unwin, London, 1968, Chapter 8; B. Herman, "A Case of Multinational Oligopoly in Poor Countries: Oil Refining Investment in East Africa", Journal of Development Economics, Vol. 2, No. 2 (1975), pp. 121-43.

Among the various reasons for which the oil-importing developing countries have been pressing the oil companies to establish domestic oil refinery industries is to save foreign exchange which is roughly equal to the difference between the costs of importing petroleum products and the costs of crude oil for producing the same amounts of products, net of profit, remittance and other foreign exchange costs of refining. However, evidence, arising from the experiences of various developing countries, indicates that the impact of the oil refinery industry on their balance of payments is likely to be unfavourable inasmuch as the international oil companies fix the prices of refined products at a high level and remit large proportions of the realised profits abroad.

Studying the foreign private investment in the oil refinery industry in Kenya, Herman(1) concluded that well over one-third of the value added in refining would be excess profit, and the prices and output pattern would result in an unnecessary after tax transfer from Kenya to the refinery owners abroad. He estimated that, under 1969 conditions, about $5.7 million were excess profits which entailed an unnecessary after tax transfer of about $3.4 million per year abroad. He attributed the decision of the Kenyan government to acquire 50 per cent of the shareholding in 1971 to a recognition of the unfavourable impact of the foreign refinery operations on the balance of payments.

Assessing the impact of foreign private investment in the oil industry on the balance of payments of India, Vedavalli(2) estimated that the negative effects of refinery activity amounted to $2.2 million between 1955 and 1970 and the negative impact of foreign investment in the marketing

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(1) Herman, op.cit., pp. 135-43.
(2) R. Vedavalli, Private Foreign Investment and Economic Development - A Case Study of Petroleum in India, Cambridge University Press, London, 1976, pp. 158-60.

sector amounted to $26.6 million during 1954-70. The unfavourable impact of the operations of foreign investment on the balance of payments were caused by the higher prices charged by the oil companies; a case which was found in both India(1) and Pakistan.(2)

Therefore the domestic oil refinery industry can contribute to the saving of foreign exchange only when it is operating under the control of the country. This would give the country the opportunity to buy crude oil and products from the international market at prices which are less than those fixed by the multinationals. This would also enable the developing countries to diversify the sources of crude oil and the use of the recently growing government-to-government deals with OPEC countries.

The degree of dependence of India, Pakistan and Kenya on petroleum imports will be analysed with respect to the imports of both crude oil and refined oil products as well as the overall dependence on petroleum imports which will be compared, for each country, with the general reliance of the low-income developing countries on oil imports. This involves the calculation of three ratios as follows:-

(i) The degree of dependence on the imports of crude oil is measured by the ratio of crude imports to the refinery throughput which is defined as the processed crude oil, whether it is imported or produced domestically.

(ii) The degree of dependence on the imports of petroleum products which is measured by the ratio of imports of refined products to net consumption of products.

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(1) Ibid, Tables 4.5 and 4.6, p.78; Table 4.7, p.79.
(2) Oil and Gas Journal, 28 June 1965, p. 45.

Products are defined here as the energy petroleum products, i.e. excluding the non-energy products such as lubricants and greases. Consumption is defined as the net inland consumption of products, excluding exports, bunkers and refinery fuels and losses.

(iii) The degree of the overall dependence on petroleum imports is measured by the ratio of all imports of crude oil and products to the total availability which is defined as the refinery throughput plus the imports of petroleum products.

Table 2-8 shows, for India, Pakistan and Kenya, the degree of their dependence on the imports of crude oil and refined oil products as well as the overall dependence which is compared to the general reliance of the low-income developing countries on petroleum imports during the period 1960-75. The reliance of India and Pakistan on imports of crude is fairly high, amounting to 66 and 89 per cent, respectively, of total refinery throughput in 1973, whereas all Kenya's requirements of crude are imported. The dependence on crude imports has varied depending mainly on the changes in the levels of domestic output of crude, but also on the changes in domestic consumption of oil products. The 1960s marked a reduction in the dependence of India on the imports of crude when the domestic output of crude oil grew faster than oil consumption. In 1969, imports of crude accounted for 61 per cent of total throughput when domestic production amounted to 6.723 million tons, whereas crude imports reached 10.702 million tons. While domestic production lagged behind consumption in the early 1970s, the dependence on imported crude increased and amounted to 66 per cent.

Table 2-8

The Degree of Dependence on the Imports of Petroleum Crude and Products and the Overall Dependence of India, Pakistan, Kenya and the Low-Income Group of the Non-OPEC Developing Countries, 1960-75.

(in percentages)

	1960	1965	1968	1970	1971	1972	1973	1974	1975
The Dependence on Imports of petroleum Crude : (1)									
India	94	70	65	63	65	63	66	70	67
Pakistan	-	82	86	86	86	88	89	88	89
Kenya	-	100	100	100	100	100	100	100	100
The Dependence on Imports of petroleum products (2): India	23	20	4	7	10	16	17	13	14
Pakistan	98	28	36	11	27	16	19	21	21
Kenya	119	5	22	20	12	21	11	15	17
The Overall Dependence on crude and products (2)									
India	95	75	66	65	68	68	71	74	71
Pakistan	86	86	90	88	89	90	90	90	91
Kenya	100	100	100	100	100	100	100	100	100
Non-OPEC Low-Income Group of LDCs (3)	92	84	79	79	79	79	80	80	-

Source: (1) Calculated for the period 1960-70 from United Nations, World Energy Supplies, 1950-1974, op.cit., Table 6, pp. 192-227, and for the period 1970-75 from United Nation, World Energy Supplies, 1972-1976, op.cit., Table 6, pp. 58-76.
(2) Calculated from data mentioned in footnote of Table 2-6.
(3) Calculated from Lambertini, op.cit., Table 4, p. 7.

In 1974, the dependence on crude imports increased to 70 per cent which has been the highest level to date. During this year, imports of crude increased greatly to 14.629 million tons to compensate the cut-down in product imports, whereas crude output only registered 7.490 million tons. In 1975, the dependence on crude imports decreased to 67 per cent as the rise in output of crude from the new discoveries was matched by small decreases in crude imports.

The degree of dependence of Pakistan on crude imports increased throughout the 1960s and amounted to 86 per cent. In 1970, while crude imports amounted to 3.043 million tons, domestic production recorded 0.469 million tons of crude. By 1973, imports of crude accounted for 89 per cent of refinery throughput mainly because of the stagnation of discovery activity and the absolute decline in the level of domestic production of crude. In that year, imports of crude declined to 2.302 million tons because of the separation of Bangladesh, though they were matched by the rise in imports of products, but domestic production of crude declined to 0.347 million tons. By 1975, while crude imports increased to 2.871 million tons, domestic output increased slightly to 0.288 million tons which followed the low level of 0.279 million tons in 1974.

The dependence on product imports diminished gradually as the domestic refineries were established and their capacities have been increased. The dependence of India on product imports decreased from 23 per cent in 1960 to its lowest point of 4 per cent in 1968; and increased again to 14 per cent in 1975. Until 1960, Pakistan was importing almost all its requirements of products (98%). Imports of products in total consumption had declined to 11 per cent in 1970; but

increased again to 21 per cent in 1975. The high dependence of Kenya on imports of products before the establishing of its refinery in 1964 can be explained by the fact that imports were obtained not only for the Kenyan market but also for East African countries (Tanzania and Uganda). Thereafter, the dependence on imports decreased to 5 per cent in 1965, increasing again to 17 per cent in 1975.

The fact that India, Pakistan and Kenya acquired their domestic refineries does not lead automatically to self-sufficiency in oil products. They still import rather a small part of their requirements of products when refinery capacity falls short from satisfying domestic demand. However, even if a country has achieved theoretically sufficient capacity, its refineries may not be able to supply the quantities of each particular product which is compatible with the pattern of domestic demand. The domestic refineries are likely to produce surpluses in some products and deficits in others. This is the problem of "product-imbalance" between refinery output and the consumption pattern which usually is corrected through international trade in petroleum products.

The degree of dependence of India, Pakistan and Kenya on oil imports varies, though it reflects, in general, the heavy reliance of the other low-income developing countries on oil imports. In 1974, while the low-income group depended on imports for 80 per cent of their oil needs, the higher income countries imported 36 per cent of their oil requirements; the middle income group imported about half their oil requirements.(1)

In general, India is less dependent on oil imports than the low-income countries, in aggregate, while Pakistan's reliance on imports is higher. As in the case of India, the dependence of the low-income group on imports

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(1) Lambertini, op.cit., p.10.

declined during the 1960s from 92 in 1960 to 79 per cent in 1972 because of the large increase in crude oil production which was achieved in 1968 and continued into the early 1970s. If these countries are to increase their production capacity from its current level, investments are required to finance production increases in relatively new areas and to arrest production declines in older producing areas.

In India and Pakistan, as well as the low-income developing countries, the dependence on oil imports started to increase by the early 1970s as consumption had grown faster than domestic production.

4. The Developments in the Domestic Production of Petroleum Crude

Growth trends between petroleum crude production and imports in the three countries during 1960-75 are shown in Table 2-9. India's production of crude was growing at 31.1 percent per annum during 1960-70, while imports grew only at 7.4 per cent per annum. This picture had changed during 1970-75 when production, growing at 4.0 per cent per annum, had lagged behind crude imports which had grown annually at 4.5 percent.

In Pakistan, the 43.8 per cent average annual growth rate of crude imports was only matched by 4.4 per cent per annum increases in production during 1960-70. The case was even worse during 1970-75 when imports grew at 0.6 per cent per annum while the crude production declined by -6.5 per cent per annum. Kenya which has not yet discovered petroleum experienced a fast growth rate of crude imports reaching 38.9 per cent per annum during 1960-70 and slowing down to 5.1 per cent per annum during 1970-75.

The lagging behind /of production could be explained by the fact that the producing wells in both India and Pakistan were all discovered in the early 1950s and 1960s; there has been no significant addition to their number in the past 10 years. Most of the recent discoveries are marginal, and represent small accumulations of oil. Since the addition to proved and

Table 2-9

The Average Annual Growth Rates of Production and Imports of Crude Petroleum in India, Pakistan and Kenya, 1960-75.

	Petroleum Crude Production		Petroleum Crude Imports	
	1960-70	1970-75	1960-70	1970-75
India	31.1	4.0	7.4	4.5
Pakistan	4.4	-6.5	43.8	0.6
Kenya	-	-	38.9	5.1

Source: Calculated from the source (1), footnote of Table 2-8 by using the formula r (the average annual growth rate)

$$r = \sqrt[t]{\frac{P_t}{P_o}} - 1$$

indicated reserves have been small, the current levels of proved reserves would go down appreciably under the pressures of increased production.

Table 2-10 shows thevintage composition of crude production and yield per well in mid-1974 in India and Pakistan. 43 percent of the Indian production of crude has been produced from fields discovered before 1955, 49 per cent from fields discovered between 1955 and 1965, and 8 per cent from fields discovered since 1965. Pakistan has a relative advantage since 43 per cent of its domestic crude comes from fields discovered after 1965. However, more than one half of its production still comes from older fields.

The data on field vintage on well productivity indicates that productivity in fields discovered since 1955 and 1965 was significantly higher

Table 2-10

India and Pakistan: Vintage Composition of Crude Oil Production and Yield per Well - mid 1974.

(b/d and %)

	Fields Discovered							
	Before 1955		From 1955 to 1965		From 1965 Onwards		Total	
	b/d	%	b/d	%	b/d	%	b/d	%
India								
production(1)	67,742	43	76,778	49	11,480	8	156,000	100
yield per well(2)	68.8	-	167.3	-	112.5	-	120.6(*)	-
Pakistan								
production(1)	4,006	57	-	-	3,057	43	7,063	100
yield per well(2)	333.8	-	-	-	164.3	-	518.9(*)	-

Source: (1) Lambartini, op.cit., Table 11, p. 22.
(2) Ibid, Table 12, p. 23.

(*) Averages

than in older fields in India. Only in Pakistan are the older fields more productive than the newer ones. Consequently, India's decline rates(*) had increased from 2.3 per cent in 1965 to 6.1 per cent in 1974 since the increases of production from 23 million barrels in 1965 to

(*) A decline rate is the rate at which well yield declines due to loss of reservoir pressures and well interference. The production/reserves ratio has usually been adopted as a proxy to the decline rate of the country as a whole. The ratio, in the limit, is equal to the decline rate. A fall in the decline rate means that known reserves have increased faster than the rate of offtake.

56 million barrels in 1974 had been matched by declines of reserves from 1000 to 926 million barrels.[1] Pakistan's decline rates had decreased from 14.8 per cent in 1965 to 10.0 per cent in 1975 as the 3 million barrels increases in reserves had been matched by 1 million barrels declines in production during that period. However, despite the improvement in Pakistan's decline rates, they are still higher than the other producing areas.

There have been many reasons behind the stagnation of domestic production of crude in the developing countries. Firstly, declining international crude prices during the 1960s, according to Lambertini,[2] has affected the expansion of crude production in countries where production was only geared to the domestic market, and where operations were state-owned. Prices of crude and products, domestically produced, were often held at unprofitable levels, discouraging investments and exploration in newer, more risky areas. The falling profitability discouraged the development of smaller prospects in known areas. Consequently, the number of successful exploratory wells drilled relative to total drilling (the success ratio) declined, leading - together with the stagnation of exploratory effort - to the stagnation or decline of reserves and decline in yield.

Secondly, the decline in the profitability of crude oil operations had reduced the investment funds that the industry could generate to finance its expansion in non-OPEC developing countries. Increasingly,

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(1) Lambertini, op.cit., Table 13, p. 24.

(2) Ibid., p. 21.

the industry responded to the growing demand for petroleum, during the 1960's by expanding refinery capacities to process imported crude. Hence, investments in refining further restricted . . the availability of capital for crude oil production operation.

Thirdly, it may be added that the availability of plenty of low-cost oil from the traditional producing areas such as the Middle East and Venezuela resulted in insignificant efforts from the multi-nationals to explore and produce oil in the non-OPEC developing countries. The activities of the oil companies in such markets were limited to the establishing of facilities to accommodate the ' crude produced in the traditional productive areas. Therefore, the activities of the oil companies had not exceeded the refining of their crude and marketing and distributing the products.

Finally, the international oil companies had not only refrained from searching for oil in the new areas in the non-OPEC developing countries but also used their power to block the governments of developing countries from undertaking such activities themselves. The international oil companies used the power of their home governments and their influence in World organisations such as the International Monetary Fund and the World Bank to pressure the governments of the non-OPEC developing countries not to use public funds to undertake indigenous oil explorations.(1) The nominal argument used by these "aid-giving" foreign institutions was that "aid money" should not be diverted to oil exploration or building government refineries because the international oil companies had the vast pools of capital and experience needed for this task. M. Tanzer argued that the "real aim of these foreign agencies was to support the

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(1) M. Tanzer, The Energy Crisis: World Struggle for Power and Wealth, Monthly Review Press, London, 1974, p. 108.

international oil companies in their profit-making activities.[1]

5. Conclusion

This chapter reviewed the relative importance of oil in the pattern of energy consumption in India, Pakistan and Kenya during the period 1960-75 and the extent to which these countries depend on oil imports to satisfy domestic consumption. The significance of oil in total energy consumption varies among India, Pakistan and Kenya, though it remains in line with the general trend in other low-income developing countries. During the period 1960-73, oil consumption increased by 2.5 times in the low-income countries, while in India, Pakistan and Kenya, it increased by 3.0, 1.5 and 1.6 times, respectively. But, while during the same period, the share of oil in total energy consumption declined in Pakistan, a gas-orientated economy, from 52 to 42 per cent, it increased in India, a coal-orientated economy, from 15 to 25 per cent, reflecting the general situation in the low-income countries, whose oil share increased from 32 to 42 per cent during that period. In general, the patterns and trends of oil consumption in the three countries are dominated by such products which are related to the consumption of the productive sectors rather than to final consumers, indicating the close link between oil consumption and economic activity.

The degree of dependence on petroleum imports, which is dominated by crude oil, varies among the three countries, though it reflects the heavy reliance on oil imports of the low-income countries. This dependence is governed by the level of domestic output of crude oil, whose growth is determined by the efforts to add new oil reserves by developing the existing fields and exploring new ones. Kenya has to import all her

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(1) Ibid, p. 109.

oil requirements; Pakistan's imports of oil and refined oil products, as percentages of oil consumption, increased from 86 per cent in 1960 to 90 per cent in 1973, while they decreased from 95 to 71 per cent in the case of India which came in line with other low-income countries whose imports also decreased from 92 to 81 per cent.

With regard to the short-term, the availability of non-oil indigenous sources of energy in India and Pakistan helped in mitigating the immediate adjustment of oil consumption during 1973-75. While the absolute amount of energy consumption increased in the three countries, the share of oil in the total declined to about 23 per cent in India and 40 per cent in Pakistan, counter-balanced by a rise in coal consumption in the former and gas consumption in the latter country, whereas in Kenya the share of oil actually increased to 93 per cent, due to the absolute decline in imported coal. The absolute decline in the consumption of oil was noticeable in India in 1974 (1.9 per cent) but slight in Pakistan in 1975 (0.1 per cent), whereas oil consumption in Kenya only slowed down at 6.3 per cent during 1975. The efforts made to adjust oil consumption in the three countries were generally directed on products related to household consumption in an attempt to maintain consumption levels of products which are used in productive sectors. By 1975, the share of oil imports in total oil consumption in India remained at 71 per cent because of the rise in domestic production of crude oil, whereas it increased to 91 per cent in Pakistan mainly because of the absolute decline in the indigenous production of crude.

CHAPTER III

PETROLEUM CONSUMPTION AND ECONOMIC GROWTH

Historically, in the developed and developing countries, there has been a close relationship between economic growth and energy consumption. Such a relationship has been drawn from the long-term historical record of the industrialised countries, the similarity over decades of experiences of different countries and the cross-sectional studies of countries of different stages of economic development. The association between changes in energy consumption and real economic growth is summarised by the term "energy elasticity".(1)

1. The Association between Energy Consumption and Economic Growth in Developing Countries

The most striking feature of the poor countries is that their economic, social, and political changes, which usually accompany the economic development process, would lead inevitably to a period when energy consumption grows faster than national output. Such a trend would be reinforced by the accepted tenet in economic faith of the close relationship between economic growth and industrialisation. Furthermore, industrialisation may involve sectoral shifts in favour of energy-intensive industries and a concentration of production and expenditure towards energy-intensive products. Despite the dominance of traditional sources of energy in LDCs, an early study of the United Nations showed a very high positive correlation between per capita income and per capita commercial energy consumption.(2)

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(1) See V. Smil and T. Kuz, "European Energy Elasticies", Energy Policy, Vol.4, No.2 (June 1976), pp. 171-74; F.G. Adam and P. Miovic, "On Relative Fuel Efficiency and the Output Elasticity of Energy Consumption in Western Europe", The Journal of Industrial Economics, Vol. 16, No. 1(November 1968), pp. 41-56.

(2) United Nations, Techniques of petroleum development, U.N. New York, 1964, pp. 1-29.

The rapid increases in energy consumption today in LDCs is not a new phenomenon as those countries which were developing during the nineteenth century went through exactly the same process. Darmstadter found that between 1890 and 1920, energy consumption in the U.S. increased one-and-a-half times as fast as GNP, while between 1920 and 1965, it grew more slowly; only three-quarters of the rate of GNP. The pre-1920's faster growth rates reflected primarily the rapid growth of manufacturing.(1)

When a country is moving steadily towards a higher degree of energy-intensiveness in production, then the specific energy contents of incremental output will be higher than the average for all output from which it started. Moreover, much of the used energy would not generate immediate output since a typically poor country devotes a large amount of its resources to establishing the infrastructure and structural outlets. When the country reaches the state of maximum energy dependence, its energy co-efficient tends to fall as the energy inputs increase less than the resulting rises in output.

L.G. Brookes(2) tested the hypothesis that, "as a country moves through the various stages of its economic development from primitive subsistance agriculture to the ultimate state of full energy-dependent production, its useful energy elasticity steadily falls from a high value tending asymptotically to one". His findings indicated that the slope of the whole group of countries, developed and developing, started at some value above one and moved closer to one as they moved up the curve of industrial development. He found that the slope of developing countries was always steeper than the corresponding slope of developed countries.

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(1) J. Darmstadter, "Energy", in R.G. Ridker (ed.), Population, Resources and the Environment, Commission on Population Growth and the American Future, Vol. 3, U.S. Government Printing Office, Washington, D.C., 1972, pp.105-49.

(2) L.G. Brookes, "More on the Output Elasticity of Energy Consumption", The Journal of Industrial Economics, Vol. 21, No. 1 (November 1972), pp.87-90.

The rapid rise in energy consumption and the high energy elasticity in the developing countries can be attributed to the fact that large proportions of energy inputs are so tightly linked with the essential uses in household sector but more particularly, productive sectors, i.e. industry, agriculture and public transports, whereas in the advanced countries, a considerable proportion of energy consumption is used in personal services and comfort functions, i.e., air conditioning, heating and private transport. According to Hudson and Jorgenson,(1) energy uses can be split into two broad categories: discretionary uses and process uses. Discretionary uses include energy inputs for personal and private uses such as heating, coaling and automobile travel, while process uses cover fuel inputs for heating materials, driving machinery and turning electric generators. Discretionary uses are, typically, characterised by greater flexibility than process uses. Firstly, the associated capital stock in discretionary uses is generally less durable and easier to replace with more energy efficient capital. Secondly, discretionary uses are inputs to the generation of psychologically rather than technically performance, e.g. desired miles driven rather than energy inputs required per ton of aluminia to be smelted, so that the level of use within the existing capital stock can be more readily varied. Given this categorization, we would expect to find a low ratio of discretionary to process use in manufacturing and an even lower ratio in electric generation, whereas the ratio is high in personal uses.

Additionally, energy elasticities in developing countries have increased even more due to institutional reasons. Most of these countries have not shown preferences for energy efficiency and environmental

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(1) E.A. Hudson and D.W. Jorgenson, "Tax Policy and Energy Conservation", in D.W. Jorgenson (ed.), Econometric Studies of U.S. Energy Policy, North Holland Publishing Co., Amsterdam, 1976, p. 65.

regulations which have led to a reduction in the energy-income relationship in the advanced countries.

In view of the strength of the energy-income relationship in developing countries, the idea, arising during the 1973 changes in the energy market, that energy conservation does not affect economic growth, is questionable. Richardson[1] argued that measures to promote energy conservation can be implemented only at the expense of economic growth and the risk of disturbing the growth of the economy. Criticizing the energy project of the Ford Foundation, Burnham[2] pointed out that the idea that greatly reduced energy usages will not seriously affect the economic wellbeing would mislead the nation.

Table 3-1 shows the average annual growth rate of GDP, and the consumption of total energy and oil of India, Pakistan and Kenya for the periods 1960-70 and 1970-75. In India total energy consumption, while growing faster than GDP, lagged behind oil consumption. During 1960-70, while GDP grew annually at 3.6 per cent, oil consumption grew at 8.8 per cent per annum, twice as fast as the growth of energy consumption. When the growth of GDP slowed down to only 1.8 per cent per annum during 1970-75, the growth of energy consumption accelerated at 6.3 per cent per annum. During that period, oil consumption, which had halted to 6.9 per cent per annum, was still growing faster than total energy consumption.

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(1) Richardson, op. cit., p. 4.

(2) Energy Policy Project of the Ford Foundation. A Time to Choose - American Energy Future, Ballinger publishing Co., Cambridge, Mass., 1974, p. 362.

Table 3-1

The Average Annual Growth Rates[a] of GDP and the Consumption of Oil and Energy in India, Pakistan and Kenya for the periods 1960-70 and 1970-75

	GDP[1]		Total energy[2]		Oil[2]	
	1960-70	1970-75	1960-70	1970-75	1960-70	1970-75
India	3.6	1.8[3]	4.7	6.3	8.8	6.9
Pakistan	5.4[b]	2.4[3]	7.8[b]	4.0	6.7[b]	0.7
Kenya	6.9[c]	4.6	1.7[c]	8.9	1.0[c]	9.7

Source: (1) United Nations, Yearbook of National Accounts Statistics, 1976, International Tables, Vol. 2, U.N., New York, 1977, Table 4A, pp. 124-231.

(2) Calculated from data shown by footnote of Table 2-1, Chapter II.

(3) Calculated from country pages in International Monetary Fund, International Financial Statistics, Vol. 31, No. 5 (May 1978).

Note: (a) Average annual growth rate (r) = $\sqrt[t]{\frac{Pt}{Po}} - 1$

(b) Growth rates of all Pakistan, including Bangladesh, cover the period 1960-69.

(c) Growth rates of GDP of Kenya covers the period 1964-70 for which the data is only available. Growth rates of oil and energy consumption are shown for the same period for the purpose of consistency.

The same pattern of growth repeated itself in Pakistan. While GDP was growing at 5.4 per cent per annum during 1960-70, energy consumption was growing annually at 7.8 per cent which is slightly faster than the growth of oil consumption (6.7 per cent). When GDP growth slowed down to 2.4 per cent per annum during 1970-75, total energy consumption grew at 4.0 per cent per annum, but oil consumption stagnated at 0.7 per cent per annum.

Consumption of energy and oil lagged behind the growth of GDP in Kenya during the period 1964-70; the years which followed directly the independence of the country. During that period, while energy and oil consumption grew at 1.7 and 1.0 per cent, respectively per annum, GDP grew at 6.9 per cent per annum. However, such a pattern changed dramatically during the expansion of industrial activities in the mid-1970s. Hence, oil consumption grew annually at 9.7 per cent, twice as fast as GDP; and total energy consumption grew slightly slower at 8.9 per cent per annum.

Rough estimates(*) of the income elasticity of the demand for both total energy and oil can be obtained by dividing the growth rates of both energy and oil consumption by the growth rates of GDP over a given period. The numerical values would, then, give the percentage changes in both energy and oil consumption for each 1.0 per cent changes in GDP as follows:(1)

(*)Formally, the income elasticity of demand for energy can be expressed as:

$$e = \frac{dE}{dY} \cdot \frac{Y}{E} = \frac{d \log E}{d \log Y},$$ where E is the consumption of energy and Y is income.

(1) Calculated from Table 3-1.

	Elasticity of Total Energy		Elasticity of Oil	
	1960-70	1970-75	1960-70	1970-75
India	1.31	3.50	2.44	3.83
Pakistan	1.44	1.67	1.24	0.29
Kenya	0.25	1.93	0.14	2.11

It seems that individual countries, because of their unique economic structure, are locked into a particular pattern of energy consumption in generating national income. However, this relationship is not immutable; it holds well over a period of time, changing slowly as structural changes proceed. For any given changes in India's national output, changes in energy and oil consumption would be not only larger than Pakistan and Kenya but would also accelerate faster. Moreover, the computed elasticities for India and Pakistan , in the last decade, are greater than one. India's income elasticity of demand for energy increased from 1.31 during 1960-70 to 3.50 during 1970-75. Moreover, oil elasticity which was over 2 during 1960-70 increased by nearly 50 per cent, reaching 3.83 during 1970-75.

Pakistan's economy has less appetite for energy and in particular for oil than India. Between 1960-69 and 1970-75, income elasticity of the demand of energy increased slightly from 1.44 to 1.67, while oil elasticity declined sharply from 1.24 to only 0.29. In contrast, Kenya has experienced large changes in its oil and energy elasticities. Demand for energy and oil with respect to income during 1964-70 was inelastic. During 1970-75, the elasticities of energy and oil became 1.93 and 2.11 respectively.

2. The Effect of the Pattern of Economic Growth on Petroleum Consumption

Increases in oil consumption would accompany a growth in national output as the country's production possibilities curve shifts outwards over a period of time whether it is caused by technological progress, capital accumulation or additions to other factors of production. However, the increases in oil consumption depend not only on the overall growth of the economy but also on the degree to which oil is used in the economy. This is influenced by the growth of various economic sectors and the composition of national output. When the oil-intensive sectors are the main source of economic growth, the economy would experience an acceleration in oil consumption.

The Pattern of Economic Growth

A fast rise in the consumption of energy and, in particular, petroleum in developing countries, can be partly induced by structural changes in the pattern of economic growth when these countries are embarking upon economic development programmes involving a great emphasis on oil and energy-intensive sectors, as a source of growth. Theories,(1) explaining economic development in developing countries, are based on an essential distinction between subsistence and modern sectors. The distinction(2) between these two sectors, which is based on the difference in capital intensity and technical advance, implies, by definition, that the industrial sector is more oil and energy-intensive than the agricultural sector.

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(1) See J.C. Fei and G. Ranis, "Agrarian, Dualism and Economic Development", in I. Adelman and E. Thorebecke (eds.), The Theory and Design of Economic Development, The John Hopkins Press, Baltimore, 1966, pp. 3-41.

(2) The distinction between the two sectors can be found in D. Colman and F. Nixon, Economics of Changes in Less Developed Countries, Philip Allen, London 1978, p. 29.

Economists maintain that the fortunes of agriculture and industry are closely interwoven in that the expansion of industry depends to a large extent on improvements in agricultural productivity whose growth depends on adequate supplies of industrial output.(1) Baran,(2) arguing that there can be no question as to whether development should proceed from industrialisation or from the improvement of agriculture, concluded that development can take place only by simultaneous efforts in both directions. The emphasis on the relationship between these two sectors came as an extension of the balanced growth doctrine which refers to the path of economic development and the pattern of investment necessary to keep the different sectors of the economy in balance so that no lack of development in one sector impedes development in another.

However, it seems that economic development strategies in most developing countries have appeared to advocate the developing of an industrial sector rather faster than an agricultural sector. There is a good deal of theoretical and empirical evidences to indicate that the pattern of development across countries has shown a shift of resources from the agricultural to the industrial sector. Thirlwall(3) attributed the broad development of the industrial sector to the manner in which demand changes as income grows. The most noticeable demand shift is the rapid rise in the demand for capital and consumer durable goods and a shift away from food, beverages and textiles. By analysing the historical pattern of industrial growth and trade for cross-sectional

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1) See A.P. Thirlwall, Growth and Development - With Special Reference to Developing Economies, 2nd Ed., MacMillan, London, 1978, p. 170; R.B. Sutcliffe, Industry and Underdevelopment, Addisson-Wesley, New York, 1971, p. 72.
2) P.A. Baran, The Political Economy of Growth, Monthly Review Press, London, 1975, pp. 282-3.
3) See Thirlwall, op.cit., p. 42.

data of fifty-one countries. Chenery[1] reached the conclusion that the resource shifts cut of agriculture are occured as part of the development process as measured by rising per capita income. He found that the elasticity of the agricultural sector with respect to income is less than 0.5, while for industry it is over 1.3 and for service it is approximately 1.0.

It has been noticed that the application of "big-push" and "balanced growth" theories have been interpreted in a way which underestimate the role of the agricultural sector in favour of heavy industry. Mahalanobis'[2] two-sector model, providing part of the basic rationale for the Indian Planning Commission's Draft of the Second Five-Year Plan of India, concentrated on the expansion of the capacities of both the consumer and capital goods industries. Such development strategy in India was criticized by Colman and Nixon who argued that it resulted in a relative neglect of the agricultural sector which led to the problem of food supply.

Moreover, the expansion of the industrial sector has been favoured by the advocates of unbalanced growth doctrine which recognises the existence of inter-industry linkages, limited resource availability and large lumps of indivisible investments. Thirlwall[3] argued that the great backward and forward linkages between manufacturing activities, strengthening the cumulative nature of development, were another powerful reason for industrialisation. Such linkages have enhanced, in Streeten's[4] view, the opportunity for successful investment decisions, since

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(1)H.B. Chenery, "Patterns of Industrial Growth", American Economic Review, Vol. 50, No. 4, (September 1966), p. 634.

(2)See P.C. Mahalanobis, "The Approach of Operational Research to Planning in India," Sankhya: The Indian Journal of Statistics, Vol.16, Part 1 & 2 (1955).

(3)Thirlwall, op.cit., p. 184.

(4)P. Streeten, "Unbalanced Growth", Oxford Economic Papers, Vol. 11, No. 2 (June 1959), pp. 175-84.

simultaneous investments in a series of industries, in harmony with the pattern of consumer's demand and different industries' demand for each other's products, is required.

Furthermore, a rapid growth of the consumption of oil and energy has been induced through the expansion of the service sector and the changes in the pattern of its activity during periods of economic development. Bauer and Yamey(1) drew attention to the fairly large service sector in developing countries. They noticed that economic development has accompanied a decline in the traditional services of pre-industrial times and a rise in those services which are associated with the growth of manufacturing. Additionally, Katouzian(2) found that new service activities, linking the growth of leisure and high mass consumption, tend to have a very high income elasticity of demand.

The association between energy consumption and service activities increases as the level of economic development of a developing country rises. Adam and Miovic(3) concluded that non-industrial output tends to keep energy consumption high, when they found that, for western European countries, the energy co-efficient with respect to GDP was higher than that related to industrial output. Moreover, the highest useful energy consumption per unit of output can be found in the United States where services account for about one-half of its GDP.(*)

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(1) P. Bauer and B. Yamey, "Economic Progress and Occupational Distribution", Economic Journal, Vol. 61 (December 1951), pp. 743-50.
(2) See M.A. Katouzian, "The Development of the Service Sector: A New Approach", Oxford Economic Papers, Vol. 22, No. 3 (November 1970), pp. 373-81.
(3) Adam and Miovic, op.cit., Table iv, p. 45.

(*) In 1975, the wholesale and retail trade, and other services accounted for 18 and 39 per cent respectively, of GDP of the United States.

For India, Pakistan and Kenya, Table 3-2 shows the sectoral composition of GDP in 1960, 1970 and 1975, and the average annual growth rates of GDP by the kind of economic activity which took place during the periods 1960-70 and 1970-75.

During 1960-70, the share of the agricultural sector in GDP decreased from 47 to 43 per cent in India, from 45 to 32 per cent in Pakistan, and from 38 to 31 per cent in Kenya. By mid-1970s, while such a share remained constant in India, it decreased to 31 and 27 per cent in Pakistan and Kenya, respectively. On the other hand, the share of industrial activities, during 1960-70, increased from 13 to 17 per cent in Pakistan and from 12 to 13 per cent in Kenya, whereas it remained constant at 15 per cent in India. By 1975, it increased to 16 per cent in India, declined to 16 per cent in Pakistan and did not change in Kenya.

In all the three countries the share of the service sector increased during the period 1960-75. The share of wholesale and retail trade increased from 9 to 11 per cent in India and from 9 to 10 per cent in Kenya, while it remained unchanged at 13 per cent in Pakistan. While the share of transport decreased from 5 to 4 per cent in India, and from 7 to 5 per cent in Kenya, it remained unchanged at 6.0 per cent in Pakistan. Other services increased from 20 to 29 per cent in Pakistan and from 23 to 27 per cent in Kenya, but decreased from 15 to 13 per cent in India.

During this time, industrial and service activities grew faster than not only agricultural sectors but also GDP as a whole. During the period 1960-70, Industrial, transport, wholesale and retail trade, and others in India were growing at 5.1, 5.3, 4.4 and 4.5 per cent per annum, respectively, which were faster than the agricultural sector, which was growing at 1.9

Table 3-2

The Sectoral Composition[1] of GDP in 1960, 1970 and 1975, and the Average Annual Growth Rates[2] of GDP by the kind of economic activity during the periods 1960-70 and 1970-75 in India, Pakistan and Kenya. (in percentages)

		Agri-culture	Industrial Activities	Construction	Wholesale & Retail Trade	Transport & Communication	Others	GDP[a]
India								
Composition:	1960	47	15	4	9	5	15	95
	1970	43	15	5	10	5	14	92
	1974	43	16	4	11	4	13	91
Growth:	1960-70	1.9	5.1	6.6	4.4	5.3	4.5	3.6
	1970-74	-0.7	3.2	-0.6	2.2	2.3	4.5	1.4
Pakistan								
Composition:	1960	45	13	3	13	6	20	100
	1970	32	17	4	13	6	18	90
(3)	1975	31	16	5	13	6	29	100
Growth:	1960-70	5.0	9.4	9.1	7.3	8.0	6.0	(4) 5.2
	1970-75	2.1	3.6	10.1	5.5	6.1	5.7	2.4
Kenya								
Composition:	1964	38	12	4	9	7	23	93
	1970	31	13	5	8	7	26	90
	1975	27	13	5	10	5	27	87
Growth:	1964-70	5.9	7.4	8.0	4.7	8.8	8.9	6.9
	1970-75	3.0	8.3	3.2	0.6	2.5	8.5	4.6

Source: (1) United Nations, Yearbook of National Accounts Statistics, 1977, op.cit., Table 3, pp. 47-123.
(2) Ibid, Table 4A, pp. 124-231.
(3) United Nations, Monthly bulletin of statistics, Vol. 32, No. 12 (December 1978), Table 65, pp. 208-15.
(4) Calculated from International Monetary Fund, International Financial Statistics, Vol. 30, No.9 (September 1977).

Note: (a) The percentage distributions of GDP by kind of economic activity do not add to 100 per cent because import duties are not included, in most cases, in the reported industrial activities.

per cent per annum and even faster than the economy as a whole which had grown at 3.6 per cent per annum during this period. During 1970-75, while agricultural output declined, absolutely, by 0.7 per cent per annum industrial, transport, wholesale and retail trade, and others, grew annually, at 3.2, 2.3, 2.2 and 4.5 per cent per annum, which were faster than the GDP which grew at 1.4 per cent per annum during that period.

In Pakistan, industrial and transport sectors grew, during 1960-70, at 9.4 and 8.0 per cent per annum, whereas the agricultural sector grew at 5.0 per cent per annum which was slightly slower than GDP, growing at 5.2 per cent per annum. During that period, wholesale and retail trade and other activities recorded high growth, amounting to 7.3 and 6.0 per cent per annum respectively. Similarly, while the industrial and transport sectors grew at 3.6 and 6.1 per cent per annum respectively, during 1970-75, the annual growth rates of agricultural output and GDP amounted to 2.1 and 2.4 per cent respectively.

The same pattern of economic growth repeated itself in Kenya where both industrial and transport sectors grew at 7.4 and 8.8 per cent per annum, respectively, during 1964-70, which was faster than the agricultural sector and the economy as a whole which grew at 5.9 and 6.9 per cent per annum. During 1970-75, industrial production grew even faster at 8.3 per cent per annum while the growth of the agricultural output slowed down at 3.0 per cent per annum, and the growth of the economy as a whole slowed down to 4.6 per cent per annum.

Sectoral Growth and the Requirements of Oil Inputs

The above-mentioned analysis indicates that the pattern of economic growth which has accompanied the economic development process showed a

strong emphasis on the development of industrial, transport and services sectors at the expense of the agricultural sector. Agricultural output, constituting a large proportion of national output of a typical developing country, exhibits lower oil requirements per unit of output because of both the labour-intensive character of the production techniques and the predominance of non-commercial sources of energy. On the other hand, industrial and transport sectors, by their definitions in terms of capital-intensity and production techniques, tend to be heavy users of oil.

A simple correlation analysis is carried out to test the direction and the strength of the relationship between the economic activity and the consumption of oil in India, Pakistan and Kenya. For the whole economy, in each country, per capita GDP at 1970 prices is correlated with per capita gross inland consumption of energy petroleum products in barrels of crude oil equivalent. For both industrial and transport sectors, per capita industrial production and per capita transport activity, respectively, in 1970 prices are correlated with per capita consumption of fuel oils in barrels of crude oil equivalent. The specification of the variables is discussed in section 5 of this chapter, and the sources of the data are shown in Appendix 1.

Table 3-3 shows the correlation co-efficients between per capita petroleum consumption and per capita economic activities of the economy as a whole and of both the industrial and transport sectors of India, Pakistan and Kenya. The correlation co-efficient between oil consumption and economic activity of transport sector in India (0.94) is higher than the correlation between oil consumption and industrial activity (0.92) because of the importance of oil as the main source of energy for the former sector. And the association between oil consumption and the activities of these two sectors is greater than in the case of the economy as a whole

Table 3-3

Correlation Coefficients[a] between Per Capita Petroleum Consumption and Per Capita Economic Activities in India, Pakistan and Kenya

	Correlation Co-efficients between Per Capita Oil Consumption and Per Capita of:		
	GDP (b)	Industrial Output (c)	Transport Activity (c)
India (d)	0.85	0.92	0.94
Pakistan (e)	0.99	0.95	0.97
Kenya (f)	-0.43	-0.44	-0.68

Source: The specification of the variables is discussed in section 5 of this chapter and the sources of the data are shown in Appendix 1.

Note: (a) Correlation co-efficients of India and Pakistan are significant at 0.001 level while those of Kenya are insignificant at 0.05 level.

(b) Per capita gross inland consumption of petroleum products is used.

(c) Per capita consumption of fuel oils (distillates and residuals) is used.

(d) 14 observations.

(e) 15 observations.

(f) 12 observations.

(0.85) since national output is dominated by the agricultural output which is less oil-intensive relative to the other two sectors.

In the case of Pakistan, the correlation co-efficients between oil consumption and the activities of both the industrial and the transport sectors, though they are high at 0.95 and 0.97 respectively, are lower than the correlation with GDP (0.99). This can be explained, in the case of the industrial sector, by the gradual shift from oil to gas in industrial uses. For the economy as a whole, consumption of Kerosenes, in the household and commercial sectors, accounts for 55 per cent of total energy consumed in those sectors.

In the case of Kenya, all the co-efficients are insignificant and they indicate the negative sign. The unsatisfactory results of Kenya may be explained by the inaccuracy of the data, since refinery throughput and the consumption of products are not adjusted for changes in the stocks which may be very important in the case of Kenya owing to the outward orientation of its refinery.

In fact, correlation co-efficients may be useful in indicating both the direction and the strength of the relationship between oil consumption and economic activity. However, they cannot give a clear interpretation of such a relationship. Therefore, a simple regression analysis is carried out to indicate the extent to which the level of economic activity in the economies of India, Pakistan and Kenya varies with variations in oil inputs. For the economy as a whole, in each country, per capita GDP at 1970 prices is regressed on per capita gross inland consumption of energy petroleum products. For both industrial and transport sectors, per capita industrial production and per capita transport activity, respectively, at 1970 prices are regressed on per capita consumption of fuel oils (distillates and residuals).

We use a function in the following form:

$$Y_t = a\, C_t^b$$

where Y = per capita GDP, industrial production or transport activity in national currency at 1970 prices

C = per capita consumption of petroleum products in barrels of crude oil equivalent

b = percentage changes in per capita economic activity for each one per cent change in per capita oil consumption in elasticity form

a = constant

The function is transformed into a log-linear equation as follows:

$$\log Y_t = \text{Log } a + b \log C_t$$

The function is estimated by the standard linear regression techniques for India, Pakistan and Kenya. The specification of the variables is discussed in Section 5 of this chapter and the sources of the data are shown in Appendix 1.

Table 3-4 shows the elasticities of per GDP, industrial production, and transport activity with respect to per capita oil consumption in India, Pakistan and Kenya. When per capita GDP is regressed on per capita oil consumption, the explanatory power of the resulting regressions, indicated by their coefficients of determination (R^2), is very high in the case of India and Pakistan, explaining about 73 and 98 per cent, respectively, of the total variations in GDP per capitas. Only Kenya's regression has R^2 of 20 per cent (i.e., explains about 20 per cent of the variations in GDP per capita.) The equations of both India and Pakistan have overall F-values

Table 3-4

The Elasticities of the Levels of Economic Activities with respect to Oil Consumption in India, Pakistan and Kenya.

Country/Economic Activity Variable Log Y_t	Constant log a	Oil Consumption variable Log $C_t^{(a)}$	R^2	F-Statistic	D.F
Per capita GDP					
India	6.8043	0.1622 (5.6321)	0.7255	31.720	13
Pakistan	7.2165	0.5503 (25.9005)	0.9810	670.838	14
Kenya	3.5956	-0.5666 (1.5906)	0.2019	2.5301	11
Per capita Industrial production					
India	5.0515	0.1891 (8.5290)	0.8584	72.745	13
Pakistan	6.5767	1.2146 (11.1538)	0.9054	124.407	14
Kenya	1.3844	-0.4961 (1.6389)	0.2117	1.6389	11
Per capita Transport activity					
India	3.8838	0.2010 (14.4945)	0.9460	210.092	13
Pakistan	4.9489	0.6999 (13.3873)	0.9324	179.219	14
Kenya	0.7934	-0.4419 (3.0627)	0.4840	9.380	11

Source: The specification of the variables is discussed in this chapter (Section 5) and the sources of data are shown in Appendix 1.

Note: (a) The values of t-statistics are shown in parentheses below the corresponding co-efficients. All the co-efficients are significant at 0.001 level except those of Kenya.

which show that the independent variable is significant in explaining the variations in GDP per capita; and the fits of the equations, in general, are very good. Except for Kenya, the estimated co-efficients of the independent variable (oil consumption) for India and Pakistan are statistically significant at 0.001 level, as shown by the t-test given in parentheses. For Kenya, the estimated co-efficient of oil consumption is not different from zero at 0.05 level and the F-value of the overall equation is insignificant. These odd results of Kenya may be caused by data inaccuracy, due to the absence of data on stock changes, and the problem of time-series analysis as well as the small numbers of observations.(1) The size of the coefficients show that for every one per cent change in per capita oil consumption, the changes in India's per capita GDP (0.16 per cent) is smaller than that of Pakistan (0.55 per cent), indicating that the Indian economy is more oil-intensive than that of Pakistan.

When per capita industrial production is regressed on per capita oil consumption measured in barrels of crude oil equivalent of fuel oil (distillates and heavy oils) which are used in industry, the explanatory power of the equation (R^2) increased for India, explaining about 86 per cent of the variations in industrial production, and both t-value and F-value rose even more. For every one per cent change in oil consumption, industrial production changed by 0.19 per cent, indicating that the industrial sector is slightly less oil-intensive than the economy as a whole owing to its heavy reliance on coal. For Pakistan, the power of the equation in explaining the variations in industrial production (R^2)dropped

(1) G. Kouris and C. Robinson, "EEC Demand for Imported Crude Oil, 1956-1985", Energy Policy, Vol. 5, No. 2 (June 1977), Table 2, p. 132. Kouris and Robinson found that the income elasticities of the demand for oil, calculated from time-series data, are negative in some country-members of EEC.

to 91 per cent and the values of both (t) and (F), though they are highly significant, decreased. For every one per cent change in oil consumption in Pakistan, industrial production changes by 1.21 per cent, indicating that the industrial sector, relying heavily on natural gas, is not only less oil-intensive than the economy as a whole but also than the industrial sector in India. The Kenya equation is statistically insignificant and gives opposite sign.

By regressing per capita transport activity on per capita oil consumption, the value of (R^2) increased to 95 per cent for India and 93 per cent for Pakistan and the statistical values of (t) and (F) for both India and Pakistan rose even more. Unexpectedly, the transport co-efficient (0.20 per cent) is slightly higher than that of industrial sector in India - less oil-intensive - can be explained by the fact that transport activity is very sensitive to the availability of operational materials such as spare parts. The transport sector in Pakistan (0.70 per cent) is more oil intensive than the industrial sector, though it is less than GDP which includes large proportions generated from other services.

In general, the Indian economy is more oil intensive than Pakistan. In comparison with the economy as a whole, the oil-intensity of both the industrial and the transport sectors in India and Pakistan is less than the GDPs because of the reliance of industrial production on coal in India, and on gas in Pakistan. Moreover, the transport sector tends to be more oil-intensive than the industrial sector in Pakistan.

3. An Analysis of the Changes in Oil Consumption

As mentioned above, the extent to which oil is used in the economy depends on the growth rates of different economic sectors and the composition of national output. The relationship between oil consumption and national output can be summarised by "Oil-output ratio" or "Oil-intensity".

Oil-Intensity

Oil-intensity can be defined, for the purpose of the research, as metric tons of petroleum crude equivalent per thousand US dollars of real gross domestic product. In other words, it is the average propensity of the economy to consume oil with respect to real GDP. Such a ratio is a simple analogy at the aggregate level of the micro-coefficient of each individual industry or product which measure total oil input per unit of value added or gross output. Such an oil ratio is a sort of weighted average of all sectoral co-efficients which consist of a wide collection of heterogeneous activities, producing a diversity of goods and services. Each country has its own unique oil-coefficients and aggregate oil ratio which depend, not only on the composition of the economic sector and the structure of the economy as a whole, but also on the relative importance of petroleum in the pattern of energy consumption.

Table 3-5 shows oil-intensities of India, Pakistan, Kenya and the low-income developing countries in selected years during the 1960s and during 1970-75. Oil-intensity is expressed as the consumption of petroleum products in metric tons of crude oil equivalent per thousand

Table 3-5

Oil-Intensity of India, Pakistan, Kenya and the Low-Income Group of the Non-OPEC Developing Countries, 1960-1975. (Metric ton of crude oil equivalent per thousand 1970 U.S. dollars of GDP).

	1960	1965	1968	1970	1971	1972	1973	1974	1975
India (1)	0.168	0.225	0.283	0.297	0.329	0.363	0.358	0.353	0.364
Pakistan (1)	0.271	0.315	0.349	0.421	0.412	0.454	0.419	0.426	0.425
Kenya (1)	n.a	0.662	0.582	0.571	0.541	0.566	0.528	0.618	0.707
The Low-Income Group of the NON-OPEC Developing Countries (2)	0.169	0.314	0.372	0.395	0.399	0.428	0.424	0.407	n.a.

Source/ (over)

Source: (1) Gross inland consumption of petroleum, expressed in million metric tons of crude equivalent, is defined as equal crude oil throughput ± variations in stocks of crude ± net imports of petroleum products (Imports-Exports-Bunkers). Data on crude oil and products for the period 1960-73 are taken from U.N., World Energy Supplies, 1950-1974, op.cit., Table 6, pp.192-227; Table 11, pp. 336-74; Table 12, pp. 375-429; Table 13, pp. 430-84; Table 14, pp. 485-540; For the period 1974-75, data are taken from U.N., World Energy Supplies, 1972-1976, op.cit., Table 6, pp. 58-67; Table 11, pp. 101-9; Table 12, pp.110-21; Table 13, pp. 122-33; Table 14, pp. 134-47. Data on GDP are obtained from U.N., Yearbook of National Accounts Statistics, 1977, Vol. 1, U.N., New York, 1978. Implicit price deflator index numbers of GDP are taken from U.N., Yearbook of National Accounts Statistics, 1977, Vol. 2, op.cit., Table 8A. Average exchange rates for the period 1960-75 are computed from International Monetary Fund, International Financial Statistics, Vol. 31, No. 5 (May 1978). Conversion factors between petroleum products and crude oil are obtained from OECD, Energy Prospects to 1985, OECD, Paris, 1974, Table 2A-2, p. 4.

(2) Calculated from Lambertini, op.cit., Table 1, p.3; Table 2, p.4. Consumption of oil is converted from thousand b/d to metric tons per year on the base of a ton of crude oil is equal 7.3 barrels and the calendar year is 365 days.

1970 U.S. dollars of GDP. The GDPs of India, Pakistan and Kenya are converted into U.S. dollars by using the average exchange rates for the period 1960-75 to insure that the oil-intensity does not reflect changes of GDP attributable to exchange rate variations, particularly, during the first half of the 1970s.

India's oil-intensity, which started from the low level of 0.168 in 1960, reached 0.364 in 1975; an increase of 117 per cent during that period. In contrast, Pakistan's oil-intensity, which was 0.271 in 1960, reached 0.425 in 1975, recording an increase of 57 per cent. Kenya has the highest oil-intensity among the three countries, amounting to 0.662 in 1965. However, it only increased to 0.707 in 1975, recording a small increase of 7 per cent over the period 1965-75.

In comparison with the low-income group of the non-OPEC developing countries, it appears that while India started in 1960 with the same oil-intensity as the group, the oil-intensity of the Indian economy rose less than that of the low-income group. During the period 1960-73, while the oil-intensity of India increased by 113 per cent, that of the low-income group increased by 150 per cent. Oil-intensity of Pakistan, which was larger than that of the group in 1960, rose by only 55 per cent which is about one-third of the increase in the oil-intensity of the low-income group. As oil is the main source of its energy requirements, the Kenyan economy has the highest oil-intensity relative to both India and Pakistan as well as the whole group. However, during the period 1965-73, Kenya's oil-intensity fell by 20 per cent.

The short-term effects of the rise in oil prices were reflected in the changes of oil-intensities of the low-income group, India and Pakistan during 1973-75. Oil-intensity of the low-income group declined from

0.428 metric tons of crude oil equivalent/thousand U.S. $ of GDP in 1972 to 0.424 metric tons of crude oil equivalent/thousand U.S. $ in 1973 and further to 0.407 metric tons of crude oil equivalent/thousand U.S. $ in 1974. In India, oil-intensity decreased from 0.363 metric tons of crude oil in 1972 to 0.358 metric tons in 1973 and further to 0.353 metric tons in 1974, before it increased again to 0.364 metric tons in 1975. Oil-intensity of Pakistan decreased from 0.454 metric tons of crude oil equivalent/thousand U.S. $ in 1972 to 0.419 metric tons in 1973. It increased again to 0.426 metric tons in 1974 and remained at that level in 1975. In the case of Kenya, oil-intensity fell from 0.566 metric tons in 1972 to 0.528 metric tons in 1973 before it greatly increased to 0.618 metric tons in 1974 and further to 0.707 metric tons in 1975.

In general, although the Indian economy is less dependent on petroleum than both Pakistan and Kenya, it has a high appetite for oil consumption. On the other hand, despite the heavy reliance of Kenya on oil, its demand is growing more slowly than the case of India and Pakistan. Despite the relatively high oil-intensity of Pakistan, its oil consumption has halted owing to the gradual shift in the industrial sector from oil to natural gas.

An Analysis of the Changes in Oil Consumption

The above-mentioned discussions have concluded that increases in oil consumption are related not only to increases in national output but also to the rise in oil-intensity of the economy as a whole which is induced by the sort of emphasis of the pattern of economic growth. To analyse the effects of both the national output and the oil-intensity on the increases in consumption, changes in oil consumption can be

separated into three constituent elements:[1]

First - there are the increases that related to rising output by itself, taking no account of the changes in oil-intensity.

Second - there are the effects of the changes in oil-intensity in itself, taking no account of the changes in output.

Third - the increases of oil consumption that arose from the changes in oil-intensity with respect to the increases in output, and which therefore take account of both output changes and changes in oil-intensity.

Algebraically this distinction may be expressed as follows: Let Y_1 and Y_2 be GDP in two periods respectively, and C_1 and C_2 the corresponding consumption of oil. The oil-intensity O is given by: $O_1 = C_1/Y_1$ and $O_2 = C_2/Y_2$. Let ΔY be the change in output $(Y_2 - Y_1)$, ΔC the change in oil consumption $(C_2 - C_1)$, and ΔO be the change in oil-intensity $(O_2 - O_1)$.

Thus, $$C_1 = O_1 Y_1 \qquad (1)$$

$$C_2 = O_2 Y_2 = (O_1 + \Delta O)(Y_1 + \Delta Y) \qquad (2)$$

$$= O_1 Y_1 + O_1 \Delta Y + \Delta O Y_1 + \Delta O \Delta Y$$

subtracting (1) from (2) yields the following equation

$$\Delta C = O_1 \Delta Y + \Delta O Y_1 + \Delta O \Delta Y \qquad (3)$$

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(1) This approach was used by Henderson in analysing the changes in total energy consumption in India. See Henderson, op.cit., pp.33-4.

The three items on the right-hand side of equation (3) correspond to the three elements which explain the increases in oil consumption advanced above. Such elements are calculated in Table 3-6 which shows an analysis of the increases in oil consumption in India, Pakistan and Kenya during the periods 1960-70 and 1970-75.

Clearly the increases of oil consumption in India are attributed more to the rise in oil-intensity than to the increases of national output. Out of the 11.499 million tons increases in oil consumption during 1960-70, 47 and 23 per cent are attributed to the rise in the oil-intensity of both the original and incremental output respectively. Only 30 per cent of such increases were for increasing output without increasing oil-intensity. During 1970-75, 68 and 6 per cent of the increases in oil consumption (6.231 million tons) were ascribed to the rise in the intensity of the original and incremental output respectively, while 26 per cent was used in generating additional output with the original intensity.

In Pakistan, 81 per cent of the increase in oil consumption (1.746 million tons) during 1960-69, was used in the incremental output without changes in the oil-intensity, while 19 per cent resulted from the rise in oil intensity of both original and incremental output. During 1970-75, the proportion of the increases in oil consumption attributed to the rise in oil-intensity diminished to only 8 per cent, since 92 per cent had been used in generating additional output without a rise in oil intensity.

The slight increases in oil consumption in Kenya (0.029 million tons) during 1964-70 can be explained by the decline in oil intensity of the economy. Increases in oil consumption devoted to the incremental output were at the expense of the decline of the oil-intensity of both the original and incremental output. However, during 1970-75, one-half of the increases of oil consumption (0.593 million tons) were caused by the rise of the oil-intensity of the output, while the remaining half was caused by the increases in output regardless of the influence of oil-intensity.

Table 3-6

An Analysis of the Changes of Oil Consumption during the periods 1960-70 and 1970-75 for India, Pakistan and Kenya. Quantities in million metric tons of crude oil equivalent)

	Increases of oil consumption arising from:							
	$O_1 \Delta Y$		$\Delta O Y_1$		$\Delta O \Delta Y$		ΔC	
		%		%		%		%
India								
1960-70	3.448	30	5.377	47	2.674	23	11.499	100
1970-75	1.693	26	4.156	68	0.382	6	6.231	100
Pakistan(a)								
1960-69	1.412	81	0.206	12	0.128	7	1.746	100
1970-75	0.421	92	0.031	7	0.004	1	0.456	100
Kenya(b)								
1964-70	0.898	3096	-0.432	-1490	-0.437	-1507	0.029	100
1970-75	0.304	51	0.217	37	0.072	12	0.593	100

Source: Based on Table 3-5.

Note: (a) The period 1960-69 refers to all Pakistan, including Bangladesh, while the period 1970-75 refers to West Pakistan only.

(b) There is no available data on GDP at constant prices for Kenya before 1964.

As a result, the pattern of economic growth in India led to a rapid growth of oil consumption through the rise in the oil-intensity of the economy, despite the fact that India is a coal-orientated economy. Such influence is insignificant and gradually diminished in Pakistan which is increasingly dependant on natural gas. In Kenya, oil intensity, which decreased throughout the 1960s, started to increase in the early 1970s and induced fast rises in oil consumption in the first half of the 1970s.

4 - The Price Effects on Oil Consumption

A rapid rise in consumption of oil before 1973 had not only been induced by the pattern of economic growth but also because oil had become the cheapest source of energy, since its prices had declined relative to the prices of other goods and services. Additionally, the government policy of pricing oil made demand for oil inelastic with respect to price changes.

The Movements of Price of Crude and Products

Statistics on posted prices[1], as shown in Table 3-7, indicate that prices of crude and products had declined during the period 1961-70 by 10.4 and 7.8 per cent, respectively, before they increased tremendously in 1974. By using the index of wholesale prices of all commodities which are internationally traded, as a deflator, the real prices of crude and products had declined, during the same period, by 23.5 and 21.3 per cent, respectively. I. Oweiss[2] found that the prices of crude had declined by 43 and 68 per cent, when the posted prices were deflated by both the U.S. wholesale price index of all commodities and the GNP deflator of 17 European countries, respectively. He also found that if the prices of crude had been gradually increased at the compound rate of inflation in the European countries, the 1973 price would have been U.S.$10.24 per barrel.

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(1) For historical background on the posted prices, See M.A. Adelman, the World Petroleum Market, John Hopkins University Press, Baltimore, 1972, Chapter 6,7.

(2) I. Oweiss, "Deciding on a price", Middle East International, No.44 (February 1975), p.12.

Table 3-7

The Trends of Current and Real Values of the Posted Prices of Crude Oil and Oil Products, 1961-75.

(1970 = 100(a))

	Current Prices		Real Prices(3)	
	Crude(1)	Products (2)	Crude	Products
1961	111.6	108.5	130.7	127.0
1962	109.1	107.6	130.5	128.7
1963	108.3	106.0	122.1	119.5
1964	102.5	99.4	108.0	104.7
1965	102.5	102.5	110.0	110.0
1966	102.5	99.6	106.8	103.8
1967	102.5	99.5	114.0	110.7
1968	100.0	100.1	112.1	112.2
1969	98.3	98.7	101.9	102.3
1970	100.0	100.0	100.0	100.0
1971	127.3	111.1	135.0	117.8
1972	146.3	115.3	136.3	107.5
1973	208.3	158.1	135.3	95.1
1974	752.1	442.2	354.4	208.4
1975	826.4	475.2	474.4	272.7

Source: (1) IMF, International Financial Statistics, Vol.31, No.5 (May 1978), p.75.

(2) Organisation of the Petroluem Exporting Countries, Annual Statistical Bulletin, 1975, Statistical Unit, OPEC, June 1976, Table 95, p.136.

(3) Real prices are computed by deflating the current prices by the index numbers of the wholesale prices of all commodities in international trade obtained from source (1)

Note: (a) All the base years are moved to 1970 for the purpose of comparison.

Table 3-8 shows the trends of unit value of imported crude oil and the average wholesale prices of all petroleum products during the period 1961-74 for India, Pakistan and Kenya. Prices are expressed in real values by deflating the unit value of imported crude by the implicit price deflator index number of industrial production, and the average wholesale price of petroleum products by the general wholesale price index number. In general, both unit values of imported crude and wholesale prices of products had experienced decline in real terms during 1961-70, before they increased greatly by the mid-1970s. Unit value of crude oil declined by 20,25 and 13 per cent in India, Pakistan Kenya respectively. By 1974, unit values increased to 490 and 689 and 378 per cent respectively. Differences in changes of unit values among the three countries are attributed to variations in exchange rates, accuracy in recording import data and oil supply contracts. The decline of the unit values of both Pakistan and Kenya and the moderate increase in the unit value of India in 1971 are explained by the devaluation of the U.S. dollar in that year. The sharp increase in Pakistan's unit value to 430 per cent in 1972 was caused by the more than 50 per cent devaluation of its Rupee. The increase of unit values of Kenya in 1973 and 1974, were relatively moderate which can be attributed to the "armlength" transactions, involving discount elements, since its refinery is market-orientated and partly owned by multinationals.

Nevertheless, the unit value of imported crude could reflect the conditions prevailing in the world market, compared with the wholesale prices which are dominated by excise taxes imposed by national governments particularly in India and Pakistan. The wholesale price of petroleum products showed fluctuations during 1961-70, though it was

Table 3-8

The Trends of Unit Value of Imports of Crude Oil and the Average Wholesale Prices of All Petroleum Products at 1970 Prices in India, Pakistan and Kenya, 1961-74.

1970 = 100

	Unit Value of Crude Oil Imports (1)			Average Wholesale Price of Petroleum Products (2)		
	India	Pakistan	Kenya	India	Pakistan	Kenya
1961	125.1	133.7	-	100.1	90.4	-
1962	126.6	130.6	-	106.7	92.3	-
1963	110.6	85.4	114.4	120.8	95.0	98.9
1964	107.3	94.4	115.4	113.0	89.0	102.1
1965	100.5	91.3	113.0	101.4	90.9	103.9
1966	69.7	97.3	107.8	98.1	95.2	104.1
1967	93.6	129.3	104.2	91.3	98.6	102.2
1968	121.8	107.1	103.2	95.9	96.3	101.0
1969	109.5	94.2	99.0	97.8	97.7	102.0
1970	100.0	100.0	100.0	100.0	100.0	100.0
1971	123.7	90.1	99.0	105.8	111.1	101.8
1972	123.3	430.1	107.2	102.7	102.8	96.4
1973	171.6	426.7	113.2	104.8	105.4	103.5
1974	489.5	688.9	378.0	133.0	90.1	296.6

Source: (1) Unit value of imported crude oil are computed from United Nations, Yearbook of International Trade Statistics, U.N., New York, issues: 1963-1975; and deflated by the implicit price deflator index numbers of industrial production obtained from U.N., Yearbook National Account Statistics, 1977, Vol.2, Op.cit., Table 88.

Source (2) Wholesale prices of petroleum products in India for the period 1961-71 are taken from Government of India, Statistical Abstracts, Central Statistic Organisation, New Delhi, issues: 1965,1968,1969 and 1972; and prices for the period 1972-74 are taken from Henderson, op.cit., Table 30, p.66. Wholesale prices of petroleum products of Pakistan for the period 1961-72 are obtained from Government of Pakistan, 25 years of Pakistan in Statistics, 1947-72; Ministry of Finance, Planning and Development, Karachi, 1973,Table 17.09,p.347; Table 17-11,p.365; and the prices for the period 1973-1974 are taken from Government of Pakistan, Pakistan Statistical Yearbook 1975-76, Ministry of Finance, Planning and Provincial Co-ordination, Karachi, 1976, Table 16.5,p.202; Table 16.7,p.203. For Kenya, retail prices of petrol (gasoline) are obtained from Republic of Kenya, Statistical Abstract, Ministry of Economic Planning and Development, Nairobi, issues: 1968,1969,1971 and 1975. General Wholesale Price Index number for India are taken from Government of India, Monthly Abstract of Statistics,Central Statistical Organisation, New Delhi, issues: Vol.25,No.10, (October 1972); Vol. 29, No.10(October 1976). For Pakistan, Government of Pakistan, 25 years of Pakistan in Statistics, op.cit.,Table 17.01,p.314; Table 17.02,p.324; Government of Pakistan,Pakistan Statistical Yearbook, 1975-76; op.cit., Table 16.1,p.176; Table 16.2,p.179. Kenya's index numbers of consumer prices are taken from I.M.F.,International Financial Statistics, Op.cit.,

dominated by a declining trend. It increased in India by 33 per cent during 1970-75 which was smaller than in unit value (389.5 per cent). In Pakistan, wholesale prices, though they were fluctuating, did rise slowly during 1961-70. During 1970-74, they increased, reflecting the world price, but at a low rate. In Kenya, retail price of gasoline showed a large increase in 1974, reflecting the increases in crude, since domestically refined oil products paid the same excise tax as the tariff paid by imports.

Government Price Policies of Petroleum Crude and Products

In most countries, government taxes and duties on the consumption of petroleum products form a sizeable part of the prices of certain products, particularly gasolines and kerosenes . Therefore, selling prices are considerably affected by changes in taxes rather than by changes in the unit cost of refining which depend basically on the cost of imported crude. Consequently, a relatively large increase in the price of crude is likely to lead to a proportionally smaller change in the wholesale price of products, and to a still smaller change in their retail prices, leading to inelastic demand for products with respect to changes in crude prices.

Price of products had also been influenced by the intervention of governments, where part of crude was domestically produced, as in the case of India and Pakistan, to keep the price of crude well under the current prices in the world market. Fixing the domestic crude at low prices in India was aimed to reduce the average costs to domestic refineries, so as to keep the prices of refined oil products

from increasing. For instance, although the Indian crude was raised in August 1973 to $2.48 per barrel, again to $3.58 at the beginning of November 1973, and further to $4.58 per barrel in August 1974, it was still well under one-half of the current world price which was at least $ 11.30[1]

Table 3-9 shows the proportions of ex-refinery prices and excise duties in the ex-storage prices for selected products in India between June 1, 1970 and September 18,1974. Excise duties on gasoline have been an important element in selling prices, accounting for 83

Table 3-9

India: Ex-Refinery Prices and Excise Duties as Percentages of Ex-Storage Point Prices for Selected Products, June 1,1970-September 18,1974.

(in percentages)

	June 1, 1970	April 1, 1972	November 30 1973	September 18 1974
Motor Spirit: Ex-refinery price	10	11	13	19
Excise duties	83	82	73	72
Kerosene: Ex-refinery price	31	28	40	71
Excise duties	60	61	61	47
High Speed Diesel Oil: Ex-refinery price	18	18	23	56
Excise duties	74	72	69	46
Furnace Oil: Ex-refinery price	32	32	40	42
Excise duties	54	46	43	17

Source: Calculated from Henderson, op.cit., Table 30, p.66

(1) Henderson, op.cit., pp.64-7.

per cent in 1970 and reduced to 72 per cent of the ex-storage point prices in 1974. In line with the recent increases in oil prices, the duties on gasoline was doubled to over Rs.2 per litre which put the retail price at Rs. 3.25. In view of wide-spread use of Kerosene among the population, excise tax on kerosene, which is lower than gasoline, accounted for 60 per cent of ex-storage prices, decreasing to 47 per cent in 1974. Despite the 30 per cent increases in the duty on kerosene, in Movember 1973, it seems that its prices were not increased significantly. There is an element of under-recovery in the selling price since the sum of ex-refinery price and excise tax exceeds the ex-storage point price. This also had appeared in the case of high speed diesel oil whose excise duties had decreased from 74 per cent in 1970 to 46 per cent in 1974 due to the increase of crude costs which raised the share of ex-refinery price from 18 percent to 56 percent during the same period.

Pakistan also put heavy duties on gasolines and has made duties on kerosene and fuel oil even heavier than India as shown in Table 3-10. Duties on gasoline which accounted for 70.5 per cent of retail price in 1971 had reached 86.8 per cent in 1975. Duties on kerosene, which had accounted for 47 per cent in 1971, declined to 29.9 per cent in 1973, before they increased sharply to 61.1 per cent in 1974 and further to 77.8 per cent in 1975. Duties on fuel oils, which were relatively small in 1971 (29.7 per cent) increased to 71.4 per cent in 1975.

Table 3-10

Pakistan: Duties and Taxes on Refined Petroleum Products as Percentages of Retail Prices, July 31,1971-July 31,1975.

(in percentage)

	July 31 1971	July 31, 1972	July 31, 1973	July 31, 1974	July 31, 1975
Motor gasoline (regular)	70.5	74.7	73.8	84.7	86.8
Motor gasoline (premium)	61.2	67.3	68.2	81.7	66.3
Household kerosene	46.9	32.9	29.9	61.1	77.8
Bunker 'C' fuel oil	29.7	na	20.7	47.0	71.4

Source: Calculated from Organisation of the Petroleum Exporting Countries, op.cit., Table 95,p.136.

In Kenya, duties on refined products were less than India and Pakistan, since products only paid an excise tax which is equivalent to tariff paid by imports.(1) Imports duties on petroleum are calaulted as percentages of retained imports as follows:(2)

(1) East African Common Services Organisation, Annual Trade Report of Tanzania, Uganda and Kenya, East African Customs and Excises, Commissioner of Customs and Excises, Mombassa,1965,p.39.
(2) Calculated from Republic of Kenya, Statistical Abstract, op.cit., issues; 1966, 1970 and 1974.

1964	1966	1968	1970	1971	1972	1973
62	53	75	81	58	26	12

Import duties declined from 62 per cent in 1964 to 58 per cent in 1972 and further to 12 per cent in 1973, indicating that such duties had declined in the face of the increased value of oil imports in the early 1970s.

The Price Elasticity of the Demand for Petroleum

Models of aggregate demand for oil and energy have tended, invariably, to use the historical energy-GNP and composition of energy use relationships for their demand forecasts.(1) Their underlying assumptions, then, are that price elasticity of demand is very low and that future price trends will reflect historical ones. But such developments as the new found strength of the oil producter's Cartel make these assumptions inappropriate. Moreover, these studies could not indicate the reaction of the consumers of energy to price changes.

Until the oil crisis in 1973/74, very little research had been done on the price elasticity of demand for energy and oil, particularly, outside the United States and probably none in developing countries. However, a number of studies on price elasticity in both developed and

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(1) See J. Darmstadter, Energy in the World Economy, The John Hopkins University Press, Baltimore, 1971; S. H. Schurr et al., Middle East Oil and the Western World, American Elsevier, New York, 1971; J. Darmstadter, "Energy Consumption: Trends and Patterns", in S.H. Schurr (ed.), Energy, Economic Growth and the Environment, John Hopkins University Press, Baltimore, 1972, Appendix; OECD, Oil: The Present Situation and Future Prospects, OECD, Paris, 1973.

developing countries had been spurred by the upheaval in the world oil market. Studying the immediate responses of oil consumers in the various economic regions of the world, Yager and Steinberg,(1) faced with the problem of estimating short-term price elasticity, incorporated, arbitrarily, into their equation a very low elasticity of -0.03 per year in estimating energy and oil consumption during 1975-78. Meanwhile, Kennedy(2) found significant price elasticities of demand for gasoline, kerosene, distillates and fuel oil in the industrial countries. Additionally, Kouris and Robinson,(3) only found a significant price elasticity of demand for oil when they pooled times series- cross section data for EEC countries, whereas most of their estimates from time-series data for the individual countries were inconsistent and insignificant.

In fact, price elasticity of the demand for oil in the developed countries is attributable to the high degree of substitutability, compounded by the effects of consumer's preferences, among competing sources of energy, changing technologies and the environmental regulations. The absence of most of these factors in the poor countries, in addition to the characteristics of the pattern of both economic growth and oil consumption, would leave oil price as a weak determinant of the demand for oil. Demand for oil in developing countries is usually studied for these countries in aggregate within the context of

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(1) J.A. Yager and E.B. Steinberg, "Trends in the International Oil Market" in E.R. Fried and C.L. Schultze (eds.), Higher Oil Prices and the World Economy - The Adjustment Problem, Brookings Institution, Washington, D.C., 1975, p.248.

(2) M.Kennedy, "A World Oil Model" in D.W. Jorgenson (ed.), Econometric Studies of U.S. Energy Policy, North-Holland Publishing Company, Amsterdam, 1976, pp.132-4.

(3) Kouris and Robinson, op.cit., p.132.

models of world oil market or for the various groups among them.[1] Estimating demand equations for developing countries classified by income-group, Lambertini [2] found a very low price elasticity of demand for oil in the high and middle income groups, By assuming price elasticity for the low-income group, he apparently could not find a significant estimate for that group. The medium-term price elasticities of demand for oil have been estimated as -0.10 in the higher income countries, -0.3 in the middle income group; and -0.15 in the lower income group. The short-term price elasticities of the three groups amounted to -0.60, -0.109 and -0.05 respectively.[3]

The low price elasticity of demand for oil in the low-income developing countries can be attributed to two factors: the pattern of oil demand and the external balance position.

The pattern and trend of oil consumption in these countries are dominated by those products which are related to the essential uses in the household sector (kerosene) and to the level of economic activities of the productive sectors (fuel oils). Lambertini estimated that, when the consumption of kerosene (primarily a household fuel) is included, the share of oil in end-uses with very limited substitution possibilities can be estimated at 58 per cent of oil consumption of the low-income group, whereas it is estimated at 52 per cent of the consumption of the high income group. Also, while road transportation accounts for 31 per cent of oil consumption in the low income group, it accounts

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(1) Yager and Steinberg, op.cit., Table 7-9, p.260.
(2) Lambertini, op.cit., p.28.
(3) Ibid., Appendix II, pp.10-2.

for 30 per cent in the middle income countries.

Nonetheless, despite the essential uses of oil in the household sector, its share in total energy consumption is relatively small, as was discussed in chapter 2 (Section 2). The shares of products related to the industrial and public transport sectors dominated the patterns of consumption of energy petroleum products. In fact, there is no empirical evidence on the response of the demand of the various sectors to changes of prices of oil and energy products in the developing countries. Most of the related studies were carried out in the United States.

Whenever price elasticities have been detected, they are usually found in the demand of the residential sector rather than in the industrial, transport and service sectors in the United States. Verleger presented results for the household and commercial sectors together, indicating that the null hypothesis of a zero price elasticity was not supported for the demand for electricity, petroleum products and natural gas. He found a price elasticity in the short-term, of -0.55 for the demand for petroleum products in these two sectors together.(1) However, in a model using the share of oil generating relative to the generating capacity of the electric utilities sector, Verleger found that the share of oil relative to the capacity generation is inelastic

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(1) P.K. Verleger Jr.,"An Econometric Analysis of the Relationship Between Macro-Economic Activities and the U.S. Energy Consumption" in M. Searl (ed.), Energy Modelling - Art, Sciences and Practice, Resources for the Future,Washington, D.C., 1974,p.86.

to changes of the price of oil and also inelastic to the changes in oil prices relative to the changes in the prices of other fuels.(1) These results compare favourably with those of Houthakker and Taylor(2) who, in a model estimated for a different purpose, also rejected the assumption of zero price elasticities in the U.S. household sector.

Verleger(3) found that the demand for energy, in general, when evaluated at the national level, is price sensitive in the household sector but not in the transportation sector. He indicated that the test of the hypothesis of the zero price elasticity in the industrial sector is more difficult due to the larger array of energy products, the dominance of a few industries in total demand, and the lack of adequate price data. Houthakker, Verleger and Sheehan (4) found a significant short-term price elasticity of 0.075 for the demand for gasoline when they fitted a logarithmic flow adjustment model of the demand for gasoline in 48 States and the District of Columbia. When the states were grouped on the basis of per cent of urbanisation, they found that, for the least urbanized states, the price elasticity turned out to be positive which generally does not fit in with the other state groups.(5) Such positive elasticity was attributed to the possibility

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(1) Ibid., Table 6, p.97.

(2) H.S. Houthakker and L.D. Taylor, Consumer Demand in the United States: Analyses and Projections, Harvard University Press, Cambridge, Mass., 1970,pp.90-95.

(3) P.K. Verleger, Jr., "The Relationship Between Energy Demand and Economic Activity", in M.S. Macrakis (ed.),Energy Demand, Conservation and Institutional Problems, The MIT Press,Cambridge, Mass,1974,p.35.

(4) H.S. Houthakker,P.K. Verleger Jr. and D.P. Sheehan,"Dynamic Demand Analysis for Gasoline and Residential Electricity", American Journal of Agricultural Economics, Vol.56,No.2(May 1974),p.415.

(5) Ibid., Table 2,p.416.

of using gasoline for agricultural purposes in the least urbanised states. Similarly, the positive price coefficient of the demand for electricity in the residential sector of the least urbanised states was attributed to the problem of classifying agricultural establishments in the residential or commercial category.(1)

Additional evidence on the low price elasticity of the demand for oil in the commercial sector emerges from the study of Hudson and Jorgenson(2) who found that, for a given increase in the prices of energy, the relative cut back in energy use in final demand is greater than in intermediate uses. They also found that although the final users of energy may be more responsive to price increase than business users, the share volume of energy absorbed in production is more important than that comes from final users. They estimated that, for a given increase in energy prices, final demand would be reduced by 10.6 per cent compared to 5.6 per cent fall in intermediate demand.

The role of oil prices as a determinant of demand is expected to be even weaker when oil is considered as an imported commodity. Models of trading behaviour of developing countries that have been carried out by Chenery and Strout (3) gave the evidence that import flows are determined not so much by changes in their relative prices as by changes in the availability of foreign exchange. The study of M.Khan(4)

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(1) Ibid., Table 3, p.416.
(2) Hudson and Jorgenson, Op.cit., p.63-5.
(3) Chenery and Strout, op.cit.,pp.682-95.
(4) M. Khan, "Import and Export Demand in Developing Countries", IMF, Staff Papers,Vol.21, (November 1974),pp.690-92.

showed the importance of import control in determining the imports in the short-run in fifteen developing countries. The role of foreign exchange in determining imports into developing countries was emphasized in a model built by W. Hemphill.(1)

Consequently, the level of oil imports, in view of the balance of payments problem, even before the oil crisis, is no longer determined by the need to meet the projected level of domestic demand according to the prevailing prices. In other words, the level of oil imports is determined by what a country can afford with respect to its external equilibrium and the need to maintain a reasonable level of other non-oil imports.

As a result, discussions on the effect of oil prices concluded that the rapid growth of oil consumption had been partly induced by the decline in its relative prices which had been kept, furthermore, insensitive to demand changes by government price policies. Moreover, oil prices are expected to be a weak determinant of demand, particularly, in poor countries because of the nature of sectoral demand, limited possibilities of conservation and external payments position.

5 - A Dynamic Model of the Demand for Oil

The research will estimate an oil demand function for each of the countries in order to achieve the following two objectives:

Firstly, to test the hypothesis that oil demand is determined

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(1) W.L. Hemphill, "The Effect of Foreign Exchange Receipts on Imports of Less Developed Countries", IMF Staff Papers, Vol.21 (November 1974)pp.638-48.

more by the level of economic activity than by changes in the price of oil; and

Secondly, to estimate the additional costs of imported oil during 1974 and 1975 on the basis of certain assumptions which will be discussed in Chapter 4.

Theoretical Background

The estimated oil demand function will be based on a dynamic flow adjustment model, in which demand for oil depends on income and prices, and the effects of these factors are spread over time. The model has been successfully used by Kennedy(1) in estimating the demand for oil products in the industrial countries (OECD), and by Lambertini(2) for non- OPEC developing countries by income group. A more recent application of the model was done by Kouris and Robinson(3) for studying oil demand in EEC area. A description of the model and its statistical properties in the context of the general distribution lag problem is found in Griliches.(4)

Three theoretical issues will be discussed before the exposition of the functional form of the model, namely, the short-term adjustment, fuel competition, and the problem of simultaneous equation bias.

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(1) Kennedy, op.cit., pp.129-34.
(2) Lambertini, op.cit., Appendix II.
(3) Kouris and Robinson, op.cit., pp.131-33.
(4) See. Z. Griliches, "Distributed lag: A survey." Econometrica Vol.35, No.1 (January 1967). pp.16-49.

The demand for oil is a derived demand, the primary one being for the oil-consuming implements.(*) Accordingly, the demand for oil is complementary and derived from the accumulation of oil-using stock. This concept was initially applied by Fisher and Kaysen in the demand for electricity and later used by Balestra in relation to the demand for natural gas.(1) Hence, it is legitimate to extend this concept to the demand for oil as well.

Therefore, it can be asserted that there is a technical relationship between the demand for oil and the stock of durables, where oil demand depends on the stock of oil-using appliances and its rate of utilization. The stock of appliances expresses long- run behaviour and it is mainly a function of consumer preferences and a stream of current and past incomes. In any time period, only a part of the entire stock will be in use; either because some units are idle or operate below capacity. What rate of utilisation is achieved depends on the general state of economic activity and the level of oil prices relative to the prices of other fuels and those of the rest of goods and services.

Therefore, a change either in the stock of oil-consuming appliances or in the rate at which a given stock is used will cause a change in oil consumption. Thus, it is appropriate, in specifying an oil demand model, to build in a stock adjustment process which will take into account not only the influence of current prices but also the effect of

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(*) The demand for non-energy petroleum products (naphtha, bitumin, lubricants.... etc.) is a primary one since such products are used directly in production. In this study, these products are excluded and, hence, all oil consumption is regarded derived.

(1) See F.M. Fisher and C. Kaysen, The Demand for Electricity in the United States, Contribution to Economic Analysis - A Study in Econometrics, North-Holland Publishing Co., Amsterdam, 1962;
P. Balestra, The Demand for Natural Gas in the United States, Contribution to Economic Analysis - A Dynamic Approach for the Residential and and Commercial Market, North-Holland Publishing Co., Amsterdam, 1967.

price expectations. It was highly likely that, in both the recent and more distant past, consumers formed expectations about the movements of fuel prices which have influenced their purchasing behaviour.

We can distinguish between actual stock and desired stock, as is usual in durable goods models. Differences between the two induce consumers to move towards the desired stock, the level of which is a function, ceteris paribus, of expectations about oil prices. If, for example, oil prices are expected to increase relative to other fuel prices in the future, then consumers will desire a stock of appliances which allows the use of cheaper fuels. The lag adjustment is attributable in general to two factors: (1) an unwillingness of consumers to view price and income change as permanent until they have continued for some time, and (2) an existing stock of equipment, which uses specific forms of energy at a specific efficiency, can not be replaced immediately delaying the response of intermediate consumers. The familiar stock adjustment principle applied to oil demand is

$$C_t - C_{t-1} = \lambda (C_t^* - C_{t-1}) \qquad (1)$$

where C^* = desired demand for oil products.

C = actual demand for oil products.

λ = the degree of adjustment process $(0 \leq \lambda \leq 1)$.

Such that $\lambda = 1$, implies that consumers adjust the actual to the desired stock completely within the time period used in the analysis. Accordingly, the objective of the model is to demonstrate both the price expectations effects and the stock of appliances affect by a dynamic formulation which assumes that changes in oil demand are

partially adjusted over time at the rate determined by the value of λ.

Competition from other fuels is expressed by the real price of coal. For the greater part of the estimation period, coal was the main competitor to oil in India and Kenya. Natural gas has become a strong competitor in industrial uses in Pakistan and, to a lesser extent, in India. This would cause some bias in the calculated oil price elasticity to the extent that gas prices would move differently from those of coal. However, there is not sufficient gas price information to calculate a comprehensive series of gas prices.

The conditions prevailing in the energy market, in general, and in the oil market, in particular, suggest that prices are not largely formed as a part of the simultaneous interaction of supply and demand, and the identification problem can adequately, therefore, be delt within the context of one equation model. This is explained by two reasons: First, the supply of oil appears to be very elastic during the period under study so that the quantities consumed ought to belong to the demand curve. Kouris(1) pointed out that "the supplies of most fuels are not known at any given time but what the experience shows is that they are always more plentiful than they are thought to be". Second, the price variable can not be treated as endogenous, meaning that there is no two-way causation between price and quantity. Prices of oil are exogenously given and not formed as part of a simultaneous interaction between supply and demand, since they are usually administered by

(1) G.Kouris,"The Determinants of Energy Demand in EEC Area", Energy Policy,Vol.4, No.4 (December 1976),p.346.

monopoly powers such as governments, multinationals or oil-producing countries. In any case, state intervention, through taxation or subsidies helps to determine price level.

The Model

The research assumes the following demand function:

$$C^*_t = a_1 + a_2 \; Y\,t + a_3 \, P_o + a_4 \, P_c + U_t \qquad (2)$$

where C^*_t = per capita desired demand for petroleum products in barrel of crude equivalent

Y_t = per capita GDP in national currency at 1970 prices.

P_o = price per ton of imported crude in national currency at 1970 prices.

P_c = price per ton of coal in national currency at 1970 prices.

U_t = a stochastic term with independent values and zero mean.

Equations (1) and (2) give rise to equation (3) which specifies the actual demand.

$$C_t = \lambda a_1 + \lambda a_2 \, Y_t + \lambda a_3 \, P_o + \lambda a_4 \, P_c + (1 - \lambda) \, C_{t-1} \qquad (3)$$

Since the function will be transformed into logarithms, the stock adjustment mechanism is assumed to be transformed to:

$$\left(\frac{C_t}{C_{t-1}} \right) = \left(\frac{C^*_t}{C_{t-1}} \right)^{\lambda} \qquad (4)$$

which implies that it is the stock ratio rather than the stock difference which is adjusted in each period. Assuming all variables are linear in logarithms, equation (3) can be written in a logarithms form as follows:

$$\ln C_t = \lambda \ln a_1 + \lambda a_2 \ln Y_t + \lambda a_3 \ln P_o + \lambda a_4 \ln P_c + (1 - \lambda) \ln C_{t-1} \qquad (5)$$

Where all parameters are interpreted as constant elasticity type. (a_2) and (a_3) are long-term income and price elasticities of demand, and (λa_2) and (λa_3) are the short-term elasticities.

The advantage of the model is its simplicity and the ease of interpretation of its parameters. Also, it was built to nearly capture the idea of lagged adjustment of consumption to economic factors; an important factor which must recognized on the demand side. Its simplicity, however, leads to some disadvantages. All adjustments to changed circumstances must follow the same pattern, whether these changes occur regularly (such as income growth) or are sudden and unexpected (such as recent OPEC price increases). Another consideration is that the largest portion of the response to any changed exogenous variable occurs in the first period, with succeeding responses diminishing in magnitude. This does not allow for the existence of gestation lag in planning for the construction of new type of equipments.

Finally, the research takes the global approach assuming that the responses of all users of oil products to changes in economic variables can be captured on one demand curve for the economy as a whole. It would be fruitful if the oil users are broken down into the various demand

sectors (residential, industrial, agricultural, transportation and power), distinguishing different patterns of demand. However, the data required to serve such sort of analysis are unavailable for the countries under consideration.

Specification of Variables

The dependent variable is oil consumption. The independent variables include, in addition to the basic variables of income and price, the lagged variable of oil consumption and the price of coal.

Petroleum Consumption Variables (Ct)

The demand for petroleum in this study is limited to the energy-petroleum products, i.e. it excludes the non-energy petroleum products such as lubricants, greases, bitumen, naphtha, ... etc. There is no direct delivery of crude to intermediate sectors and final consumers whose demand derived only from petroleum products. Crude petroleum both imported and indigenous (if it exists) is delivered directly to domestic refineries as so-called "throughput". Inland consumption consists of the output of domestic refineries of products plus "net imports of products, excluding exports and bunkers. Such consumption is net rather than gross, since it does not include the demand of refineries themselves, covering fuel boilers and losses, which is considered a part of the over all demand.(1)

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(1) Lambertini, op.cit. Appendix II, p.11. For computing gross inland consumption of the different income groups of developing countries, Lambertini assumed that the refinery fuel and loss factors account for 5 per cent of consumption of petroleum in the lower and middle income groups and 7 per cent in the higher income group.

Taking into consideration refinery fuel boilers and losses, gross inland consumption of petroleum is defined as equal crude throughput ± variations in stocks of crude ± net imports of petroleum products (imports - exports - bunkers). Petroleum products consist of liquified petroleum gases, gasolines, kerosenes, heavy distillates and residuals. All quantities are converted into crude oil equivalent, by using the relevant conversion factors, and expressed in terms of barrels per capita by dividing by population.

In addition to this basic dependent variable in the model, another oil consumption variable is derived which is expressed as per capita consumption of fuel oils, consisting of middle distillates and heavy fuel oils. This is justified by the fact that consumption of household sector, consisting mainly of gasolines and kerosenes and accounting for only a small proportion of total consumption, is devoted to essential uses. This may weaken the response of overall demand for changes in economic activity and probably the response to price changes. This variable is specified, representing the demand of intermediate sectors, particularly industrial and transport, on the basis of its importance relative to overall demand.

Income Variables (Yt)

Per capita GDP in national currency at 1970 prices is specified to be the basic income variable. Alternatively, per capita of both industrial production and transport activity in national currency at 1970 prices, are used as income variables owing to their high dependence on oil inputs relative to the whole economy. This is justified on the grounds that the transport sector is technically dependent on oil and the industrial sector, including power generators, derives, partially

or totally, its energy requirements from oil. Moreover, industrialisation, transportation and urbanization are interrelated so that they have induced shifts from traditional energy towards petroleum products while population has moved from the rural areas to the new urban and industrial centers.

The exclusion of agricultural output, though it represents a large proportion of national output, in specifying the alternative income variables stems from the belief that changes in agricultural output do not induce large changes in oil demand. On the one hand, a large proportion of agricultural activity as well as the rural style of life depend on the various sources of non-commercial energy. On the other hand, yields of agricultural production, while depending on the variations in the use of various inputs including petroleum products, are largely influenced by natural hazards.

GDP, industrial production and transport activity are deflated by the implicit price deflator index numbers of GDP and those of the corresponding sectors and are then divided by population.

Price Variables (P)

In view of the conclusion reached that oil prices are unlikely to be a powerful determinant of demand, three sets of prices are prepared for use, alternatively, in an attempt to detect meaningful price elasticities : (i) unit value of imported crude oil in national currency per ton (c.i.f.),(2) posted prices of Saudi crude (34°,f.o.b. Ras Tunara) in U.S. $ per barrel, and (3) the average wholesale prices of all products in national currency per ton. Expressing all

prices in real terms, the first and second prices are deflated by the implicit price deflator index numbers of industrial production and the third by the general wholesale price index numbers at 1970 prices.

Competition from other fuels is expressed by the real prices of coal. For India and Pakistan, the average wholesale prices of all kinds of coal in national currency per ton are deflated by the general wholesale index numbers at 1970 prices. In the absence of wholesale prices of coal in Kenya, the unit values of imported coal in national currency per ton are used and deflated by the implicit price deflator index numbers of industrial production.

The data used in this estimate and its sources are shown in Appendix 1.

Application of the Model

The model, as specified in equation (5), is applied to India for the 14 year period 1961-74, to Pakistan for the 15 year period 1960-74 and to Kenya for the 12 year period 1963-74. The first observation was lost due to the introduction of the lagged variable for each country. The value of t-statistics are in parentheses under the coefficients.

India

$$\ln C_t = \underset{(1.5844)}{3.0021} + \underset{(4.3116)}{3.7582} \ln Y_t - \underset{(0.0889)}{0.0208} \ln P_c - \underset{(1.7873)}{0.8981} \ln P_c - \underset{(0.0033)}{0.003} \ln C_{t-1} \qquad (5a)$$

$R^2 = 0.8328$ $\quad$ $F = 9.9649$ $\quad$ $D.W. = 2.2528$

$S.E. = 0.1446$ $\quad$ No. of observations = 13

Pakistan

$$\ln C_t = -5.6835 + 1.3296 \ln Y_t - 0.0560 \ln P_o$$
$$(11.7326) \quad (5.1055) \quad (0.9808)$$
$$+0.0386 \ln P_c - 0.091 \ln C_{t-1} \qquad (5b)$$
$$(6.7418) \quad (1.039)$$

$R^2 = 0.9762$ F = 92.4418 D.W. = 1.8882

S.E. = 0.08499 No. of observations = 14

Kenya

$$\ln C_t = -0.2651 - 0.2075 \ln Y_t + 0.02064 \ln P_o$$
$$(0.2091) \quad (0.6730) \quad (2.0884)$$
$$+ 0.085 \ln P_c - 0.1968 \ln C_{t-1} \qquad (5c)$$
$$(0.7573) \quad (1.3236)$$

$R^2 = 0.9094$ F = 15.0510 D.W. = 2.2529

S.E. = 0.0987 No. of observations = 11

R^2 values of the above-mentioned equations judge the power of the theory in using the independent variables in explaining the demand for oil i.e. the goodness of fit of the regression line. As a proportion of total variations in oil consumption, equation (5a) explains 83 per cent for India, equation (5b) explains 98 per cent for Pakistan and equation (5c) explains 91 per cent for Kenya. Judging from F-tables, F-values are highly significant, for all countries, at 1% level.

Except for Kenya, the elasticities of income-variable (Y_t), as one could expect on a priori reasons, are the most prominent ones in the model which are manifested in both their sizes and the statistical significance. The income elasticities of both India and Pakistan are 3.76 and 1.33 respectively and are significant at 1% level, as shown by the respective t-values. Their positive signs indicate that oil consumption varies in the same direction with income which is in accordance

with economic theory. It is also noticeable that India's income elasticity is larger than that of Pakistan. This is not because Pakistan has a more mature economy than India since both countries have concentrated in the late years on a rapid industrial growth. It is most probably because of the increased dependence of Pakistan's industrial sector on natural gas, though the share of oil in total energy use in industrial sector in both countries is about 16 per cent.(1) For Kenya, the income elasticity has not only held the opposite sign but is also not different from zero at 5% level.

The elasticities of oil prices (Po), for all the three countries, are never different from zero at 5% level. In the case of India and Pakistan, price elasticity assumes the right sign (negative) while Kenya's holds the wrong sign(positive). Although the model has identified a demand relationship, it can not apparently unscrumble any meaningful price elasticity. Not surprisingly, the same result was reported by Kouris and Robinson(2) for France, Denmark and Belgium/ Luxemburg in their time-series analyses of the individual members of EEC. Moreover, Kouris(3) found that price elasticity of demand for energy was positively insignificant in West Germany, Belgium/Luxemburg and U.K. and negative, but insignificant, in Netherlands, France and Denmark.

One reason may be that the prices have been sticky and have not varied significantly during the period under study. Another is the

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(1) The share of India is calculated from Henderson, op.cit.,Table 9, p.30; and that of Pakistan is taken from Government of Pakistan, Annual Plan; 1975-76, Planning Commission, Government of Pakistan, Karachi, July, 1975,p.214.
(2) Kouris and Robinson, op.cit.,Table 2,p.132.
(3) Kouris,op.cit., Table 1,p.346.

absence of other explanatory variables which influence consumption via oil imports, i.e. the availability of foreign exchange and import control regulations. It is probable that fluctuation in foreign exchange, caused basically by the instability of export earnings, may lead to a downward shift in the oil demand curve, when foreign exchange is constrained, and to an upward shift, when it is available,regardless of the movements of oil prices. Moreover, consumption of oil may be influenced by the quantitative restrictions which are important factors in determining imports (1) in developing countries.

However, price elasticity is expected, on a priori considerations, to be low in the long-run and even lower in the short-run, since persistent differences among fuel prices, in the long-run, would lead to a substitution on the reformation of the capital structure, favouring cheap fuels.

Pakistan is the only country where the elasticity of coal price (P_c) is significantly positive at 1% level, indicating that coal competes with oil according to demand theory. However, the low elasticity of 0.04 indicates that coal has inelastic effect on oil consumption. Such low elasticity can be explained by the fact that coal is replaced more by gas than by oil, since the correlation co-efficient between the consumption of coal and that of both oil and gas are -0.21 and -0.28 respectively. The price elasticity of coal in both India and Kenya is not different from zero, assuming the opposite sign in the former. For all countries, the co-efficient of the lagged variable (C_{t-1})

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(1) Khan, op.cit.,p.691.

is not different from zero and assume the wrong sign (negative), though it is included in the model to improve the fit.

Such inconsistent results are partly attributable to the small number of observations, but mostly to the problem of multi-collinearity which usually happen in time series data. There is evidence of multi-collinearity for all the independent variables, referring to the condition of such variables are non-stochastic, and so they belong to the sample and not to the population. For instance, increases in oil consumption in recent years have been positively associated with the rise in real income and the fall in real prices, leading to some ambiguity in interpreting the data. This ambiguity will be reflected in relatively high standard errors of the estimates of the elasticities of both (Y_t) and (P_o). There is a clear symptom of collinearity between oil price and income, particularly in Kenya, which to be inversely correlated. (rY_t, P_o) for India, Pakistan and Kenya are -0.41, -0.08 and -0.60 respectively. Similarly, there is a strong degree of collinearity between the prices of both oil and coal which tend to be inversely correlated $(rP_o, P_c = 0.17, -0.78$ and $-0.92)$

Also, collinearity exists between the lagged variable (C_{t-1}) and income (Y_t) which tends to be positively correlated in India and inversely correlated in Pakistan and Kenya $(r_{Yt, Ct-1}) = 0.13, -0.84$ and -0.62), leading to high standard errors of income coefficient. It would also lead the income elasticity to be very high and significant while the elasticity of the lagged variable to be very low and insignificant, i.e. low t-ratio. A measure of collinearity is given by the values of simple r^2 between the independent variables as follows:

	$r^2_{Y_t, P_o}$	$r^2_{Y_t, P_c}$	$r^2_{Y_t, C_{t-1}}$	$r^2_{P_o, P_c}$
India	0.17	0.20	0, 02	0. 03
Pakistan	0.01	0.14	0.70	0.60
Kenya	0.36	0.51	0.38	0.85

Moreover, the inclusion of a lagged dependent variable in the right-hand side of the equation, creating a distributed lag bias, tends to explain too much, forcing the rest of the variables to explain too little of the movement of the independent variables.

Another statistical problem which results from the natural ordering of observations in time-series analysis is the serial correlation. D-W statistics indicate no serial correlation in the equations of both India and Kenya, while, in the Pakistan's equation, the test is inconclusive, indicating neither positive nor no autocorrelation.

In fact, both multi-collinearity and a distributed lag bias tend to diminish when they are treated adequately by increasing both the variability and sample size.[1] In comparison with time-series analysis, Kouris and Robinson[2], and Kouris[3] himself, found that serial correlation and multi-collinearity are not normally a serious issue in a pooled cross-section and time-serious analysis which statistically yields more reliable income and price elasticities of demand for oil and energy.

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(1) E. Malinvaud, Statistical Methods of Econometrics, North-Holland Publishing Co., Amsterdam, 1966, Chapter 14.
(2) Kouris and Robinson, op.cit., p.132.
(3) Kouris, op.cit., Table 3, p.348 and Table 5, p.352.

In view of the insignificant results of oil price elasticity, a fair amount of experimentation was carried out through the replacement of unit value of imported crude oil by both the posted prices and the average wholesale prices of products at 1970 prices. Additionally, in view of the complex demand phenomenon, some modifications are introduced into the model on the ground that a large proportion of product consumption, consisting of heavy distillates and fuel oils, is linked with the economic activities of industrial and transport sectors. Hence, both per capital industrial production and transportation are used as income variables and per capita oil consumption excluding gasoline and kerosene, as dependent variable. However, such attempts did not change the results which turned out to be worse in some cases as shown in Appendix 1.

The Predictive Power of the Model

Despite the shortcomings caused by the time-series analysis and data problems, an attempt is made to test the predictive power of the model during the period 1970-74 which had showed the outset of the change in oil market in 1971 and the oil crisis in 1973-74. As a conditional forecast, the known values of income, price and lagged variables are introduced into equation (5a) for India and (5b) for Pakistan, and the estimated oil consumption, then is compared with the actual values, in terms of million metric tons of crude oil equivalent, as follows:(1)

(1) Kenya is excluded owing to the inconsistencies of the results of equation (5c).

	India			Pakistan		
	Actual	Estimated	Errors%	Actual	Estimated	Errors%
1970	18.430	18.991	+3.0	3.353	3.277	-2.3
1971	20.585	20.448	-0.7	3.297	3.181	-3.5
1972	22.465	20.183	-10.2	3.642	3.386	-7.0
1973	23.393	23.347	-0.2	3.583	3.913	+9.2
1974	23.019	20.879	-9.3	3.782	3.907	+3.3

The differences between the actual and estimated oil consumption in India indicate that the model is underpredictible, though the results seem to be correct in the general magnitude except in 1972 and 1974. In the case of Pakistan, the model underpredicted the consumption during 1970-72, and overpredicted that of 1973-74, producing large differences in the yars 1972 and 1973.

There are some factors which have influenced the predictive power of the model. In addition to its insignificant price elasticities, the specifications of the model imply constant elasticity, i.e. an average elasticity for the entire period, which could not capture changes in oil consumption induced by various factors, making elasticities vary along the demand curve. For instance income elasticity could not capture increases in oil consumption in Pakistan in the early 1970s which coincided with the years of the reconstruction of the economy after the civil war.

Moreover, constant elasticities have failed to demonstrate the effects of inter-fuel substitution resulting in the expanding use of indigenous fuels in India and Pakistan in the first half of the 1970s. Consumption of coal in India increased by 8.1 per cent in 1974 and 14.4 per cent in 1975; an increase which had not happened before. Also, consumption of gas in Pakistan increased by 15 per cent in 1973, 5 per cent in 1974 and 9 per cent in 1975. Finally, the calculated elasticities could not capture changes in oil consumption induced by factors which lay outside the control of market forces. Despite the large oil price increases, the capacity of India and Pakistan to import oil was maintained by foreign exchange made available through IMF oil facility,(1) and the unrequited transfers. In the case of India, large quantities of petroleum, crude and products, were imported from the Soviet Union and Middle Eastern OPEC countries, in the context of bilateral agreements, involving discounted prices, deferred payments and barter trade.(2)

As a result, the model explains to a high degree a good deal of the variation in oil consumption, as indicated by R^2 value, and confirms the hypothesis that income is the most prominent variable in determining oil demand. The model gives results which permit neither the acceptance nor the rejection of the price as a determinant of oil demand, thus, not answering the relevant question of what will happen if prices change. Moreover, the negative and insignificant lagged variable indicates that oil consumption does not demonstrate a definite adjustment for income changes and price expectations. It seems that there is an other force, working on the demand side, which is not included in the model. It is probably related to the availability of foreign exchange which determines the capacity to import oil.

(1) See Chapter VI, Section 2.
(2) See Chapter IV, Section 1.

6. Conclusion

The analysis of the relationship between oil consumption and economic growth showed that oil consumption grew faster than the aggregate output, particularly in India and Kenya; a phenomenon which has generally been observed in developing countries passing through a period of rapid industrialisation which involves structural changes favouring the energy-intensive sectors. The close link between per capita oil consumption and per capita GDP, industrial output and transport activity was indicated by a simple correlation analysis whose coefficients amounted to 0.85, 0.92 and 0.94, respectively, for India, and 0.99, 0.95 and 0.97 respectively, for Pakistan, whereas, in the case of Kenya, the results are inconsistent because of the inaccuracy of data and the small number of observations. Moreover, a simple regression analysis indicates that, for a given economic growth, oil requirements for the Indian economy are relatively higher than those for Pakistan, and that in both countries the requirements for the economy as a whole, unexpectedly, are higher than those for both industrial and transport sectors.

The impact of the pattern of economic growth on oil use, expressed by oil-intensity, and thus on the growth of oil consumption varies among India, Pakistan and Kenya. While the Indian economy, on the one extreme, is the lowest oil-intensive, the Kenyan economy, on the other extreme, is the highest; Pakistan is found between the two extremes. Nevertheless, during the period 1960-75, while the oil-intensity of India increased by 117 per cent which remained in line with the trend of the low-income developing countries whose oil-intensity increased by 111 per cent, it increased by 57 per cent in Pakistan

and fluctuated widely around 7 per cent in Kenya. During the period 1970-75, the rise in oil-intensity accounted for 74, 8 and 49 per cent of the increases of oil consumption of India, Pakistan and Kenya, respectively, while the rest is attributable to the rises in GDPs.

Rapid increase of oil consumption has not only been induced by the pattern of economic growth but also fostered by the decline in the world prices of oil relative to the prices of other goods and services traded internationally. Government pricing policy, particularly in India, tended to fix the prices of the domestic production of crude below the world price in order to reduce the rise of domestic prices of oil products, which further were declining relative to the general price levels. Furthermore, since the prices of products consists of a sizeable proportion of taxes and duties, their changes reflect changes in tax levels rather than the movements of the price of crude oil, and thus they failed to dampen domestic demand.

A dynamic model of the demand for oil is estimated only for India and Pakistan, while its equation could not be fitted for Kenya whose inconsistent results may be attributed to the inaccuracy of data, the small number of observations, and time-series problems. The income variable proved, as one would expect on a priori reasons, to be predominent in determining the demand for oil in the low-income developing countries, as its elasticity is prominent, in both its size and statistical signifance, amounting to 3.8 for India and 1.3 for Pakistan. Despite some experimentation, the model could not unscramble any significant price elasticity, though it indicates the right sign,

and thus it permits neither the acceptance nor the rejection of the price as a determinant of oil demand. Although the model demonstrated a high explanatory power in explaining a good deal of variations in oil consumption, it could not answer the relevant question of what will happen in these countries if oil prices change.

CHAPTER IV

THE EFFECTS OF THE ADDITIONAL OIL COSTS ON THE EXTERNAL BALANCE

THE DIRECT EFFECTS

As a consequence of oil price increases, the oil importers must offer more than before in return for the oil they import, reflecting the inflated oil import bills. The additional oil costs, resulting from the worsening of their terms of trade, mean that a transfer of real income from the oil-importing countries to the oil-exporters had occurred. Apart from the effect of income transfer on economic growth, each of the three countries under study faced the problem of the effect of such transfer on the balance of payments. For a typically poor country, the additional expenditures on oil imports can transfer a potential foreign exchange gap to an "acute" one or aggravate an "acute foreign exchange gap" already existing.(1) This is the "direct effect".

1. Oil Imports during 1970-75

In general, imports of petroleum into developing countries and their patterns of international trade in petroleum products have been geared to the strategy of investment on which domestic refineries have been built. Imports have been concentrated in crude oil which is processed in domestic refineries, satisfying inland consumption of products. Nevertheless, products are imported to correct product imbalances, to make up for a sudden short fall in refining capacities and to provide the domestic market with non-energy petroleum products which could not

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(1) These concepts of foreign exchange gap will be discussed on pp.143-4, pp. 160-2

be produced domestically such as lubricants, greases .... etc. In 1975, the costs of imported crude accounted for, as percentages of total petroleum imports, 84, 67 and 92 per cent in India, Pakistan and Kenya respectively.(1)

On the other hand, when domestic refineries are built on the basis of small capacities, only satisfying domestic demand, as with the case of India and Pakistan, petroleum exports, which represent product surpluses, account for a small proportion of both petroleum imports and total exports of goods and commodities. In 1975, product exports accounted for 0.5 and 1.1 per cent of the total export value of India and Pakistan respectively; and 1.4 and 2.9 per cent of their total value of petroleum imports.

Unlike India and Pakistan, Kenya's refinery was built on the basis of "outward-market-orientation" to serve not only the domestic market but also the entire market of the rest of East Africa, other neighbouring countries and the small islands of the Indian Ocean. The implication of such a strategy for international trade is that Kenya's exports of petroleum products represented 39 per cent of the value of total petroleum imports and 22 per cent of the value of total exports in 1975. Thus, understanding the differences in the patterns of international trade in petroleum among the three countries helps in calculating the import volumes, movements in prices and the net oil import bills in 1974 and 1975.

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(1) Calculated from United Nations, Year Book of International Trade Statistics, 1976, U.N., New York, 1977.

Import Volumes and Price Movements

Table 4.1 shows the net imports of petroleum crude and products and the movements in their prices, in terms of both U.S. $ and index numbers in India, Pakistan and Kenya during 1970-75. Quantum and unit value index numbers represent total imports of crude and products, and are adjusted in the case of India and Pakistan for the calendar year. Imports of products are expressed as the net - difference between exports and imports. Net imports of crude into Kenya are expressed as the difference between total import of crude and exports of products in terms of crude equivalent. Methods of calculations and compiling the data are discussed in Appendix 2.

Unit values of imported crude into India rose from $3.20 per barrel in 1973 to $11.00 in 1974 and further to $11.69 per barrel in 1975. For the products, the price per ton increased from $35.22 in 1973 to $96.34 in 1974 and $102.89 in 1975. Index numbers of unit value of crude and products, together, rose from 133.7 per cent in 1973 to 396.6 per cent in 1974 and further to 489.2 per cent in 1975.

Nevertheless, imports of crude increased from 13.293 million tons in 1973 to 14.629 million tons in 1974; an increase which amounted to 10 per cent of 1973's imports. However, imports of crude declined to 14.006 million tons in 1975 owing to the increase in domestic production of crude in that year.

In fact, the effects of oil crisis were reflected in the "net" imports of products which decreased from 3.371 million tons in 1973 to 2.715 million tons in 1974 and to 2.085 million tons in 1975; a level which was lower than those of 1973 and 1974. Quantum index numbers of imported crude and products declined by 55 and 22 per cent in 1974 and 1975 respectively.

Table 4-1

Volumes and Unit Values of Net Imports of Petroleum into India, Pakistan, and Kenya, 1970-75[a]

	Volume of Net Imports			Unit Value of Imports		
	In Million Metric Tons of:			In Current U.S. $ per: (4)		
	Crude[1]	Products[2]	Index Number[3]	Barrel of crude	Ton of Products	Index Number[3]
India						
1970	11.157	0.594	100.0	1.54	12.15	100.0
1971	12.662	1.554	201.3	2.02	35.75	82.3
1972	12.282	3.133	233.3	2.13	23.31	66.1
1973	13.293	3.371	301.4	3.20	35.22	133.7
1974	14.629	2.715	246.4	11.00	96.34	396.6
1975	14.006	2.085	224.6	11.69	102.89	489.2
Pakistan						
1970	3.073	0.153	100.0	1.99	35.46	100.0
1971	3.007	0.421	82.3	1.86	25.22	114.1
1972	2.953	0.283	108.3	1.65	24.09	219.1
1973	2.649	0.256	130.7	3.92	35.28	482.9
1974	2.550	0.498	124.9	8.71	108.10	1016.9
1975	2.822	0.475	143.9	11.47	160.12	1432.6
Kenya						
1970	0.755	0.179	100.0	1.92	36.87	100.0
1971	0.963	0.115	114.0	1.93	34.78	101.0
1972	0.961	0.206	122.0	2.24	36.92	114.0
1973	1.148	0.121	124.0	2.53	47.55	126.7
1974	1.287	0.201	134.7	9.16	85.66	412.4
1975	1.543	0.046	120.8	11.43	102.11	522.9

Source: (1) India's imports of crude oil are taken from U.N., World Energy Supplies, issues: No. 19, 21, op.cit., (see footnote 1, Table 2-8). Pakistan imports are taken from Government of Pakistan, Economic Survey, 1975-76, op.cit., Statistical Appendix, Table 18, p.43. Kenya's imports of crude oil, which is defined as the difference between total imports of crude and the exports of petroleum products, are calculated from Republic of Kenya, Statistical Abstract, issues: 1974, op.cit, Table 63(a), p.71; Table 59(b), p.64; Statistical Abstract, 1975, op.cit, Table 62(b), p.69; Table 63(b), p.71.

(2) Net imports of petroleum products of India and Pakistan are taken from U.N., World Energy Supplies, issues 19, 21, op.cit., (see footnote Table 2-6). For Kenya products imports are taken from Republic of Kenya, Statistical Abstract, issue 1974, op.cit, Table 63(b); issue 1975, op.cit., Table 63(b).

(3) Quantum and unit value index numbers of oil imports of India are taken from Government of India, Monthly Abstract of Statistics, Vol. 30, No. 10, October 1977, op.cit., Table 2.6, p.52; Table 2.7, p.54; Government of India, Statistical Abstract, 1972, op.cit. , Table 85, p.224. Data of Pakistan are obtained from Government of Pakistan, Pakistan Statistical Yearbook, 1975-76, op.cit., Table 17.7, p.239; Table 17.8, p.241. Kenya's data are taken from Republic of Kenya, Statistical Abstract, issue 1974, op.cit., Table 70(b), p.81; issue 1975, op.cit., Table 73, p.91; Table 74, p.92.

(4) Unit values of crude oil and oil products are computed by dividing the value of imports of crude and products by the quantities of the imports of crude (footnote 1) and products (footnote 2), respectively. The value of the imports of crude oil and oil product of India are obtained from U.N., Yearbook of International Trade Statistics, issues: 1970-75. Data of Pakistan are taken from Government of Pakistan, Pakistan Statistical Yearbook, 1975-76, op.cit., Table 17.5, pp.222-33; Government of Pakistan, 25 Years of Pakistan in Statistics, op.cit., Table 18.06, pp.408-9. Data of Kenya are taken from Republic of Kenya, Statistical Abstract, issue 1974, op.cit., Table 36(a); issue 1975, op.cit., Table 36(a).

Note: (a) For notes on the methods of compilation of data and the calculations, see Appendix 2.

India could only maintain reasonable levels of petroleum imports through bilateral agreements, i.e., government-to-government direct deals during 1974 and 1975. Special financing terms were negotiated, for certain imports of crude, by the Government of India with Iran and Iraq, as a part of the bilateral agreements covering trade, investment and financial arrangements. Accordingly, India was supplied with 2.4 million tons from Iran and 2.8 million tons from Iraq. As the selling prices were estimated to be $11.00 and $10.86 per barrel, it was apparent that there was no concessional element in the prices. In both cases, however, it appears that only part of the price would be payable in cash, amounting to $3.50 and $5.86 per barrel in the case of Iran and Iraq respectively. This implies that the amounts that were subject to deferred payments were $7.50 in the case of Iran and $5.00 in the case of Iraq.(1) It was also reported that India obtained 1.0 million tons from Abu Dhabi.(2) Moreover, in the context of a 15 year treaty of economic, scientific and technological co-operation with the Soviet Union, India obtained three million tons of crude and 1.5 million tons of kerosene during 1974.(3) It was the first time crude has been the subject of trade agreement between the two countries because of the reluctance of the oil companies in the past to accommodate Russian crude. Such imports took place within barter arrangements which have enabled India to pay in inconvertible currency through exports.

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(1) Henderson, op.cit., p.113.

(2) Petroleum Economist, Vol. 43, No. 1 (January 1976), p.73.

(3) Petroleum Economist, Vol. 41, No. 1 (January 1974), p.13.

The unit value of imported crude into Pakistan rose from $3.92 per barrel in 1973 to $8.71 in 1974 and further to $11.47 per barrel in 1975. The price per ton of products increased from $35.28 in 1973 to $108.10 in 1974 and to $160.12 in 1975. Unit value index numbers of all petroleum imports increased by 534 per cent in 1974 and 416 per cent in 1975. The sharp increases in unit value are attributable to the 1972's large devaluation of the Pakistani rupee. Imports of crude decreased by 0.099 million tons in 1974 below 1973's level, though they increased in 1975 by 0.270 million tons over 1974, even higher than 1973. However, the decline in imports of crude in 1974 was compensated by an increase in the net import of products from 0.256 million tons in 1973 to 0.498 million tons in 1974, decreasing slightly to 0.475 million tons in 1975. The quantum index of oil imports declined by 6 per cent in 1974, but increased by 19 per cent in 1975.

The unit value of imported crude into Kenya increased from $2.53 per barrel in 1973 to $9.16 in 1974 and to $11.43 per barrel in 1975. Also, the price per ton of products rose from $47.55 in 1973 to $85.66 and $102.11 in 1974 and 1975 respectively. This added an increase of 286 per cent to the unit value index number in 1974 and a further 111 per cent in 1975. Net crude import increased, progressively, from 1.148 million tons in 1973 to 1.287 million tons in 1974 and to 1.543 million tons in 1975. Import of products, which nearly doubled to 0.201 million tons in 1974, declined sharply to only 0.046 million tons in 1975. Hence, the quantum index of total imports, which had increased by 10 per cent in 1974, declined by another 14 per cent in 1975.

Net Oil Import Bills

Table 4-2 shows the net oil import bills which are calculated as equal to the value of imported crude, plus the net value of imported energy-petroleum products and the value of imported non-energy petroleum products. Data of Pakistan and Kenya are converted from national currency to U.S. $ by using the current exchange rate. Data of Pakistan are adjusted to calendar years. Methods of compiling the data, and calculating the import bills are shown in Appendix 2.

India's net oil import bills in 1974 amounted, in current U.S. $ to $1426 million, an increase of as much as three and a half times the 1973 figure. The $1024 million increase originated from the $864 million increase in crude oil bills (85%) and the $160 million rise in product bills (15%). In 1975, the decline in imported petroleum led to the decrease of net bills to $1397 million., though they still amounted to just under three and a half times the figure of 1973. The $28 million decreases in 1975 net oil bills originated from the $48 million decline in product bills, since the cost of imported crude increased by $20 million .

Pakistan's net oil import bills in 1974 amounted to $232 million which equalled 2.8 times that of 1973. Despite the 4 per cent decline in the volume of imported crude, its value increased by 114 per cent which represented about 57 per cent of the $149 million increases in the bills. Hence, about a half of the increases came from the rise in imported products which were nearly doubled. In 1975, net oil import bills increased to $344 million which is nearly 50 per cent higher than 1974 and amounted to just over four times the 1973 figure. The 10 per cent increases in imported crude added $74 millions which accounted for 46 per cent of the increases of crude bills. Moreover,

Table 4-2

Net Oil Import Bills of India, Pakistan and Kenya, 1970-75[a]
(in million of current U.S. $)

	(1) Net Crude Imports	(2) Net Energy Product Imports	(3) Net Non-Energy Product Imports	(4) Net Oil Import Bills (1+2+3)	(5) Changes over the previous year	
						%
India						
1970	125.748	1.780	22.285	149.831	-	-
1971	186.566	55.735	11.397	253.716	+103.885	+69.3
1972	190.727	62.365	-	253.092	-0.621	-0.2
1973	311.015	90.361	-	401.376	+148.284	+58.6
1974	1174.797	250.706	-	1425.503	+1024.127	+255.2
1975	1194.913	202.583	-	1397.497	-28.006	-2.0
Pakistan						
1970	44.551	8.195	4.267	57.013	-	-
1971	40.822	14.555	2.120	57.497	+ 0.484	+0.8
1972	35.484	4.364	1.283	41.131	-16.366	-28.5
1973	75.713	7.783	-	83.496	+42.365	+103.0
1974	162.194	70.290	-	232.484	+ 148.988	+178.4
1975	236.243	107.934	-	344.177	+ 111.693	+48.0
Kenya						
1970	10.563	6.599	2.231	19.393	-	-
1971	13.581	4.000	6.010	23.591	+4.198	+21.6
1972	15.706	7.605	7.930	31.241	+7.65	+32.4
1973	21.199	5.753	8.068	35.020	+3.779	+12.1
1974	86.017	17.217	21.369	124.603	+89.583	+255.8
1975	128.757	4.697	16.355	149.809	+25.206	+20.2

Source: See footnote (3) of Table 4-1.

Note: (a) For notes on the methods of compilation of data and calculations, see Appendix 2.

despite the 5 per cent decline in the imported products, their value increased by 54 per cent.

Kenya's net oil import bills in 1974 rose to $125 million which amounted to just over three and a half times the figure of 1973, 65 per cent of the $90 million increase in net bills came from the crude oil bills and the remaining from the increase in products bills. The 12 per cent increases in the volume of imported crude and 66 per cent increases in the volume of imported products led to increases of their values by 305 and 191 per cent respectively. In 1975, the net oil import bills rose further to $150 million which was equivalent to 4.3 times that of 1973, and 20 per cent higher than that of 1974. The $25 million increases in such bills over 1974 came from the $43 million increases in the costs of crude, whose imports volume increased by 20 per cent, while the product bills declined by $13 million as the imported quantity decreased by 77 per cent.

2. The Additional Costs of Oil Imports in 1974 and 1975

The oil price increases, as reflected in the rise in unit values of both crude and products, meant that each oil-importing country, incurring additional oil costs, had to pay more than before for the oil it imported. These additional costs vary among countries, depending not only on the changes in oil prices but also on changes in oil imports induced by variations in the pace of economic growth. Hence, there are two different additional oil bills for each country: (1) the bills which were actually paid and (2) the bills which might be paid had the normal trend of economic growth resumed its pace without interruption and if the pre-October 1973's prices were prevailing.

The Actually Paid Additional Oil Costs

The actually paid additional oil costs in 1974 and 1975 are defined as the differences between the actual payments for oil import bills according to the new high level of oil prices and the estimates of such bills had the pre-October 1973's prices of oil continued throughout these two years. The pre-October 1973's prices of crude and products as quoted in September 1973 are shown in Table 4-3.

The pre-October 1973 price of crude oil is assumed $2.75 per barrel which was used by Fried and Schultze for a similar study conducted by the Brookings Institution. The prices per ton of the main petroleum products are $54.828 for gasolines, $46.346 for kerosenes and $26.610 for distillates and residuals. These prices are calculated as the average prices per ton of all brands and grades of the three main product groups as quoted in September 1973 by the large international refineries.

Since such prices are quoted on the basis of F.O.B., they are converted into C.I.F. by using the F.O.B./C.I.F. factor for each country calculated from the IMF[1] International Financial Statistic by dividing imports C.I.F. by imports F.O.B.

Table 4-3

Pre-October 1973's Prices of Petroleum Crude and Products
(in current U.S. $)

Fuel	Unit	Price
Petroleum crude	barrel	2.75[1]
Gasolines including naphtha	ton[3]	54.828[2]
Kerosenes	ton[3]	46.346[2]
Distillates and residual fuel oils	ton[3]	26.610[2]

(1) IMF, International Financial Statistics, Vol. 31, No. 5, (May 1978).

Source: (1) Fried and Schultze, "Overview", op.cit., p.10.

(2) Petroleum Press Service, Vol. 40, No. 9 (September 1973), pp.358-9. Such products consist of 7 products which include 32 different brands and grades, produced by five international refineries. Their prices are quoted as posted export prices for bulk cargo shipment in U.S. cents per gallon.

(3) Prices are converted from U.S. cents per gallon to U.S. $ per ton by using conversion factors in OECD, Oil Statistics, OECD, Paris, 1975, pp.7-8.

These factors for India, Pakistan and Kenya are 1.120, 1.097 and 1.150 respectively. Moreover, the prices of crude oil and oil products are adjusted to the rise in the world general price level, assuming that the 9.6 per cent increases in the world consumer prices during 1973 would continue throughout 1974 and 1975. Finally, the prices of crude oil are expressed per ton on the basis that a ton is equivalent to 7.3 barrels. Taking all such factors into consideration and assuming that OPEC had not increased its prices unilaterally, the import prices of India, Pakistan and Kenya per ton of crude oil, gasolines, kerosenes, and distillates and residuals in current U.S. $ on C.I.F. base during 1974 and 1975 would be as follows:

	India		Pakistan		Kenya	
	1974	1975	1974	1975	1974	1975
Crude oil	22.484	24.642	22.022	24.136	23.086	25.303
Gasolines including naphta	67.302	73.764	65.920	72.249	69.105	75.739
Kerosenes	56.891	62.352	55.722	61.072	58.414	64.022
Distillates and residual fuel oils	32.664	35.800	31.994	35.065	33.539	36.759

The application of such prices to the actual volume of net imports of crude oil and products in 1974 and 1975 in Table 4-1 results in the net oil import bills in these two years, had pre-October 1973's prices continued in 1974 and 1975, as shown in Table (1) of Appendix 3.(1)

(1) For detailed calculations of the additional oil costs, see Appendix 3.

The differences between such estimates and the actual payments for oil imports, indicated in Table 4-2, result in the actually paid additional oil costs which are shown in Table 4-4 for India, Pakistan and Kenya in current U.S. $ in 1974 and 1975.

Table 4-4

The Actually Paid Additional Oil Costs in 1974 and 1975 for India, Pakistan and Kenya.

(in millions of current U.S.$)

	Actual Additional Bills of:					
	Crude		Products		Total Crude and Products	
	$	% of Act. Bills	$	% of Act. Bills	$	% of Act. Bills
India						
1974	845.879	72.0	142.132	56.7	988.011	69.3
1975	849.777	71.1	95.705	47.2	945.482	67.7
Pakistan						
1974	106.038	65.4	51.949	73.9	157.987	68.0
1975	168.131	71.2	88.789	82.3	256.920	74.6
Kenya						
1974	56.305	65.5	6.957	40.4	63.262	61.2
1975	89.714	69.7	2.098	44.7	91.812	68.8

Source: Based on Table 4-2 and Table 1 of Appendix 3.

Figures in Table 4-4 indicate that the actual additional bills accounted, in general, for just over two-thirds of the net oil bills paid by each of the three countries in 1974 and 1975. India paid $988 million in 1974 and $945 million in 1975 which accounted for 69 and 68 per cent of the net oil bills respectively. Crude imports added $846 million in 1974 and $850 million in 1975 which represented just over 70 per cent of bills of crude in these two years. Imports of products brought about additional costs of $142 million in 1974 and $96 million in 1975 which accounted for 56.7 and 47.2 per cent, respectively, of the actual bills of the imported products.

The increases in Pakistan's oil bills amounted to $158 millions in 1974 and $257 million in 1975 which represented 68 and 74.6 per cent of the actual bills respectively. Crude cost Pakistan additional $106 million in 1974 and $168 million in 1975 which made up 65.4 and 71.2 per cent of the actual expenditures on crude imports. Imports of products added $52 million in 1974 and $89 million in 1975, accounting for between three-quarters and four-fifths of the payments for products.

The additional oil costs of Kenya amounted to $63 million in 1974 and $92 million in 1975, explaining 61.2 and 68.8 per cent of the actual costs paid respectively. Crude added $56 million in 1974 and $90 million in 1975, representing 61.2 and 68.6 per cent, respectively, of the net oil bills of crude. Imports of products added $7 million in 1974 and $2 million to the additional oil bills, accounting for just over two-fifths of the actual costs of products and taking no account of the costs of non-energy oil products.

The Additional Oil Costs Compatible with Internal Equilibrium

Additional oil costs calculated above are based on the actual quantities of imported crude and products. Actual imports, whose costs were indicated on the accounting balance of payments, were probably decided on the ground of a limited availability of foreign exchange and the conditions of external balances. Therefore, they were not, necessarily, a reflection of the minimum requirements of oil imports, appearing on the programme balance of payments, which are needed to sustain the internal equilibrium. The inability to secure such minimum requirements of oil, which defined as an operational import, would create a factor-proportions problem, leading to the decline of the existing capacity utilization and the detriment of capacity growth.

The costs of oil imports which are needed to maintain capacity utilization and growth can only be reflected on the programme balance of payments, despite the pursuance of an optimum balance of payments policy, when oil imports are defined as what is required for internal balance. None of the expenditure shifters and adjusters that are part of the conventional balance of payments theory are effective in reducing the resulting large deficits without disturbing the internal balance in favour of the external balance. Such deficits are defined by Machlup "as an excess of dollar amounts needed or desired for some specified purposes over the dollar amounts expected to become available from regular sources".(1) Also, Findlay(2) estimated the foreign exchange gap as the "foreign exchange required at the equilibrium point without any constraints on trade".

However, the practices in most developing countries are to hide balance of payments deficits by various kinds of commercial policy controls which aim to reduce imports. Thus, actual imports of petroleum, as they exist on the balance of payments, are only suitable for external payments considerations, substituting external equilibrium for internal equilibrium.

Thus, the additional costs of oil compatible with internal equilibrium is defined as the difference between the actual net oil import bills in 1974 and 1975 - with the world economy in recession and with

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(1) F. Machlup, "Three Concepts of the Balance of Payments and the So-called Dollar Shortage", The Economic Journal, Vol. 60, No. 237 (March 1950), pp.55-60.

(2) R. Findlay, "The Foreign Exchange Gap and Growth in Developing Countries", in J. Bhagwati et al. (eds.), Trade, Balance of Payments and Growth, North-Holland Publishing Co., A msterdam, 1971, pp.175-78.

oil prices at their new levels - and the estimation of what may have been expected to occur in the pre-October 1973's economic environment under the assumption of continuation of 1973's economic growth and oil prices throughout 1974 and 1975. Because of the inconsistent results of Kenya when its equation was estimated, only the equations of India and Pakistan will be used to estimate their consumption and imports of oil during 1974 and 1975 under the following assumptions:

(i) The growth of per capita GDP in national currencies at 1970 prices in India and Pakistan throughout 1974 and 1975 had kept pace with 1973's growth rate, namely, 3.0 and 3.7 per cent per annum in India and Pakistan respectively.

(ii) pre-October 1973's oil price is $2.75 per barrel of crude in 1974 dollar, and the real prices of coal remained unchanged.

These two assumptions are computed in Table 2 of Appendix 3.

Equation (5a) for India and equation (5b) for Pakistan (chapter III, pp.118-9) are used to calculate their gross inland consumption of petroleum during 1974 and 1975 under the assumptions mentioned above. Petroleum imports for each country are computed as residuals by deducting the actual domestic production from the estimated consumption in terms of crude oil equivalent, making no allowance for changes in the stocks. Total petroleum imports are, then, disaggregated into imports of crude and the imports of products on the basis of the actual patterns of petroleum imports which were prevailing in both India and Pakistan in 1974 and 1975. Moreover, imports of petroleum products are converted from crude oil equivalent to the equivalent of gasolines; kerosenes and distillates and residuals by using the relevant conversion factors. Consumption, production and imports of petroleum crude and products of India and Pakistan during 1974 and 1975 on the assumption of pre-October

1973's oil prices and economic growth are shown in Table 3, Appendix 3.

Table 4-5 reproduces imports of petroleum crude and products in million metric tons into India and Pakistan in 1974 and 1975 under the assumption of 1973's economic conditions. Accordingly, net oil imports

Table 4-5

Estimated Imports of Petroleum Crude and Products of India and Pakistan in 1974 and 1975 Under the Assumptions of 1973's Economic Conditions
(in million metric tons)

	India		Pakistan	
	1974	1975	1974	1975
Imports of Crude	16.100	19.126	3.287	3.667
Imports of products				
Gasolines	0.008	0.019	0.036	0.031
Kerosenes	0.854	1.602	0.074	0.075
Distillates and residuals	2.107	1.237	0.532	0.511
Total	19.069	21.984	3.929	4.284

Source: Table 3 of Appendix 3.

of crude and products into India would have increased from 16.664[1] million tons in 1973 to 19.069 million tons in 1974, or by 14.4 per cent, and risen further by 15.3 per cent in 1975 to reach 21.984 million tons, though the actual imports increased by 4.1 per cent in 1974 and declined by 7.2 per cent in 1975. Pakistan's imports would have increased from 2.905[2] million tons in 1973 to 3.929 million tons in 1974, or by 35.2 per cent, and risen further by 9.0 per cent in 1975 to reach a level of 4.284 million tons, though the actual imports increased by 4.9 and 8.2 per cent respectively in these two years.

(1) See Table 4-1.

(2) See Table 4-1.

Finally, such imports of petroleum crude and products are multiplied by the corresponding prices of crude and products indicated in p.141 to estimate net oil import bills compatible to internal equilibrium which are shown in Table 4 of Appendix 3. The differences between such estimates and the actual payments for oil imports, as indicated in Table 4-2, represent the additional oil costs compatible with internal equilibrium in India and Pakistan during 1974 and 1975, as shown in Table 4-6. Clearly, the estimates of Table 4-6 are lower than those of

Table 4-6

The Additional Oil Costs Compatible with Internal Equilibrium of India and Pakistan in 1974 and 1975
(in millions of current U.S. $)

	Additional Bills of: Crude		Products		Total	
	$	% of Act. Bills	$	% of Act. Bills	$	% of Act. Bills
India						
1974	812.805	69.2	132.760	53.0	945.565	66.3
1975	723.610	60.6	57.008	28.1	780.618	55.9
Pakistan						
1974	89.808	55.4	46.773	66.5	136.581	58.7
1975	147.736	62.5	83.196	77.1	230.932	67.1

Source: Based on Table 4-2 and Table 4 of Appendix 3.

Table 4-4 since the actual petroleum imports in 1974 and 1975 are less than what India and Pakistan would have imported during these two years to sustain higher economic growth. In fact, 66 and 59 per cent of the actual oil bills paid in 1974 by both India and Pakistan, respectively, represented excesses over what might otherwise have been paid. In 1975, additional oil bills of India would have decreased to about 56 per cent of the actual bills because of the decrease of import volume, while those of Pakistan would have increased to 67 per cent as a result of the rising level of its oil imports.

3. The Effects on the Terms of Trade and Income Transfer

The Terms of Trade Effects

The rise in oil prices means that an oil-importing country would have to part with more of its output than before if it wants to import a unit of petroleum, resulting in unfavourable effects on the country's terms of trade. Any worsening of the terms of trade will shift income away and reduce the capacity to import, retarding the economic development process, particularly where foreign trade generates a relatively large proportion of national income.

Among the several measures of the terms of trade, two are relevant for presenting the changes in the relationship between commodity exports and total imports as well as petroleum imports, namely, commodity and income terms of trade. The commodity terms of trade of total exports versus both total imports and petroleum imports are calculated in order to measure the changes of the purchasing power of unit of exports in terms of such imports. Additionally, it is equally important to have a notion of the income terms of trade or what may be called the capacity to imports. It is noteworthy that a country's income terms of trade might improve at the same time as its commodity terms of trade deteriorate when the volume of its exports increases sufficiently to cause a rise in the index of income terms of trade.

For India, Pakistan and Kenya, Table 4-7 shows the movements of the commodity and income terms of trade during 1970-75 as well as the commodity terms of trade of total commodity exports versus petroleum imports during the same period. The indices of India and Pakistan have been adjusted for the calendar years and the various base years of the three countries are moved to 1970.

Table 4-7

The General Commodity and Income Terms of Trade and the Commodity Terms of Trade between Petroleum Imports and Total Exports, 1971-75
1970 = 100

	1971	1972	1973	1974	1975
Commodity Terms of Trade					
India	110.4	119.4	106.9	79.6	70.3
Pakistan	90.5	93.4	107.9	92.8	72.6
Kenya	87.4	86.6	86.0	74.3	72.3
Income Terms of Trade					
India	111.9	131.6	124.9	98.5	95.3
Pakistan	117.1	158.1	190.4	152.2	128.9
Kenya	85.2	86.9	99.0	82.6	71.2
Oil-related Terms of Trade					
India	124.2	168.2	99.1	41.6	37.6
Pakistan	100.0	88.6	71.2	40.3	27.7
Kenya	95.2	93.7	95.7	39.9	36.1

Source: Calculated from Government of India, Monthly Abstract of Statistics, Vol. 30, No. 10 (October 1977), Table 26, pp.52-53; Table 27, p.55; Government of Pakistan, Statistical Yearbook, 1976, op.cit., Table 17.7, pp.239-240; Table 17.8, pp.241-42; Republic of Kenya, Statistical Abstract, op.cit., issue 1975, Tables 70(a) and 70(b) p.81, issue 1976, Table 73, p.91; Table 74, p.92.

Pakistan's commodity terms of trade continued to increase from 93.4 per cent in 1972 to 107.9 per cent in 1973 owing to the significant increases of the prices of its exports during 1973 boom. The commodity terms of trade of India deteriorated by about 13 per cent as the prices of its exports had not increased sufficiently to meet the increases in the price of its imports. In the case of Kenya, the price

of its exports had lagged behind those of imports since 1971. The drastic decline in the terms of trade occurred in 1974 as the indices declined to 80 per cent in India, 93 per cent in Pakistan and 74 per cent in Kenya. The deterioration of the indices of Pakistan was less than that of both India and Kenya as the prices of its exports recorded large increases during that year. By the 1975 recession, the terms of trade of the three countries had declined further to 70, 73 and 72 per cent respectively.

Much of the decline in the commodity terms of trade can be attributed to the oil prices which began rising steadily in the early 1970s and quadrupled by 1974, as indicated by the commodity terms of trade of total exports versus oil imports. When the posted price was raised to $5.119 per barrel in October 1973, the indices declined from 168 per cent in 1972 to 99 per cent in 1973 in India, and from 88 to 71 per cent in Pakistan. In the case of Kenya the index increased from 94 per cent in 1972 to 96 per cent in 1973. Such an increase may be attributed to the operations of Kenyan refinery, as an outward-market-orientated refinery whose oil requirements are supplied through arm-length transactions, since the refinery is partly owned by multinationals. However, the drastic decline in the indices took place in 1974 when posted prices were raised to $11.651, deteriorating the index to 42 for India, 40 per cent for Pakistan and to 40 for Kenya. Moreover, the effect of the 1975's 10 per cent increase in the posted price led to a further decline of the index to 38, 28 and 36 per cent for India, Pakistan and Kenya, respectively. The deteriorations of such indices indicate that a given volume of export will exchange a smaller volume of oil imports than formerly took place.

The unfavourable oil-related effects on the commodity terms of trade contributed to the deterioration of the import capacities of the three countries which were further deteriorated by the effects of the mid-1970s world recession on the volumes of their exports. The index of income terms of trade of India, which increased from 112 to 132 per cent during 1971/72, declined to 125 per cent in 1973 and further to 99 per cent in 1974 and to 95 per cent in 1975. The Pakistan index, which increased from 158 per cent in 1972 to 190 per cent in 1973, declined to 152 per cent in 1974, owing to the 7.1 per cent declines in the quantum index of exports, and further to 12.9 per cent in 1975, despite the volume recovery by 8.2 per cent. Similarly, Kenya's index declined from 99 per cent in 1973 to 83 per cent in 1974 and further to 71 per cent in 1975, because of the decline of export volume by 3.4 and 11.4 per cent in these two years, respectively.

The income transfer effects

Theoretically, if each oil-importing country uses its currency, or borrows the currency of other country, to pay for the oil it imports, oil payments only involve financial transfers from the oil-importing to the oil-exporting countries. Real transfers occur when the oil-exporters use such purchasing power to acquire goods and services from the rest of the world.(1) Practically, the payments for the additional oil bills,

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(1) For discussion on the theoretical background of the transfer problem, see R.E. Caves and R.W. Jones, World Trade and Payments, Little Brown & Co, Boston, 1973, pp.455-66; R.W. Jones, "The Transfer Problem Revisited", Economica, Vol. 37, No. 146 (May 1970), pp.178-84; M.O. Clement, R.L. Pfister and K.J. Rothwell, Theoretical Issues in International Economics, Constable & Co, London, 1967, pp.141-50. For discussions on the oil-related transfer problem, see H. Chenery, "Reconstructing the World Economy", Foreign Affairs, Vol. 53, No. 2 (January 1975), pp.250-58; Willett, op.cit., pp. 4-20.

in the case of a typical oil-importing developing country, involve the shift of the same value of real resources from domestic uses to increase exports for acquiring internationally recognized means of payments, i.e. foreign exchange. Viewing the additional oil bills as an international excise tax imposed by the OPEC countries, each oil-importing country was worse off in welfare terms than before, since it had to surrender a part of its real income equivalent to the additional oil bills, resulting from the unfavourable effects of the rise in oil prices on its terms of trade.

Table 4-8 shows the annual income transfers and the foregone economic growth, as percentages of GNP, resulting from the additional

Table 4-8

The Effects of Oil-Related Income Transfers on GNP Growth in India, Pakistan and Kenya during 1974 and 1975
(in percentages)

	Annual Income Transfer		Foregone Economic Growth	
	1974	1975	1974	1975
Actual Additional Oil Bills				
India	1.22	1.12	1.27	1.07
Pakistan	2.04	2.57	2.39	3.03
Kenya	2.48	3.04	2.62	3.29
Additional Oil Bills Compatible with Internal Equilibrium				
India	1.17	0.92	1.22	0.88
Pakistan	1.76	2.31	2.07	2.72

Source: Additional oil bills both actual and compatible with internal equilibrium are obtained from Tables 4-4 and 4-6 respectively. GNP in national currency at market prices, adjusted for the calendar year, and exchange rates are taken from IMF, International Financial Statistics, Vol. 31, No. 5 (May 1978).

oil costs, both actual and compatible with internal equilibrium, during 1974 and 1975. Annual income transfer is defined as the additional oil bills expressed as a percentage of GNP of the same year, while the foregoing economic growth is calculated as the additional bills of the current year expressed as a percentage of GNP of the previous year after the former is adjusted to the inflation rate 9.6 per cent, which prevailed in 1973.

Annual transfers during 1974 caused by oil price increases as percentages of GNP, were running at the order of 1.2 per cent for India, 2.0 per cent for Pakistan, and 2.5 per cent for Kenya. In 1975, income transfer decreased slightly to 1.1 per cent for India, but increased to 2.6 and 3.0 per cent for Pakistan and Kenya, respectively, owing to the rise in oil imports during that year.

The result of this one-time costs increase was the reduction of GNP of India, Pakistan and Kenya in 1974 by 1.3, 2.4 and 2.6 per cent and in 1975 by 1.1, 3.0 and 3.3 per cent respectively. Moreover, both annual income transfers and foregoing economic growth fall slightly when imports of petroleum compatible with internal balance are taken into account.

Reductions of incomes of the three countries in the range of 1-3 per cent may appear to be small when they are compared with those of the industrial countries - 4 per cent in Italy and 5 per cent in Belgium.(1) However, such income losses become a matter of concern because of their disruptive effects on economies which are considered

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(1) Willett, op.cit., p.3.

very poor. Taking into account that the average annual growth rates of GDPs in India, Pakistan and Kenya during the two years between 1973 and 1975 were 1.9,[1] 2.3,[1] and 2.0[2] per cent respectively, a corresponding average of foregoing economic growth of 1.2, 2.7 and 3.0 per cent means that annual income transfer had pre-empted any realized economic growth particularly in Kenya, and to a lesser extent in India and Pakistan.

Furthermore, such income transfers are considered exceptionally large when they are viewed in the light of the past experiences of transfer problems. For instance, Machlup[3] has calculated that the financial transfer associated with German reparations after the First World War represented 3.5 per cent of national income in their peak (1924) and averaged only 2.5 per cent for the entire period 1924-1932. He also found that the ratio of U.S. foreign payments to national income over the period of Marshal Plan, was running at the order of 3.0 per cent which is slightly over Pakistan's income transfer, but below that of Kenya in 1975.

The magnitudes of income transfers and losses of economic growth vary among the sample countries, depending on the extent to which a country is a user and importer of oil as well as the availability of indigenous energy resources other than oil. At the one extreme,

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(1) Calculated from I.M.F., International Financial Statistics, op.cit., p.199, p.305.

(2) U.N., Yearbook of National Accounts Statistics, 1976, op.cit., Table 4A, p.134.

(3) F. Machlup, "International Payments, Debts and Gold", part five, in F. Machlup, Capital Movements and the Transfer Problem, Scribner, 1964, pp.368-447.

the size of income transfer from India had been limited by its position as a light user of oil which provides just under one quarter of energy requirements during the 1970s, importing about 70 per cent of its oil needs, and deriving just over 70 per cent of its energy use from domestic coal. On the other extreme, Kenya obtained more than 90 per cent of its energy uses from oil which is totally imported owing to the absence of indigenous source of energy. The Pakistan economy can be found between the two extremes, where 40 per cent of energy uses are obtained from oil, 90 per cent of which are imported. Moreover, indigenous gas has gradually become an important source of energy, providing just under one half of its requirements.

4. The Effects on the External Balances

The Adjustment for Oil Deficit - A Theoretical Background

The effects of the deterioration of the terms of trade on the balance of payments and the policy options available for adjustment in the poor countries can be clarified in terms of a simple diagram which appeared in an early article of Corden[1] and was used later for a similar purpose.[2] His analysis seems, more or less, suitable for an oil-importing developing country. However, the scope of adjustment and policy options are different in the case of developing countries,

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(1) See W.M. Corden,"The Geometric Representation of Policies to Attain Internal and External Balance", Review of Economic Studies, Vol. 28, No. 75 (1960/61), pp.1-22.

(2) W.M. Corden, "The Effects of the Oil Price Rise on the International Economy", in M.J. Artis and A.R. Nobay (eds), Essays in Economic Analysis, The Proceedings of the Association of University Teachers of Economics, Sheffield, 1975, Cambridge University Press, 1976, Appendix 2, pp.142-47.

since deficits caused by the additional oil cost can create a potential foreign exchange gap or transform an already existing gap to an acute one, making the conventional theory of balance of payments not automatically applicable.

Figure 1(a) shows the effects of deteriorations of the terms of trade on the balance of payments, assuming constant money expenditure.

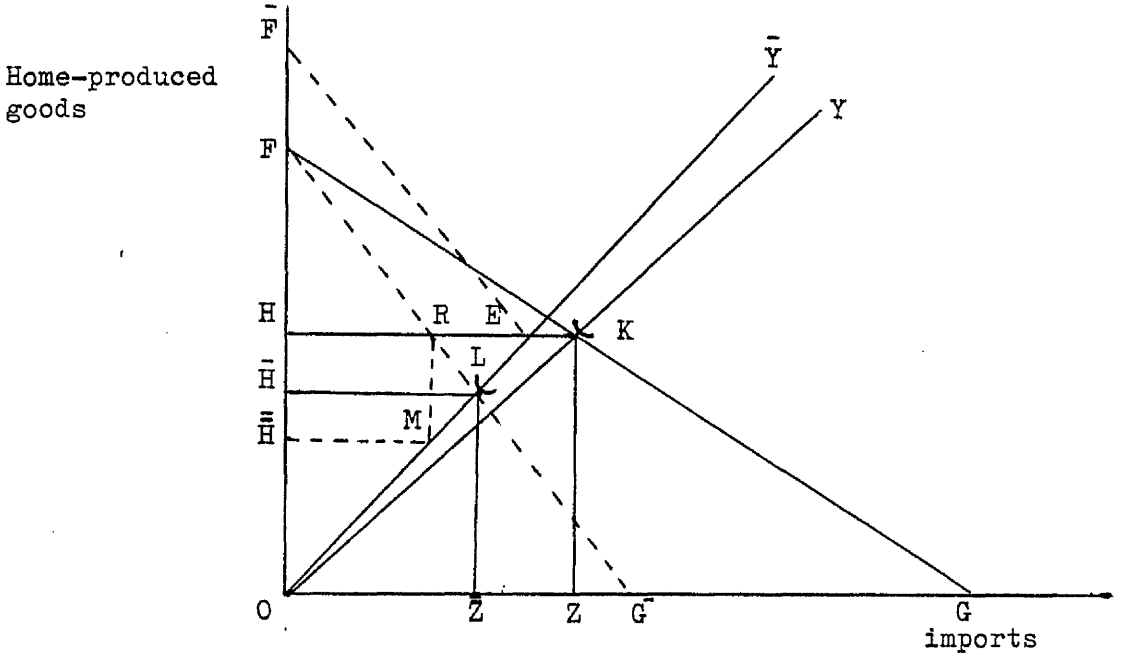

Figure 1(a) The Effects of Deterioration in the Terms of Trade on the Balance of Trade

The vertical axis shows the quantity of home-produced goods and the horizontal axis shows the quantity of imports. Given the foreign price of imports and the exchange rate and the average money price of home-produced goods, the prices of both exports and imports are fixed; and the initial domestic price ratio between the two categories of goods is given by the slope (FG). Initial money expenditure (income) is given by (OF) in terms of home-produced goods and the chosen demand position is at the point (K), and the right quantity of home-produced goods for internal balance is (OH). The quantity of exports (FH) is equal to imports (OZ) at the given price ratio. The level of real expenditure (absorption) is indicated by the indifference curve through (K) and (OY)

is the income-consumption line.

The rise in import prices has shifted the opportunity line to ($F\bar{G}$). There has been a fall in real absorption presented by the movement from the indifference curve through (K) to that through L on ($O\bar{Y}$) line; and the deflationary impact reduces the demand for home-produced goods from (OH) to ($O\bar{H}$); and the demand for imports falls by ($Z\bar{Z}$). Measured in terms of home-produced goods or exports, the value of import has risen from (FH) to ($F\bar{H}$), leading to a balance of payments deficit equal to ($H\bar{H}$) which is created, in the first place, by the rise in oil prices.

This situation is only sustainable if expenditure (OF) is kept above the lower level of income by amount equal ($H\bar{H}$) which must be financed through borrowing, credit creation or running down balances. This case implies a thoroughly non-neutral monetary policy which is needed to keep money expenditure constant.

If government policy tends to cure internal deflationary disequilibrium, restoring fully employment, effective demand can be increased, according to the Keynesian theory, to $O\bar{F}$ through measures which stimulate domestic expenditure to equilibrium level at (E). Export increases are necessary conditions to prevent external imbalance, resulting from a rise in domestic expenditure and income. However, exports cannot be stimulated beyond their maximum which is determined by both domestic supply of exportables and the conditions of external demand. The value of imports increased by (LE) and the balance of payments deficit, being larger than before, increased from ($H\bar{H}$) to ($F\bar{F}$). Such a deficit needs to be financed, as rises in consumption and investment cannot be engineered without additional operational and investment imports.

If government policy aims to cure the deficit by deflating the economy through saving increases, expenditure will be reduced to the point (M). Import volume would decrease to (HR) and the demand for home-produced goods would fall to ($O\bar{H}$), increasing the unemployment. However, the rise in the ex-ante propensity to save would induce a large external imbalance, as the input imports required to utilize such savings are not matched by an increase in foreign exchange earnings, assuming the pursuance of optimum expenditure policies at the outset.

Alternatively, if the government could not borrow to accommodate the balance of payments deficits, devaluation, combined with expenditure adjustement, may be used to shift demand away from foreign to domestic goods through changes in their relative prices, restoring, simultaneously, internal and external balances. Money income derived from expenditure on domestic goods would remain constant while income derived from exports would rise because of the increase in profits and wages in export industries, leading to a rise in the nominal money supply. However, the usefulness of devaluation for a typical developing country is limited by the weak responses of domestic supply and by its impact on the level of economic activity and price level.

Reviewing some experiences of devaluations in developing countries, R.N. Cooper[1] concluded that the recessionary tendencies, which frequently accompany devaluation, trigger a rise in the domestic

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(1) R.N. Cooper, "An assessment of currency devaluation in developing countries", in G. Ranis (ed.), Government and Economic Development, Yale University Press, New Haven, 1971, pp.487-92.

prices of tradeable goods, a tendency which may be aggravated by overly restrictive fiscal and monetary policies. Moreover, the effectiveness of devaluations is limited by the weak response of domestic supply. The failure of domestic supply to respond quickly to highly unstable relative prices caused by massive devaluation explained the painful experience of devaluation in Argentine.(1)

Furthermore, the side effects of devaluation on developing countries which receive foreign aid have been explored by Cooper(2) who found out that devaluation can lower aggregate demand, acting essentially as an excise tax, at least, in the short-run.

In fact, the role assigned to devaluation in the conventional theory could not be played efficiently in developing countries because of the existence of foreign exchange gap which arises from the very characteristic of the curves of supply of and demand for foreign exchange. The demand curve for foreign exchange in a typical developing country can be drawn similar to that curve described by Hart and Kenen.(3) It is composed of two elements: demand for non-input imports, showing the general characteristics of the familiar demand curve, and the demand for input imports, needed for an internal balance which is inelastic, exhibiting no intersection with the supply curve. Indeed an increase in imports in the form of essential input will not lead to a fall in income and effective demand, but it will exert a positive leverage effect on domestic income, particularly, if there is lack of

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(1) See C.F. Diaz-Alejandra, Exchange Rate Devaluation in a Semi-Industrialized Country, Cambridge, Mass., M.I.T. Press, 1965.

(2) R.N. Cooper, "Devaluation and Aggregate Demand in Aid-Receiving Countries", in J. Bhagwati et al. (eds), Trade, Balance of Payments and Growth, North-Holland Publishing Co., Amsterdam, 1971, Figure 16.3, p.365; pp.367-75.

(3) A.G. Hart and P.B. Kenen, Money, Debt and Economic Activity, 3rd Ed., Englewood Cliffs, 1961, pp.316-18. Also, the characteristics of supply and demand curves of foreign exchange are quoted in S.B. Linder, Trade and Trade Policy for Development, Pall Mall Press, London, 1967, pp.80-1.

operational imports and underuntilized capacity. On the other hand, supply of foreign exchange will reach its maximum level when the foreign demand curve for the country's export has unitary elasticity so that successive devaluations will result in decreases in export earnings as the supply curve of foreign exchange become backward sloping.

Taking into consideration the inflationary sprial during 1974/75, devaluation would be even more harmful if the real price rigidity case reinforced itself, leading to the rise in not only the domestic price of imports but also the money prices of home-produced goods. Thus, prices of home-produced goods rise in the same proportion as the prices of imports, so that the relative price ratio does not change and the economy stays on the income-consumption line ($O\bar{Y}$), as shown in Figure 1(b).

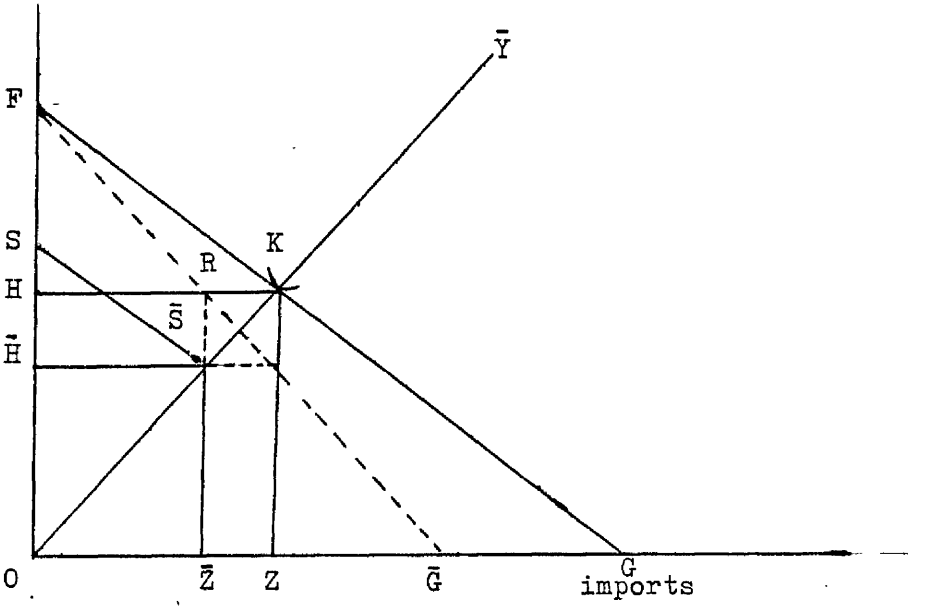

Figure 1(b): The Effect of a Deterioration in the Terms of Trade on the Balance of Trade

If the balance of payments is to be brought into equilibrium, expenditure measured in terms of home produced goods has to fall to (OS), bringing the equilibrium ($\bar{S}$), and causing the demand to fall short of full employment by ($R\bar{S}$). The quantity of imports has been reduced

to (HR) as required. If there is government commitment to full employment, the economy must go back to (K) and expenditure stay at (OF) and the demand for home produced goods remain at (OH) and the demand for imports at (OZ). The balance of payments deficits, being larger than in the Figure 1(a), amounts to (RK) measured in terms of imports. A typical oil-importing developing country can keep its real absorption constant if the minimum oil requirements are maintained and the large external deficits can be financed.

In fact, oil-related deficits cannot be viewed in isolation from the broad picture of external balance and the way through which it is redressed in developing countries. Most developing countries are generally exposed, even before the oil crisis, to the foreign exchange gap which is generated by the simultaneous interaction of both an export maximum and import minimum, making the external balances move back and forth between "potential" and "acute" gap according to the circumstances in which a country actually finds itself.(1) The practice in most of these countries, owing to the inefficiency of adjustment process, is to redress external balances, hiding large deficits, at high costs of reducing domestic expenditure through the imposing of restrictive import control policies aimed to cut imports. Summarising the adjustment process in developing countries, Paul Streeten(2) pointed out that the "adjustment process is likely to work more slowly in LDCs, and if it speeds up, more painfully",..... "Industrial underutilization or stagnation caused by import restrictions or deflation disrupt economic development and can inflect considerable damage."

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(1) Linder, op.cit., pp.40-48.

(2) P. Streeten, "International Monetary Reform and the Less-Developed Countries", Banca Nazionale Del Lavoro, Vol. 20, No. 81 (June 1967), p.161.

Consequently, oil-deficits merely added to their long-term external disequilibria, worsening their balance of payments positions even further. Hence, oil deficits would induce either a potential foreign exchange gap or transform one already existing to an acute foreign exchange gap which is defined by Linder[1] as "the difference between the need of foreign exchange for input imports and the amount of foreign exchange available for such imports from current account transactions and autonomous capital movement, assuming the pursuance of optimum expenditure policies and commercial policies formulated on the basis of conventional theory". Whatever, the changes in exchange rates and expenditure policies, foreign exchange earnings cannot be increased beyond the export maximum, and foreign exchange requirements could not be reduced below the import minimum. External balance can only be brought about by hiding the acute gap by various kinds of commercial policy control, reducing the volume of both oil and non-oil imports. Thus, balance of payments would indicate external balance, but at the expense of internal balance.

The External Balances During 1970/75

The oil price increases had not happened in a vacuum, but accompanied by other major events in the international economy - worldwide inflation and recession - which had been reflected on the external balances of India, Pakistan and Kenya. Developments in both current and capital accounts as well as the overall balances of payments of the three countries during 1970-75 are shown in Table 4-9. Such developments are explained in the light of the changes in volumes and prices of both exports and imports during the same period which are shown in Table 4-10.

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(1) Linder, op.cit., p.43.

Table 4-9

Changes in the Balances of Payments of India, Pakistan and Kenya, 1970-75 (in millions of current U.S. $) (a)

	(1) Trade Balance	(2) Net Service and Investment Income	(3) Net Private and Government Unrequited Transfer	(4) Current Account (1+2+3)	(5) Net short and long-term capital flows	(6) Balance of Payments (4 + 5)
India						
1970	-131.0	-493.0	+232.0	-392.0	+560.0	+168.0
1971	-373.1	-535.6	+267.8	-640.9	+663.0	+22.1
1972	+68.4	-502.7	+281.2	-153.1	+23.9	-129.2
1973	-195.5	-608.0	-268.2	-535.3	+426.8	-108.5
1974	-625.4	-490.7	+2316.2	+1200.2	-1220.6	-20.5
1975	-270.8	-467.5	+609.5	-128.8	+490.5	+361.7
Pakistan						
1970	-538.0	-248.0	+119.0	-667.0	+549.0	-118.0
1971	-419.3	-241.7	+179.5	-481.4	+430.3	-51.2
1972	-233.4	-181.3	+173.7	-241.0	-230.2	-10.8
1973	-102.5	-157.4	+189.5	-70.4	+261.1	+190.7
1974	-888.7	-270.6	+241.7	-917.6	+772.1	-145.5
1975	-1158.3	-296.3	+403.1	-1051.5	+836.6	-214.9
Kenya						
1970	-86.3	+11.7	+25.6	-49.0	+94.3	+45.3
1971	-185.0	+14.9	+58.3	-111.8	+41.2	-70.6
1972	-116.8	+10.6	+38.1	-68.1	+91.9	+23.8
1973	-74.9	-81.1	+29.9	-126.1	+147.7	+21.6
1974	-316.9	-22.4	+31.4	-307.9	+219.6	-88.3
1975	-223.7	-54.9	+44.2	-234.3	+180.9	-53.4

Source: International Monetary Fund, Balance of Payments Yearbook, Vol. 29 (December 1978).

Note: (a) Data converted from SDRs to U.S. $ by rates provided by the same source.

Table 4-10

The Year-to-Year Changes in Quantum and Unit Value Index Numbers of Exports and Imports of India, Pakistan and Kenya, 1971-75

1970 = 100[(a)]

	India		Pakistan		Kenya	
	Q	P	Q	P	Q	P
Exports						
1971	-1.5	+1.8	+36.5	+20.8	-2.5	-3.8
1972	+12.0	+11.3	+36.5	+34.3	+2.9	+10.6
1973	+4.6	+24.5	-23.3	+155.7	+14.7	+14.4
1974	+7.4	+34.9	+0.4	-27.4	-3.9	+43.3
1975	+13.0	+13.2	+24.2	+1.0	-2.7	+24.1
Imports						
1971	+28.4	-9.5	-8.7	+30.2	+17.6	+10.1
1972	-7.4	+3.9	+48.1	+108.1	-12.9	+13.2
1973	+18.4	+39.8	+30.4	+106.4	-4.7	+17.6
1974	-17.2	+98.3	+14.7	+168.7	+7.0	+80.4
1975	-1.2	+39.9	+6.6	-26.6	-21.2	+39.6

Source: See Source of Table 4-7.

Note: (a) Base years are moved to 1970 for the three countries, and data of India and Pakistan are adjusted to the calendar year.

India's current account had continued, since 1970, to be in deficit which originated from both trade and invisible balances, which amounted to $535 million in 1973. Such a deficit had not been determined by changes in exports as much as by those changes in imports. The overall balance of payments turned out from a surplus of $168 million in 1970 to a deficit of $108 million in 1973. By the increases of oil price in 1974, current accounts came under pressure owing to the large increases

in unit value of imports by 98 per cent compared to 35 per cent rises in unit value of exports, leading to a deficit of $1116 million on both trade and invisible balance which is 39 per cent higher than those of 1973. However, current accounts turned out to have a large surplus of $1200 million which can be attributed to three reasons: firstly, demand for imports had been partly reduced by the restrictive fiscal and monetary policies instituted in 1974 and continued throughout 1975 to alleviate the inflationary pressures.(1) Such policies led to the absolute decline in real investment and left the economy without any realy growth in its GDP. Secondly, large parts of the trade deficit had been hidden by the 17 per cent reduction in import volume. Thirdly, the deficit had been absorbed by the $2316 million of unrequited transfers; 87 per cent of which represented grant, particularly from the United States, and the remaining were remitted from Indians abroad. In that year, the overall balance of payments showed a deficit of $20 million which resulted from large capital outflows when the government repaid its obligations. In 1975, deficit on trade and invisible balances had been reduced to $738 million which is 50 per cent smaller than that of 1974, though current accounts turned out to be in deficit of $129 million . In that year, the decline in trade deficit was caused by the 1.0 per cent decreases in import volume and the 13.0 per cent increases in export volume. The $362 million surplus realised on the overall balance of payments were attributed to the $491 million of net capital inflows.

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(1) Government of India, Economic Survey, 1974-75, Economic Division, Ministry of Finance, NewDelhi , 1975 , p. 2 , 4 .

Unlike India, a gradual liberalization of import regime, which was introduced in Pakistan in 1972, has continued, despite the pressures on the balance of payments caused by the desire to maintain both a high level of development spending on investment activity, particularly, in the public sector, and of supplies of essential raw material for domestic industry.(1) The deficit on current account had continued since 1970, though it decreased significantly from $667 million in 1970 to $70 million in 1973. During that year the deficit on trade balance decreased to less than one-half of the previous year, accompanied by another slight decline in the deficit on the service balance. The high unit value realisation of export more than compensated the decline in export volume caused by constraints on domestic supplies and exceeded, even more, the rise in unit value of imports. Moreover, the $261 million net capital inflows turned out the balance of payments to a surplus of $191 million. This picture changed drastically in 1974 when the deficit on trade balance increased to $889 million , accounting for eight times the 1973 figure and the deficit on the service balanced increased to $271 million which is 70 per cent higher, resulting in a deficit on the current account which amounted to $918 million or 13 times that of 1973, despite the increases in unrequited transfers to $242 million. Such a large deficit caused by the slackened external demand and decline of export prices by 27 per cent, on the one hand, and the continued rise in both price and volume of import by 169 and 15 per cent respectively. Although capital inflows amounted to $772 million, accounting for three times that of 1973, the overall balance of payments showed a deficit of $146 million. In 1975 the deficit on trade balance increased to $1158

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(1) Government of Pakistan, Pakistan Basic Facts, 1975-76, op.cit., p.142.

million , which was 30 per cent higher than 1974. This was caused mainly by the 7 per cent increase in import volume, although the unit value decreased by 27 per cent. It was apparent that such a moderate rise in imports had nullified the effect of the 24 per cent increase in export volume whose price had only risen by 1.0 per cent. During that year, the current account deteriorated to $1052 million , despite the increases of unrequited transfer to $403 million , which was greater than the $837 million net capital flows could accommodate. This led to an overall deficit of $215 million .

Also, the deterioration in Kenya's balance of payments position was not a temporary phenomenon caused by oil crisis but a sign of more permanent disequilibrium. Following the 1971's balance of payments crisis, measures were taken to improve the current account such as the introduction of a range of import controls, the restriction on domestic credit and the curtailment of government expenditure.(1) During the course of 1973, these measures dampened down imports and, assisted by a good export performance, helped to make the balance of payments position much stronger. During that year, trade deficit decreased to its lowest level of $75 million , though it was matched by a large deficit on the invisible balance. However, the overall balance of payments showed a surplus of $22 million which was created by large net capital flows of $148 million . Such improvements led to the relaxation of import controls and credit restrictions which resulted in the increase of import volume in 1974 by 7 per cent; meanwhile, export volume declined by 4.0 per cent. Taking into account that unit value of imports

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(1) J. Burrows, Kenya: Into the Second Decade, Report of The World Bank's Mission to Kenya, John Hopkins University Press, Baltimore, 1975, pp.240-50.

rose as much as twice that of exports, trade deficit, deteriorating four times that of 1973, amounted to $317 million , resulting in a current account deficit of $308 million . In spite of the $220 million net capital inflow, the overall balance turned out to be a deficit amounting to $88 million . The deterioration of balance of payments led to the re-imposition of restrictive policy in 1975 which resulted in the decrease of the deficit on the trade balance to $224 million , attributed to the decline of import volume by 21 per cent, though export volume also declined by 3 per cent. Deficit on the current account was reduced to $234 million and the overall deficit fell to $53 million, though the net capital inflows amounted to $181 million.

The Effects on Current Account and Resource Gap

Table 4-11 shows the extent to which additional oil costs affected both the current account and the resource gap of the three countries during 1974/75. Resource gap is calculated as equal current account excluding financial services, i.e. trade balance, net non-financial services and private unrequited transfers.(1) Adjusted current account and resource gap indicate the state of external balance on the basis of pre-October 1973's oil prices by adding up actual additional oil costs to them. The acute current account and the resource gap indicate what external balance would otherwise be if oil was imported in the quantities required to maintain the 1973's economic growth throughout 1974 and 1975, regardless of the changes in the prices, i.e. oil prices

(1) For the method of calculating the resource gap, see C.F. Dias-Alejendro, "Some Aspects of the Brazilian Experience with Foreign Aid", in J. Bhagwati et al.(eds), Trade, Balance of Payments and Growth, North-Holland Publishing Co., Amsterdam, 1971, p.446.

Table 4-11

The Effects of the Additional Oil Costs on the Current Accounts and Resource Gaps of India, Pakistan and Kenya in 1974 and 1975
(in millions of current U.S. $)

	Actual Additional Oil Costs[1]	Current Account			Resource Gap		
		Actual[2]	Adjusted[a]	Acute[b]	Actual[2]	Adjusted[a]	Acute[b]
India							
1973		-535.3			-227.7		
1974	988.0	+1200.2	+2188.2	+1046.8	-608.6	+379.4[c]	-762.0
1975	945.5	-128.8	+816.7	-657.5	+53.4[c]	+998.9[c]	-675.3
Pakistan							
1973		-70.4			-36.9		
1974	158.0	-917.6	-759.6	-963.5	-900.7	-742.7	- 946.6
1975	256.9	-1051.5	-794.6	-113.1	-1051.5	-974.6	-1113.1
Kenya							
1973		-126.1			-50.1		
1974	63.3	-307.9	-244.6	-	-240.2	-176.9	-
1975	91.8	-234.3	-142.5	-	-184.7	-92.9	-

Source: (1) Table 4-4.

(2) Computed from International Monetary Fund, Balance of Payments Yearbook, op.cit.

Note: (a) The adjusted current account and resource gap are the actual current account and resource gap excluding the actually paid additional oil costs. They are calculated by adding the actual additional costs to both the actual current account and the actual resource gap.

(b) The acute current account and resource gap represent current account and resource gap which could result if India and Pakistan import petroleum in quantities compatible with internal equilibrium. They are calculated by adding to the actual current account and resource gap the differences between the value petroleum imports in 1974 and 1975 (Table 4-2) and the value of imported petroleum compatible with internal equilibrium (Table 4-5) which is valued at the prevailing prices in 1974 and 1975 (Table 4-1).

(c) The positive sign indicates "surplus gap".

are inelastic. They are calculated by adding to the actual current account and resource gap the difference between what the net oil import bills would be - quantity of oil imports of Table 4-5 multiplied by actual oil price of Table 4-1 - and the actual net oil import bills in Table 4-2.

In the absence of oil price increases, surplus on India's current account may increase to $2188 million in 1974 and deficit of the $129 millions in 1975 may be turned out to a surplus of $817 million . Moreover, the resource gap, which increased from $228 million in 1973 to $608 million in 1974, could be transformed into a resource surplus of $379 million ; and the 1975's resource surplus of $53 million may increase to $999 million . Apparently, the effects of additional oil costs on the external balance had been exaggerated due to the fact that balance of payments was improved significantly through a large reduction in non-oil imports.

In comparison with external balance of 1973, the deterioration of the adjusted current account and resource gap of both Pakistan and Kenya during 1974 and 1975, in the absence of additional oil costs,are very sharp and are generated from non-oil deficits, indicating that deficits on balance of payments are larger than can be attributed to oil alone. By neutralizing the effects of additional oil costs in 1974 and 1975, the deficits on Pakistan's current accounts would increase, nonetheless, to $760 and $795 million, respectively, which is more than ten times the 1973's deficit. Also, the resource gap would increase to $743 millions in 1974 and $975 million in 1975 which is more than 20 and 26 times that of 1973 respectively. Similarly, the adjusted current account of Kenya in 1974 increased as much as twice that in 1973, and in 1975 it amounted to $143 million which is still higher. In comparison with 1973's resource gap, those of 1974 and 1975 increased as much as 3 and 2 times respectively.

The pressures on the balance of payments originated from the rise in the prices of both oil and non-oil imports led to the cut down of imports, hiding an acute current account deficit and large resource gap, in an attempt to reduce the external imbalances. If India had imported oil at the level required to sustain the 1973's economic growth the surplus on 1974's current account would have decreased from $1200 to $1047 million and the resource gap widen from $609 to $762 million . Also, both the deficit on current account and the resource gap in 1975 may increase by 529 million . Similarly, cutting down oil imports into Pakistan in 1974 reduced both the current account deficit and the resource gap by $46 million ; otherwise they would have reached $964 and $947 million respectively. Also, for the same reason, both the current account deficit and the resource gap would have increased from $1052 to $1113 million in 1975.

5. Conclusion

An assessment of the immediate consequences of the rise in oil prices on the economies of India, Pakistan and Kenya in 1974 and 1975 showed that the direct effects on their oil import costs, terms of trade, income transfers and external balances were substantial. In comparison with 1973, the sudden and large rise in the unit value of petroleum imports, crude and refined products, led to a large increase in the net oil import bills which had risen, by 1975, three and a half times for India, four times for Pakistan and four and a quarter times for Kenya. It is estimated that about 69, 68 and 61 per cent of the actual net oil import bills paid in 1974 by India, Pakistan and Kenya, respectively, represent excess expenditure over and above what would

otherwise have been paid had the pre-October 1973's level of oil prices continued throughout 1974 and 1975 after they were adjusted for the prevailing world inflation and transport costs. And in 1975, the additional oil costs would have fallen slightly to 68 per cent for India, while they would have risen to 75 and 69 per cent for Pakistan and Kenya respectively. Even if the 1973 economic growth had continued throughout 1974 and 1975, the resulting additional oil costs for both India and Pakistan would have accounted for between one-half and two-thirds of what was actually paid.

The deterioration of commodity terms of trade was sharp, declining during 1973-75 from 107 to 70 for India, from 108 to 73 for Pakistan, and from 86 to 72 for Kenya (with 1970 = 100). Much of this deterioration is ascribed to the large rise in the unit value of import of petroleum as the commodity terms of trade of total commodity exports versus petroleum imports alone declined from 99 to 37 for India, from 71 to 28 for Pakistan and from 96 to 36 for Kenya. The magnitude of the rise in oil prices, combined with the slackened demand in export markets, made it difficult to improve the income terms of trade, which also sharply deteriorated.

The resulting income transfer was substantial when viewed in relation to the performance of the economies of the three countries. It preempted a large proportion of the realized economic growth especially in the case of Kenya, since the relative size of income transfer from India, and to some extent Pakistan, was contained, since they are relatively smaller users and importers of oil as well as both possessing indigenous energy sources. The foregone economic growth for India, Pakistan and Kenya in 1974 amounted to 1.3, 2.4 and 2.6 per cent of GNP respectively,

and in 1975 it amounted to 1.3, 3.0 and 3.3 per cent of the GNPs of the three countries, respectively, whereas the recorded average annual growth rate of GDP during 1973-75 amounted to 1.9 per cent for India, 2.3 per cent for Pakistan and 2.0 per cent for Kenya.

The implications of such transfers for the balance of payments can be seen in the light of the vulnerable position of the external balance of a typical poor country which is permanently exposed to foreign exchange gaps emerging from structural disequilibrium which stems from the simultaneous existence of maximum exports and minimum imports. Theoretical analysis of the oil situation illustrated diagrammatically, concludes that the weak and inefficient adjustment process and limited policy options available in the non-oil developing countries to attain external balance would leave import restriction policy and low income growth as the only alternative for redressing external balances in the absence of sufficient external finance.

The deterioration in the current account of the balance of payments and the widening of the foreign exchange gap were larger than can be attributed solely to the additional oil costs in the three countries, where large non-oil deficits and changes in import control and domestic expenditure policies also played a crucial role. The over-cautious use of import control and anti-inflationary policies by India, coupled with large unrequited transfers, hid a large deficit on the current account which showed a comfortable position in 1974 and led to a surplus on the overall balance of payments in 1975. On the other hand, trade liberalization policy in Pakistan and relaxation of import restrictions in Kenya resulted in a rise in the deficit on their current accounts in 1974 which changed the overall balance of payments into deficits.

In 1975, while Kenya cut her import volume drastically in an attempt to reduce the pressures on the current account, Pakistan continued to finance her increased imports by large unrequited transfers and the increase of long-term capital flows.

Consequently, despite the large increases in the value of oil imports, the exclusion of the additional oil costs would not leave the current account and resource gap, particularly in Pakistan and Kenya in 1974 and 1975, in a position better than that of 1973, unless all imports had been cut down drastically. Though they are adjusted for the additional oil costs, deficit on current account increased about 10-11 times in Pakistan and 1-2 times in Kenya, whereas India's current account improved and was in surplus. Also, while the resource gap widened about 20-26 times in Pakistan and 2-4 times in Kenya, India's resource gap was closed by 1975.

Nevertheless, the improved current account and closed resource gap in India hide a large deficit by cutting down oil imports which was also followed in Pakistan to contain its deficit. By using the oil demand model discussed above, it was found that the current account deficit and the resource gap would have become larger had India and Pakistan imported petroleum in the quantities required to maintain 1973 economic growth in 1974 and 1975.

CHAPTER V

THE OIL-INDUCED CHANGES IN THE WORLD ECONOMY AND THEIR TRANSMISSIONS TO DEVELOPING COUNTRIES: THE INDIRECT EFFECTS

The first half of the 1970s, which coincided with the large rise in oil prices, witnessed other major events in the world economy which were influenced by oil crisis: sharp fluctuations in the level of economic activities, strong world-wide inflation and strains on the international financial system. Oil price increases participated, intensively, in the changes of the economic activities and incomes of two of the main economic areas of the world, namely, the oil-related recession in the OECD area and the oil-related boom in the OPEC area.

Neither the effects of higher oil prices on the world economy, nor the assessment of such effects are among the main purposes of a study which is basically devoted to the poor countries. Nevertheless, changes in the world economy induced, partly or totally, by higher oil prices can not be ignored, since oil prices have influenced variables which are exogenous to developing countries, and these effects are considered as important as the additional oil costs themselves. The transmission of such effects, through trade and payments, to developing countries, represent what are called the "indirect effects". It is relevant here to quote Walter Tims' words as follows:

> "An assessment of the consequences of the higher prices of oil on developing countries and of the scope for possible policy response can not be made independently from similar assessment for the other regions of the world." (1)

(1) Tims, op.cit., p.169.

1. The Fluctuations in World Economy During 1970-75

Historically, in almost all industrial countries, since the time they began to industrialize or come into contact with each other the path of economic growth has been punctuated by fluctuations in income and employment. The relation, between the forces making for growth and those making for fluctuations has become one of the most important issues in the business cycle theory. The developing countries, including the oil-exporters, not being participants in such cycles, have only received the ultimate effects through the cycle repercussions on their economies. Pinto and Knakal argued that the "center-periphery" term, illustrating the relationship between developed and developing countries, was principally inspired by the unequal role played by the two segments in the world's periodic fluctuations: the former play an "active" role, while the role of the latter is "passive" or "reflexive".(1)

The first half of the Second Development Decade was a period of marked economic instability particularly in the developed market economies which are represented by the members of the Organisation for Economic Co-operation and Development (OECD) as shown in Table 5-1 which measures the degree of variability of economic variables by the difference between lowest and highest average annual growth during the period 1971-75 compared with the period 1966-70. The variability of GDP growth in OECD amounted to 7.7 per cent during 1971-75 which is considered high relative

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(1) A. Pinto and J. Knakal, "The Center-periphery System 20 Years Later", in L.E. Di Marco (ed.), International Economics and Development, Academic Press, New York, 1972, p.97.

to variation of 2.7 per cent during 1966-70, though the average annual growth rate during 1971-75 was 2.8 per cent. The centrally planned countries (CPCs) had exhibited more economic stability as the variability of GDP during 1966-70 (3.0 per cent) and 1971-75 (3.9 per cent) are small relative to the average annual growth rates during these two periods which amounted to 7.4 and 6.2 per cent per annum, respectively. In developing countries (LDCs), variability of GDP is also small and amounted to 2.4 per cent during 1966-70 and 2.5 per cent during 1971-75, whereas the average annual growth of GDP during these two periods amounted to 5.8 and 5.5 per cent respectively. The low variability of GDP in developing countries is not an indicator of economic stability, but due to the weak leverage of domestic effective demand on income.

However, the variability of exports and imports was significantly higher than that of GDP, indicating the sharpness of the up and down-swings during the quenquinnium 1971-75 especially in the foreign trade of both developed and developing countries. The high variability of both exports and imports of OECD, amounting to 27.2 and 42.0 per cent respectively, was matched by an even higher variability of those of developing countries whose exports and imports varied by 45.1 and 57.4 per cent respectively. It can be concluded that large variations in export earnings of the developing countries, which are associated with variations of income and economic activity in OECD, have determined the import capacity. International trade of centrally planned countries, though affected by the conditions of world economy, had exhibited less instability owing to trade policies among socialist countries.

Table 5-1

The World Economy: Fluctuation in Growth Rates of Income and Trade by Economic Region During 1966-70 and 1971-75

(in percentages)

Item/Region	1966-1970		1971-75	
	Average Annual Rate of Increase	Difference Between Lowest and Highest Annual Growth Rates	Average Annual Rate of Increase	Difference Between Lowest and Highest Annual Growth Rates.
Gross Domestic Product				
OECD	4.6	2.7	2.8	7.7
CPCs	7.4	3.0	6.2	3.9
LDCs	5.8	2.4	5.5	2.5
Export Value in SDRs				
OECD	12.0	9.9	16.8	27.2
CPCs	9.1	5.2	15.4	14.7
LDCs	8.6	9.9	11.2	45.1
Import Value in SDRs				
OECD	11.8	10.3	17.2	42.0
CPCs	9.0	9.5	17.8	17.6
LDCs	8.7	9.2	24.1	57.4

Source: United Nations, World Economic Survey 1975 - Fluctuations and Development in the World Economy, U.N., New York, 1976, Table 1, pp.42-43.

The impact of the 1970s business cycle on world income is indicated in Table 5-2 which shows the year-to-year changes of GDP growth during the period 1970/75 of the four economic regions of the world: OECD, OPEC, LDCs and CPCs. The world GDP increased by 4.4 per cent in 1971, following the 1970's recession, accelerated at 6.6 per cent in 1973, decelerated at 1.9 per cent in 1974 before it stagnated at 0.2 in 1975. Changes in the world economic growth are determined by the state of economic activity in OECD which is the most dominant area. Recovering from 1970 recession, OECD area as a whole was growing at 3.8 per cent in 1971 and continued an accelerated growth which peaked at 5.9 per cent in 1973 before it levelled off at the end of the same year. Then, there was a virtual cessation of growth of GDP which decelerated throughout 1974 at 0.3 per cent, before it absolutely declined in 1975 by 1.7 per cent below 1974 level.

Table 5-2

The World Economy: The Year- to -Year Changes of GDP at Constant Prices by Economic Region, 1971-75.

(in percentages)

Region	Average Annual 1971-75	Changes From the Preceding Year				
		1971	1972	1973	1974	1975
OECD (1)	2.8	3.8	5.6	5.9	0,3	-1.7
OPEC (2)	7.0	6.7	8.5	8.9	7.0	4.8
LDCs (2)	5.0	5.1	5.0	6.3	4.9	4.0
CPCs (3)	6.2	6.1	5.0	8.8	6.2	4.9
World (1)	3.7	4.4	5.5	6.6	1.9	0.2

Source: (1) U.N., World Economic Survey 1975, op.cit., Table 3, p.45.
(2) Ibid., Supplement, Table III-1, p.249.
(3) Ibid., Table 36, p.86.

GDP growth of the oil exporters during 1971-75 was the highest among the world regions, recording 7.0 per cent per annum, though it followed a similar phase to that of the OECD. GDP, which increased by 6.7 per cent in 1971, accelerated at 8.9 per cent in 1973 and then - under the effect of the reduction in oil demand induced by both the rise of oil prices and the OECD recession - increased at only 7.0 per cent in 1974 and started to decelerate at 4.8 per cent in 1975. The oil-importing developing countries (LDCs) achieved just over 6.0 per cent in the wake of the 1973 upswing, a growth rate which was set as a target in the International Development Strategy. However, the effect of the subsequent recession in OECD reduced this figure to 4.9 per cent in 1974 and further to 4.0 per cent in 1975.

Despite the fact that recession and inflation in the world economy have not been without effect on the centrally planned countries, they demonstrated a remarkable resilience, as the growth of their net material product (national output) during 1971/75 was 6.2 per cent per annum, reached its peak in 1973 when their economies were growing at 8.8 per cent. During 1974, growth slowed down at 6.3 per cent, decelerated further to 4.9 per cent in 1975, though it was higher than those of the other regions.

2 - The Impact of Oil Price Increases on the World Economy

The contractionary phase of the business cycle during the first half of the 1970s, differing from those of the post-war period, can be categorized, according to a recent distinction made by Sir John Hicks[1],

(1) J.Hicks, "Real and Monetary Factors in Economic Fluctuations", Scottish Journal of Political Economy, Vol. 21, No.3 (November 1974), pp.206-7.

as a true economic cycle, rather than a statistically defined one. The severity of the 1974/75 recession, being reflected in the absolute decline in the world level of economic activity, is attributed to the international synchronization of the contraction in the world economy combined with the dilemma of unemployment and inflation or what is called "stagflation". Much of this recession can be attributed to the effects of oil price increases on the world economy, though the deflationary policies pursued by individual countries had aggravated such effects.

The Deflationary Effects

The most important effect of higher oil prices on the world economy was the decline in aggregate demand, since additional oil costs can be considered as an excise tax imposed by the members of OPEC on the oil-importing countries. Thus, consumers paid more for oil and other energy sources and had less to spend on other products; and sales lost by industries have not been offset by the increase in the export to OPEC since they can only absorb a small portion of their increased oil income. There was not, moreover, a sharp rise in domestic energy investment - at least not initially. Consequently, sales, output, and employment were reduced in the consumer goods industries. Total demand and output fell not only by the amount of the initial loss, but still further through the typical cyclical process in which the initial reduction in employment and income was the cause of still further declines in demand, output and jobs. Moreover, the loss of output and income in each country tended to be self-reinforcing, since each country provides an export market for the other. In addition to such an aggregate

picture of the deflationary impact on the world economy as a whole, oil price increases were operating, with different effects, on the level of individual countries. This caused the world economy to be pushed into severe recession.

Analysing the primary loss caused by higher oil prices, Corden[1] pointed out that the fall in the absorption of the economy of a typical oil-importing country caused by the additional oil costs would be aggravated by the reduction in the quantities of imports of both oil and oil-intensive goods as well as the rise in the cost of oil-substitutes stimulated by the increased oil prices. In addition to the macro-employment created by the shift of demand away from home produced goods, Corden [2] argued that the shift of demand away from oil-intensive goods would cause, in the short-run, a micro-unemployment attributable to immobility of labour, which could not be solved by the internal macro-economic policies and would thus result in a further fall in output and expenditure.

Thus, assuming that income is initially equal to expenditure, the effect of oil price increases appears deflationary as total real expenditure has to fall. Moreover, real wages need to fall in order to maintain full employment, assuming that any squeeze on profits and investment was not sufficient to absorb the required real expenditure fall, through the rise in price level combined with constant money wages or making the rise in wages much slower than prices. However, prices would not fall in real terms in response to the reduction in demand as

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(1) Corden, The Effects of the Oil Price Rise on the International Economy, op.cit., pp.130-32.

(2) Ibid., pp.138-9.

firms would attempt to restore profits by raising prices[1] and wage earners would try to restore their real income by demanding higher money wages, inducing, even more, price-wage spirals. Assuming that domestic expenditure is kept constant to control inflation, this would result in increased unemployment which would rise even more when tightened fiscal and monetary policy was applied.

The Inflationary Effects

The sharp increases in the price of crude oil was passed to the general price levels through the rise in the prices of gasolines, heating oils, electricity and petrochemicals, and stimulated the prices of domestically produced fuels. Wage increases accelerated in response to the high level of general prices, resulting in additional price rises in areas outside the energy industries. This gave a substantial thrust to cost-push inflation which added to an already high rate of world inflation.

Various studies have been carried out in order to estimate the extent to which aggregate price increases are ascribable to higher oil prices.

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(1) For detailed discussions on the phenomenon of rising prices during a period of a recession, see G.C. Means, "Simultaneous Inflation and Unemployment: A Challenge to Theory and Policy", in G.C. Means et al.(eds.), The Roots of Inflation - The International Crisis, Burn Frankline & Co., New York,1975, pp.1-32; J.M. Blair,"Administrative Prices: A Phenomenon in Search for a Theory", American Economic Review, Vol.49, No.2 (May 1959), pp.431-50.

Sorting out the impact of oil price increases on the economic variables in the American economy. George Perry (1), using the Federal Reserve Board Econometric Model, estimated that the deflator of both consumption and GNP and the compensation per man-hour increased by 3.55, 1.50 and 4.40 per cent, respectively, by the fourth quarter of 1974. The application of the Mitchigan Econometric Model produced increases of 2.60 and 3.40 per cent in GNP deflator and compensation per man-hour respectively. (2) By using an input-output model for the Japanese economy, T. Watanabe (3) found that a rise of oil prices from $3 to $9 per barrel, when it passed through into product prices on an absolute basis without making up for further indirect effects through the wage-price spiral, could raise the wholesale price index by 6.6 per cent in 1974, 7.4 per cent in 1975 and by 7.6 per cent in 1976 over the level it would otherwise have reached.

The effects of oil price increases on domestic price levels would be transmitted to the relative prices of goods and commodities traded internationally. Baseri provided some estimates of the increases in the deflator of commodity exports for some western European countries. On the basis of the mechanical input-output transmission, he found that the deflators of commodity exports would increase by 1.6, and 6.0 and 5.6 per cent for West Germany, Belgium and France respectively. (4) Also,

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(1) G.L. Perry, "The United States", in E.R. Fried and G.L. Schultze,(eds.), Higher Oil Prices and the World Economy - The Adjustment Problem, The Brookings Institute, Washington, D.C., 1975, Table 2-8, pp.96-7.
(2) Ibid, Table 2-9, pp.96-7.
(3) T. Watanabe, "Japan", in E.R. Fried and G.L. Schultze (eds), Higher Oil Prices and the World Economy - The Adjustment Problem, The Brookings Institute, Washington, D.C., 1975, Table 4-6, p.160.
(4) G. Baseri, "Western Europe", in E.R. Fried and G.L. Schultze, (eds.), Higher Oil Prices and the World Economy - The Adjustment Problems, The Brookings Institution, Washington, D.C., 1975, p.120.

the unit value of manufactured imports into western Europe as a whole would increase by 19.2, 7.6 and 4.8 per cent in 1974, 1975 and 1976, when oil price increases were taken into account. Otherwise, the increases would only amount to 12.7, 6.2 and 3.8 per cent respectively.(1)

The Policy-Induced Effects

As a result of oil-related deficits, the balance of payments of most oil-importing countries were moving, simultaneously, into massive deficits which were described by the Managing Director of the IMF as a "staggering disquilibrium in the global balance of payments ..... that will place strains on the monetary system far in excess of any that have been experienced since the war."(2) Few countries could partly offset their deficits through attracting OPEC's investable funds and increasing exports to their market, while most of them could not bring about these offsetting factors, in a world with different rates of inflation, price rigidity and of balance of payments and exchange rate targets. Over the above, the structural disequilibria of other countries, which change independently from changes in effective demand and the state of the economy, were fed during the expansion of early 1970 by what Letiche called "inflationary transmission"(3). Losing reserves, which are the traditional built-in stabilizers, most OECD countries came under pressures to rescue their balance of payments by resorting to

(1) G.Basevi, "Western Europe", in E.R. Fried and C.L. Schultze (eds.), Higher Oil Prices and the World Economy - The Adjustment Problem The Brookings Institution, Washington, D.C., 1975,p.119.
(2) Quoted from G.A. Pollack, "The Economic Consequences of the Energy Crisis, Foreign Affairs, Vol.52, No.3 (April 1974),p.452.
(3) J.M. Letiche, "Lessons of the Oil Crisis", Lloyds Bank Review, No. 124 (1977),p.32.

immediate government policies which were previously used to correct internal rather than external imbalances.

On the other hand, the price-raising effect of the oil crisis, followed hard on an already accelerating inflation, attracted far more attention from the policy-makers in the industrial countries than did its depressing effects on aggregate demand. Reviewing the policies of aggregate demand management in the OECD area during 1974/75, Basevi[1] indicated that monetary policy far from being relaxed in order to offset the demand and reduce the effect of oil prices, was tightened in an effort to moderate their inflationary impact. This tightening was particularly evident in the U.S. and Japan, but it was also observed, to a lesser extent, in Western Europe. By the end of 1974, the sharp fall in aggregate demand, though it acted to moderate inflation, resulted in the worst recession in thirty years. Hence, recession was not an inevitable consequence of oil crisis, rather it was deliberately designed by governments to restrain wage inflation and maintain external balances.[2]

The adoption of Keynesian remedies, which were relevant as national policy in the 1930s, could not solve the problems of world economy in the 1970s where foreign trade in a world of trade liberalization and differing rates of inflation would affect employment. On the one hand, according to a hypothetical example expounded numerically by McLeod[3],

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(1) Basevi, op.cit.,pp.128-31.
(2) W.M. Corden and P. Oppenheimer, Basic Implications for the Rise in Oil Prices, Staff Paper No. 6, Trade Policy Research Center, London, August 1974,pp.6-7.
(3) A.N. McLeod, "The Essential Conditions for International Economic Stability," Banca Nazionale Del Lavoro, Vol.28, No.113 (June 1975),pp.179-83.

policies which were pursued, presumably, to stimulate the domestic economy, but, basically, to bring about an external balance at the expense of other countries during a period of stagflation, would lead at the end of a compound sequence of the foreign trade multiplier to a recession of the whole system. On the other hand, a rise in the level of domestic expenditure for reflating an economy which is vulnerable to inflation may raise its price level relative to other countries and weaken its international competitiveness, resulting in a rise in unemployment and the deterioration of the external balance.

In view of the importance of the effects of the changes in income of OECD area on the world economy as a whole and on developing countries, in particular, results of a study carried out by the Brookings Institution to isolate the effects of oil price increases on the three main economic regions - U.S., Western Europe and Japan - which constitute OECD area are presented. The regional studies were based on an overall framework which distinguishes, among other things, three major sources of shock or economic impact of higher oil prices(1): (1) the additional oil costs of imported oil, (2) the increases in exports from OECD to OPEC countries and (3) the reduction in OECD exports to the non-oil developing countries whose imports will have to be reduced; as the world recession adversely affected their export earnings. These three factors constitute the magnitude of the initial depressing influence of the rise in oil prices on the aggregate demand. While the first and third factor depressed demand, the second provided an offsetting stimulant to demand. The impact of the three sources was estimated to be the difference between two projections: Firstly, what might have been expected to

(1) Fried and Schultz, "Overview", op.cit, pp.6-26.

occur in the pre-October 1973 environment, under the assumption of a continuation of economic growth at more or less trend rates and with oil prices at $ 2.75 per barrel, and, second, what might be projected in mid-1975 with the world economy in recession and with oil prices at $ 10.0 per barrel. The impact of these three factors on aggregate demand, calculated as percentages of GNP, during their initial shock in 1974 in U.S., Western Europe and Japan appear as follows(1)

Country or Region	Increases in Oil Import Bills	Increases in Export to Oil-Exporting Countries	Loss of Exports to Oil-Importing LDCs	Total
United States	- 1.03	+ 0.18	- 0.03	- 1.74(*)
Western Europe	- 2.28	+ 0.35	- 0.03	- 1.96
Japan	- 2.67	+ 0.49	- 0.06	- 2.24

(*) Including the increase in payments to domestic oil producers.

Such initial depressing effects were translated into the ultimate effects on GNP by using various econometric models for each economic region. The relation between the initial and ultimate effect on GNP is called the impact multiplier which is expressed as the percentage

(1) Fried and Schultz, "Overview", op.cit., p. 19.

change in GNP per 1 per cent initial shock, George Basevi[1] took the initial shock of the period 1974-76 for U.S., Western Europe and Japan, by using the multiplier technique, in order to estimate the ultimate effects as the reduction in GNP from the growth path. His results were as follows:[2]

Year	United States	Western Europe	Japan
1974	-1.2	-2.66	-3.4
1975	-1.8	-2.89	-4.2
1976	-2.7	-2.82	-4.0
1977	-1.7	-1.81	-3.2

For the United States, the effect reached its highest level of 2.7 per cent of GNP in 1976 and then decreased to 1.7 per cent in 1977. In general, the effects on both Western Europe and Japan are stronger than on the United States because of their larger dependence on oil imports.

3. The Transmission of World Economic Fluctuations to Developing Countries - Theoretical Background

The channels through which economic fluctuations in developed countries are transmitted to developing countries can be viewed in the light of the interrelationship between them which was described by the

(1) Basevi, op.cit., pp.106-13.
(2) Ibid., Table 3.3, p.112-p.111.

center-periphery system which originated largely in ECLA (The Economic Commission of Latin America) and was contained in the strands of thought of Marxist perspectives. The basis on which the system has been operated may be conceived of as a circular process binding two flows: the center-oriented primary inflow and the periphery-oriented industrial goods inflow. Additionally, capital inflow moves along this connection mainly increasing the developing countries' export and import capacity, performing a dual role: to supplement and enhance the supply of domestic savings for financing the required level of investment and to fill the gap between the required imports and the earnings it derives from exports. Insofar as the center has expanded its imports and capital flows, it provides resources which have enabled the periphery to pay for its imports and investment.

Therefore, the economic dependence of developing countries on developed countries has made the former extremely vulnerable to variations in the economic activity of the latter; whether such variations are generated simultaneously from normal cyclical fluctuations or induced by government policies for the purposes of stabilizing domestic economy or redressing balance of payments disequilibrium. Hence, a fall in expenditure and income, induced partly by the deflationary impact of oil prices and partly by anti-inflationary policies, would cause reduction in imports which are partly the counterpart of developing countries' exports. Viewing the balance of payments as a reflection of the relationship between aggregate income and expenditure rather than just an account of a country's debts and credits in its relation with the rest of the world, variations in income and expenditure, inducing changes in the different items on the balance of payments, will be

transmitted to its trading partners. The effects of the transmission process on the rest of the world depend not only on the strength of the forces used to induce changes but also on the size of the active countries in terms of their economic variables.(1) Taking into account the fact that OECD, which is considered the major economic and financial power in the world, had experienced a strong adjustment process, the full burden of the recession fell on the poor countries. Letiche pointed out that " the non-oil producing LDCs, and particularly the poorest of the poor, were hit in the recent recession harder than anyone else."(2)

The principal channels through which economic fluctuations are transmitted to developing countries are foreign trade and capital flows. The analysis, here, is limited to transmission through the exports.

The Transmission Through Exports

Exports of goods and services of developing countries are the principal channel through which changes in economic activities in developed countries would be transmitted to the former. However, most of the related literature attributes changes in export performances of LDCs to factors related mainly to supply rather than demand. It is frequently asserted that the supply-price elasticity of exportables in LDCs is low either because of institutional rigidities in the case of rural exportables or the difficulties of entry and quality in the case of non-traditional manufactured goods.

(1) R.A. Mundell, International Economics, MacMillan,London,1968,pp.192-95.
(2) Letiche, op.cit., p.34.

Cohen and Sisler [1] showed that, despite the most rapid growth rate at which commodities were being imported by industrial countries, developing countries experienced the largest losses in potential exports. They took the failure of LDCs to maintain their market shares as prima facie evidence that low growth rates of LDCs exports were due primarily to the domestic supply problems, often induced by incorrect policies, rather than a lack of external demand. Not only the long-term performances of exports are attributed to supply, but also the short-term fluctuations. MacBean [2] found that the causes of acute export fluctuations lay with domestic factors - including weather, pests, political turmoil and economic errors - rather than shifts in world demand.

On the other hand, it is argued that economic fluctuations in LDCs are seldom due to any excess or deficiency of domestic effective demand, and when they happen, as was contended by Kanesathasan[3], it is mainly because of the business cycle originated in the industrial countries. Scammell[4] also lent credence to this point when he argued that the balance of payments disequilibrium resulting from domestic cyclical fluctuations can not largely be related to developing countries which are much more vulnerable to external conditions.

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(1) B.I. Cohen and D.G. Sisler, "Exports of Developing Countries in the 1960s", Review of Economic and Statistics, Vol.53, No.4 (November 1971),pp.358-60

(2) A.MacBean, Export Instability and Economic Development, Allen & Unwin, London, 1966,pp.339-41.

(3) S. Kanesathasan," Export Instability and Contracyclical Fiscal Policy in Underdeveloped Export Economies: A Case Study of Ceylon since 1948", IMF Staff Papers, Vol.7 (1959/1960),pp.46-7.

(4) W.M. Scammell, International Trade and Payments, McMillan Press Ltd., London, 1974,p.287.

L.E. Di Marco [1] moved the argument further, by linking the level of economic activity in the industrial countries with exports, disequilibrium and welfare in developing countries, when he said,"..... every time there is a cyclical contraction in the industrial center, theimport co-efficient declines, thus creating a large disequilibrium in the periphery..... The picture is obviously quite different when there is full employment in the center, which is a situation which generates a sort of economic welfare in the periphery." Furthermore, Pinto and Knakal [2] claimed that the center imports depends basically on the rate of its domestic economic activity, not on its terms of trade with the periphery.

In general, economists tended to de-emphasize the influence of international economic fluctuations in explaining changes in LDCs exports owing to the fact that world economy since the Second World War up to the late 1960s has shown remarkable stability since such fluctuations have not happened in unison, and, it may be added, were either a mild kind, by themselves, or under the effect of successful institutional arrangements and demand management policies. However, the dramatic events in the world economy in the first half of the 1970s - sharp business cycle, world wide inflation in the oil-importing countries and boom in the oil-importing countries have been a strenuous test through which the economic policies of the industrial countries have not yet successfully passed. In such circumstances, external demand

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(1) L.E. Di Marco, "The Evolution of Prebisch's Economic Thought", in L.E. Di Marco(ed.), International Economics and Development Academic Press, New York, 1972, p.8

(2) Pinto and Knakal, op.cit., p.98.

factors in the short run would play an important role in tramsmitting the repercussion of the world business cycle to developing countries.

Table 5-3 shows the year-to-year changes in the world imports by economic region from the non-OPEC developing countries during 1971-75, expressed in 1970 prices. The pattern of import changes shows, in general, a clear business cycle which exhibited sharp fluctuations, particularly, in OECD's imports from LDCs. In 1971, OECD imports declined absolutely by 3.5 per cent below 1970 level owing to the 1970 recession. As the area was recovering in 1972, imports increased by 8.6 per cent in that year and peaked in 1973 by increases of 18.2 per cent. In 1974, imports decelerated at 1.9 per cent before they declined absolutely by 13.3 per cent in 1975 below 1974 level. The same cyclical patterns were demonstrated in the imports of the non-oil developing countries among themselves, indicating the close link between up and down swings in both developed and developing countries. The imports of oil importing developing countries increased by 9.7 per cent in 1972 and peaked at 12.9 per cent in 1973. In response to the downswings in OECD, their imports levelled off in 1974 before they declined by 8.8 per cent in 1975 below the previous year. In contrast, the imports of OPEC countries from the rest of developing countries increased, progressively, by 5.2 per cent in 1971, 26.3 per cent in 1972 and peaked in 1973 at 30.0 per cent. In 1974, their imports decelerated at 11.6 per cent and rose again in 1975 at 19.5 per cent.

Imports of centrally planned countries from non-oil developing countries at constant prices may be inaccurate since their imports in current dollars are deflated by the world index of the unit value of

imports because of the unavailability of the corresponding index for that region. As their economies are less sensitive to fluctuations and inflation in market economies, their imports increased by 11.3 per cent in 1972, levelled off in 1973 and increased by 16.1 per cent in 1974 when the imports of the other region started to slow down. However, their imports returned back to 1973 level when they declined absolutely by 16.1 per cent in 1975.

Table 5-3

The World Economy: The Year-to-Year Changes in Imports from the Non-OPEC Developing Countries by Economic Region at 1970 Prices, 1971-75.

(in percentage changes)

	1971	1972	1973	1974	1975
OECD	-3.5	8.6	18.2	1.9	-13.3
OPEC	5.2	26.3	30.0	11.6	19.5
LDCs	7.4	9.7	12.9	0.8	- 8.8
CPCs[a]	-0.1	11.3	0.0	16.1	-16.1
The World	0.3	9.0	17.1	2.9	- 11.8

Source: Data of imports of the four economic regions in current U.S.$ are taken from International Monetary Fund, Direction of Trade, 1970-76, Annual, No.12,1977,pp.28-31, 36-7. Imports of each region in current U.S. $ are deflated by the corresponding index of unit value of imports taken from International Monetary Fund, International Financial Statistics, Vol.31,No.5 (May 1978).

Note: (a) Imports of the Centrally planned countries from developing countries are deflated by the world index of unit value of imports because of the absence of the corresponding index for that region.

The Characteristics of the Demand for Developing Countries' Exports

Despite the fact that exports of developing countries include an increased proportion of manufactured goods while those of developed countries consist to a considerable extent of primary products, trade flows between both sides are traditionally analysed on the basis that the former are exporters of primary products and the latter of manufactured goods.

According to the traditional view price and income elasticity of supply of and demand for primary products are such that variations in the level of economic activities in the industrial countries cause greater variations in the price of such commodities and in export earnings. The major reason for this lies in the short-run inflexibility of both the output and demand of primary products in their relation to price changes, compared with manufactured goods. In general, the lack of short-run response of exports of agricultural products is attributed to the lengthy period required to bring about a significant adjustment in the production which is usually lagging behind market forces. In the case of minerals, although the supply response is generally higher than agricultural products, it is unlikely to be substantially greater.(1) Consequently, the more inelastic supply and demand are with respect to prices, the greater will tend to be the induced variations in prices, and the smaller those in quantities demanded. Moreover, the greater the departure of price elasticity of demand from unity, the more

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(1) MacBean, Export Instability and Economic Development, op.cit., pp. 23-25.

pronounced are the price variations and the effects on export receipts of a shift in supply of primary products. Supply shifts will produce offsetting changes in both volume and price, but they usually lead to changes in export value in a direction opposite to those of the underlying shift in demand. In the case of the exports of manufactured goods, since the responses of both supply and demand for price changes are higher than those of primary products, changes in export values, therefore, generate from variations in volume more than from price.

Pinto and Knakal(1) argued that a fall in the relative price of imports into developed countries from developing countries, caused by reductions in imports demand attributable to decrease in national income, does not seem to cause imports to rise again. They claimed that this fall in price is simply a means of enabling the developed countries to acquire their imports with a small proportion of their money income. This was confirmed by Da done and Di Marco (2) when they asserted that the prices of manufactured goods decrease less than those of primary products during the contraction phase of the business cycle. Particularly, in view of the low elasticity demand for primary products, the greater decline in their prices can be explained by the sharp volatility of imports over exports of industrial countries during short-term business cycles. F.G. Adam(3) found that a great deal of fluctuations in the trade balance of OECD is more ascribed to variations in demand for imports than in their exports; since imports, being more sensitive to domestic activity, more sharply, with close timing, in response to economic fluctuations.

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(1) . Pinto and Knakal, op.cit., pp.98-90.

(2) A.A. Da done and L.E. Di Marco, "The Impact of Prebisch's Ideas on Modern Economic Analysis," in L.E. Di Marco (ed.), International Economics and Development, Academic Press, New York, 1972, p.19.

(3) F.G. Adam, An Econometric Analysis of International Trade - An Interrelated Explanation of Imports and Exports of OECD Countries, OECD, Paris, 1969, pp.17-9, 45-9.

A number of studies have been devoted to assessing the dependence of the exports of developing countries upon the economic activities in the developed countries during the post-war period. Within the context of the world trade model of the I.M.F., R. Rhomberg(1) estimated both price and income elasticities of the demand for imports into the United States and Western Europe, during the period 1953-65, from the rest of the world which consists largely of developing countries. He reported only a price elasticity for the United States of -0.4 since that of Western Europe was found unreasonably low. Income elasticities for both regions were found larger, amounting to 1.4 and 0.9 respectively. In comparison with an earlier application of the original model by R. Rhombery and L. Boissonneault(2) for the period 1946-62, it is noticed that while income elasticities increased, price elasticities fell further.

Furthermore, Rhomberg attached particular interest to the question of the separate effects of year-to-year changes in economic activities in OECD countries on the quantities, prices and values of their imports from developing countries, and to the comparison of the results with the corresponding responsiveness of their imports from industrial countries among themselves. The response pattern of total merchandise exports as well as the exports of commodity categories from developing to OECD countries are estimated in the form of elasticity co-efficients as follows:(3) (Co-efficients with an asterisk (*) are significant at 5% level; others are not).

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(1) R.R. Rhomberg, "Transmission of Business Fluctuations from Developed to Developing Countries", IMF Staff Papers, Vol. 15 (1968) Table 2, p.7.
(2) R.R. Rhomberg and L. Boissonneault, "Effects of Income and Price Changes on the U.S. Balance of Payments", IMF Staff Papers, Vol. 11 (1964), Table 1, p.66.
(3) Rhomberg, op.cit., Table 3, p.10.

	Value	Quantum	Unit Value
Total merchandise export (SITC 0-9)	0.48	0.37*	0.08
Food and beverage (SITC 0-1)	-0.41	0.39	-0.79
Raw material, excluding fuel (SITC 2,4)	1.56*	0.59*	1.05*
Manufactures (SITC 5-9)	2.03*	0.35	1.66

Such results support the view that the export earnings from total merchandise exports in LDCs are responsive to changes in economic activity in developed countries. The estimated elasticity of quantum is not high (0.37), though it is much higher than the unit value elasticity which is almost negligible. For the commodity group, it is found that the developing countries' export proceeds from raw material are strongly responsive to economic activity in industrial countries, and that such responsiveness is generated, to a greater extent, from price rather than volume variations. Unexpectedly, there is a similar indication for manufactured goods whose price elasticity is the highest one, whereas the elasticity co-efficient for the volume is smaller and statistically uncertain. The response of quantity of food is very weak and the price appears to be inversely related; a result which was expected.

Recently, numerous studies have investigated, critically, the prop of domestic factors on export supply, claiming that where a market for commercial agriculture exists,LDCs farmers will respond to changes im relative prices. Nowshirvani's survey of that literature noted that higher prices will motivate the spread of the markets, so that

their total economic effects will induce a movement along a given supply schedule, He found that the supply response of some cash crops in northern India was positive and significant for price changes.(1) Such results were supported by Behrman's (2) study on Four Crops in Thailand. Moreover, Mohsen Khan (3) asserted that the exporters of primary products do not necessarily face an inelastic demand schedule and price variations do play an important role in the determination of exports which appear to adjust within a year to change in demand. The size of the estimated price elasticities were found to be fairly high for most of the 14 developing countries whose export demand equations were fitted.

However, the impact of the export supply variations within a single exporting country upon variations in price, depends not only on the elasticity of the world demand curve but also on the demand curve facing a particular developing country which is basically influenced by its share in the world market of the commodity in question. Variations in the world prices are the product of the actions taken by the other producers which may moderate the variations in their export earnings, but they would induce variations in the prices of the exports of any single exporter and, in turn, in his export earnings. For him, the supply-induced price change of other producers is best regarded as a demand-induced price change. The demand, in this case, would refer not to the

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(1) See V. Nowshirvani, The Efficiency of the Market Mechanism in Traditional Agriculture: Re-examination of an Old Controversy. Yale Growth Center Discussion, Paper No. 106, New Haven, 1971, Chapter 4.

(2) See J.R. Behrman, Supply Response in Underdeveloped Agriculture, North-Holland Publishing Co., Amsterdam, 1968,Chapter 6.

(3) Khan, op.cit.,pp.690-2.

total world demand but to the specific demand for a particular country's exports. Therefore, a demand curve facing a particular country can be related to the world demand curve according to the formula:

$E^{(1)} = \frac{W + KR}{1 - K}$, where E is the demand elasticity facing a country; W, the demand elasticity facing the world; R, the supply elasticity of the rest of the world; and K, the market share of the rest of the world. Since $(1 - K) \leqslant 1$ but $\geqslant 0$, and $KR > 0$, $E > W$. The case $K \longrightarrow \lim 1$ is the case of infinite elasticity for individual producers ($E \longrightarrow \lim^{\infty}$) under free competition. If $K = 0$, and the individual country thus has 100 per cent of the market, $E = W$. Accordingly, a country, accounting for a large proportion of world exports, will be faced with a demand curve with an elasticity closer to that of the world, whereas a country which accounts only for a smaller share will be faced with a demand curve which is differently shaped, subject to different shifts, and which is more elastic than the world demand curve. Firstly, a reduction in price will increase demand for the products not only by the amount by which world demand increases, but also by the amount by which the supply of the rest of the world decreases. Secondly, when the demand elasticity for an individual country is calculated, changes in demand are related to a smaller original quantity - i.e. the quantity supplied by this particular country at the original price - than the one used when calculating world demand elasticity.

In general, the smaller the country's share, the more elastic the demand curve would be, tending to be horizontally infinite. Having little

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(1) Linder, op.cit., p.158.

impact on world prices, a country, therefore, is a price-taker. Studying the variations in export earnings in five developing countries, MacBean (1) pointed out that the prices of a country's commodity are largely determined by world supply and demand and only very slightly by what happens in each country.

During the up- and down swings of the world economy in the first half of the 1970s, prices of primary commodities experienced large variations attributed to both shifts in demand and supply. Although there can be little doubt that the upswing in demand did exercise a strong influence on price movements, the extraordinary rise in prices in 1973 of some primary commodities, implicit in the upsurge in trade values, was not solely or even mainly the result of cyclical expansion in the major industrial countries. In some cases, there were severe constraints on the supplies of basic food stuffs, and, in other cases, prices were raised, unilaterally, by the international producers who were able to exercise control over the supply of some commodities such as petroleum and wheat. Additionally, expectations of shortages gave rise to additional demand for precautionary and speculative purchases. The shortages were further intensified by an increase in the desire to hold inventories of goods rather than currencies whose value had become suspect. As the 1973 boom came to an end, the recessionary forces had exerted pressures on the prices of commodities which levelled off at the second quarter of 1974 before they started to decline by the end of the year. Nevertheless, prices of some foodstuffs resisted the early downward trend, continuing to increase until the beginning of 1975.

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(1) MacBean, Export Instability and Economic Development, op.cit., p.143.

Table 5-4

Developing Countries: Price Indices of Exports of Basic Commodities, 1971-75

(1970 =100)

Year	Food Stuffs	Agricultural Raw Materials	Non-Ferrous Metals	Total Basic Commodities
1971	103.0	101.0	81.3	98.5
1972	121.3	113.5	82.3	111.0
1973	168.3	186.5	126.5	160,8
1974	255.3	228.3	160.3	206.8
1975	225.8	178.6	108.0	175.3

Source: Calculated from quarterly year averages taken from U.N., World Economic Survey, 1975, op.cit.Supplement, Table III-13, p.277.

Table 5-4 shows price indices of the exports of basic commodities during the period 1971-75. In 1973, prices of foodstuffs increased by 39.0 per cent and further by 52.0 per cent in 1974, those of agricultural raw material rose by 64 per cent in 1973 and 22 per cent in 1974, and those of non-ferrous metals increased by 54.0 per cent in 1973 and 27.0 per cent in 1974. The prices of the basic commodities as a whole increased by 45 per cent in 1973 and 29.0 per cent in 1974.

As the recessionary effects spread out throughout 1975, prices of food-stuffs declined by 12 per cent which was less than the declines in the prices of both agricultural raw materials and non-ferrous metals which amounted to 22 and 33 per cent, respectively, in that year. For the total basic commodities, the decline amounted to 15.0 per cent which

generated largely from industrial raw materials, agricultural and minerals, rather than foodstuffs, owing to their sensitivity to changes in economic activity in industrial countries.

4 - Conclusion

During the first half of the 1970s the world economy experienced strong fluctuations of economic activities and international trade flows, which were manifested in the upswings during 1973's boom and the downswings during the recession of 1974 and 1975. Though such fluctuations originated basically from the OECD area, the pattern was common in other economic regions of the world, particularly the LDCs.

During 1974 and 1975, while the income of the oil exporting countries was boosted by the sudden and large rise in oil revenue which resulted from the large increase in oil price, the world economy as a whole experienced a sharp decline in income and economic activities so that they indicated a sign of a deep and prolonged recession. The decline in income was partly caused by the deflationary and inflationary effects of the rise in oil prices, but it was partly attributable to the strong anti-inflationary policies adopted by the major industrial countries in the face of oil crisis. The estimates of three econometric studies carried out by the Brookings Institution in the United States to isolate the impact of the rise in oil prices on the economies of the United States, Western Europe and Japan indicated that the oil-induced declines in their GNPs were substantial.

The theoretical and empirical evidence support the proposition that because of the vulnerability of the export earnings of developing countries to variations in the level of economic activities in the industrial countries, oil-related recession in the OECD area was transmitted through international trade to developing countries whose export earnings decreased through the reductions in prices and quantum of their exports. The reduction in the earnings from the exports of primary products, particularly agricultural raw materials, would be generated from the decline in prices more than from the fall in quantum exports. In the case of the exports of manufactured goods, the reduction in the earnings would come from the decline in export volume more than from the decrease of unit value. Nevertheless, the effect of the slackened world demand on the export earnings of a developing country would be modified, in any case, by the influence of the country's share in the world market of the commodity in question and by the changes in the world supplies of such commodity.

On the other hand, the decline in the export earnings from the OECD market would be mitigated, though not compensated, if developing countries can expand their exports to the market of the oil-exporting countries whose imports have been boosted by the large rise in their income.

CHAPTER VI

FINANCING OIL PAYMENTS WITHIN THE CONTEXT OF POST-1973's CHANGES IN THE INTERNATIONAL ECONOMY

The rise in oil prices created an external financial problem which resulted mainly from the need to increase the flows of foreign exchange receipts to finance the additional oil costs. A typical oil-importing developing country can meet oil payments only through increases in foreign exchange availability acquired from additional exports and from capital inflows or through foreign exchange reserves accumulated from the previous years. On the other hand, as was discussed in chapter 5, the availability of foreign exchange was undermined further by the transmission of an oil-induced recession in the industrial countries which was reflected in slackened world demand and reduced export earnings.

This chapter is devoted to examining the extent to which export earnings were affected by oil crisis, through an analysis of changes in export earnings by both the commodity group and the export market, to indicate the source of such effects and the capacity of exports to meet additional oil bills. Also, the implications of oil price increases for foreign exchange reserves in relation to their adequacy and capacity to meet additional oil payments are examined.

1. The Effects on Export Earnings

The essential way to meet additional oil bills is to export more than before during the same period in which oil was imported. Nonetheless, the ability to utilize exports for settling external payments depends

not only on the performance of the export sector but also on the state of the world economy. Exports of India, Pakistan and Kenya during the first half of the 1970s demonstrated fluctuations which coincided with the economic swings in the world economy. Such a pattern, though common in all the three countries, was more marked in Pakistan and Kenya than in India. Table 6-1 shows the index numbers of unit value and quantum of exports and the export earnings of India, Pakistan and Kenya during the period 1970-75. The data on the exports earnings of the three countries are converted from national currencies to current U.S. $ by using their current exchange rates and the data of both India and Pakistan are adjusted for the calendar years. Export earnings of India, which are compiled on monthly basis in the source used, are converted to yearly basis. In the case of Kenya, total exports earnings are computed by adding up earnings from the exports to the other members of the East Africa Community (Tanzania and Uganda) and from the domestic exports (exports to the rest of the world).

Following the 1970-71 recession in the industrial countries, export earnings in all countries started to rise by 1972, reached their peak in 1973 and decelerated in 1974 before they declined in 1975. In 1972, India's export earnings increased by $357 million , or by 17 per cent, which were generated by equal increases of both unit value and quantum of 9 per cent. In 1973, export earnings rose by $606 million which amounted to 25 per cent more than the previous year. Such increases came basically from the 21 per cent increases in unit value, since quantum index increased by only 7 per cent. Despite the slow down of world

Table 6-1

Total Exports of India, Pakistan and Kenya, 1970-75

	Index Numbers of:(1)		Exports F.O.B.(2)		
	Unit Value	Quantum	Millions of Current US $	Changes from the Preceding Year.	%
India					
1970	100.0	100.0	1994.0	-	-
1971	102.2	101.4	2110.9	+116.9	+ 5.9
1972	111.2	110.2	2467.8	+356.9	+ 16.9
1973	132.5	116.8	3073.9	+606.1	+ 24.6
1974	165.1	123.7	3853.4	+779.5	+ 25.4
1975	183.8	135.5	4596.7	+743.3	+ 19.3
Pakistan					
1970	100.0	100.0	378.9	-	-
1971	114.1	129.4	505.3	+126.4	+ 33.4
1972	194.2	169.3	666.7	+161.4	+ 31.9
1973	344.0	176.5	933.5	+266.8	+ 40.0
1974	410.3	164.0	1029.5	+96.0	+ 10.3
1975	396.7	177.5	1084.4	+54.9	+ 5.3
Kenya					
1970	100.0	100.0	288.6	-	-
1971	96.2	97.5	299.8	+11.2	+ 3.9
1972	106.8	100.4	345.5	+45.7	+ 15.2
1973	121.2	115.1	461.0	+115.5	+ 33.4
1974	164.5	111.2	591.6	+130.6	+ 28.4
1975	188.6	98.5	580.5	-11.1	- 1.9

Source /....

Source:

(1) Data of Index numbers of unit value and quantum of export for India is taken from Government of India, Statistical Abstract 1972, op.cit., Table 86, p. 225; Government of India, Monthly Abstract of Statistics, Vol. 30, No. 10 (October 1977), Table 26, p. 53, Table 27, p. 55; For Pakistan, data are taken from Government of Pakistan, Pakistan Statistical Yearbook, 1975-76, op.cit., Table 17.7, pp. 239-4, Table 17.8, pp. 241-2. For Kenya, data is taken from Republic of Kenya, Statistical Abstract, 1974, Table 70 (b), p. 81; Statistical Abstract, 1975, Table 73, p. 91, Table 74, p. 92.

(2) Data of exports for India is taken from Statistical Abstract 1972, op.cit., Table 77, pp. 199-209; Monthly Abstract of Statistics, op.cit., Table 30, pp. 65-8. For Pakistan, data is taken from Government of Pakistan, Pakistan Statistical Yearbook 1975-76, op.cit., Table 17.5, pp. 222-33. For Kenya, data is taken from Republic of Kenya, Statistical Abstract, 1976, op.cit., export to Tanzania, Table 62 (a), p. 68; Export to Uganda, Table 63 (a), p. 70; export to the rest of the world (domestic exports), Table 59 (a), p. 63.

economic activity in 1974, India's export earnings reached their peak of $3853 million., realising increases of 25.4 per cent over the previous year. Such increases were achieved by the 7 and 21 per cent rise in quantum and unit value respectively. The effects of world recession on Indian exports was only felt in 1975 when the growth of export earnings decelerated at 19 per cent which resulted in increases of export earnings by $743 million . In that year, the increases in export earnings resulted mainly from the rise in unit value which amounted to 19 per cent as quantum index rose by only 12 per cent.

Pakistan benefited more from the commodity boom and was more sensitive to change in world demand than India. In 1972, export earnings grew very fast, by $161 million, amounting to 32 per cent more than the previous year. This was partly attributable to the 1972's Rupee devaluation. In that year, unit value and quantum increased, largely, by 80 and 40 respectively. During the 1973 boom, increases of export earnings accelerated at 40 per cent and reached $267 million , generating basically from the 150 per cent increases in unit value, since quantum increased by only 7 per cent over the previous year. In 1974, export earnings increased by $ 96 million. Such increases were only generated from the 66 per cent increases of unit value since quantum declined absolutely by 13 per cent. Export earnings continued their deceleration in 1975 at 5 per cent, increasing by only $55 million which came from the 14 per cent increase of quantum, as unit value declined by 14 per cent below the previous year.

Following the 1970/71 recession, Kenya's export earnings in 1972 increased by $46 million which amounted to 15 per cent over the previous

year. In that year, both unit value and quantum indices recovered at 11 and 3 per cent respectively. The movements of unit value and quantum indices in 1973 indicate that the commodity price boom by-passed Kenya's exports. In that year, the 33 per cent increases of export earnings, amounting to $116 million, originated from a 15 per cent rise in both unit value and quantum. In 1974, export earnings increased, amounting to $131 million, a recorded 28 per cent over the previous year. Such increases came only from the 43 per cent increases in unit value, since quantum declined absolutely by 4 per cent. During the 1975 recession, the 24 per cent increases in unit value were not sufficient to moderate the effects of the 13 per cent declines in quantum, leading to a decline of export earnings of 2 per cent below the 1974 level.

Clearly, while the 1973's commodity boom benefited Pakistan exports, to some extent, it by-passed those of India and Kenya, in particular. Moreover, during the downswing of 1974/75, export earnings of both Pakistan and Kenya were more sensitive than those of India. However, the above-mentioned discussions only give an aggregate picture of the year-to-year changes in total export earnings of the sample countries. It has not provided, therefore, detailed information on the sources of such changes. Hence the following two sections will analyse changes in export earnings by both the commodity group and the export market.

1.1 Changes of Export Earnings by Commodity Group

The theoretical background advanced in chapter 5, analysing the effects of variations in economic activity and income in the developed countries on exports of developing countries, has not only distinguished

between the different responses between both primary products and manufactured goods but also in the case of the former, between foods and raw materials. It has also concluded that when a country's share of the commodity in question is less than 100 per cent of the world market, such a country, as a price-taker, will face a demand curve which is more elastic than the world demand curve, depending on the changes in supplies and demand in the rest of the world. The unusual amplitude of the swings in demand in the first half of the decade and the extraordinary factor affecting the supply of certain commodities had combined to change radically a number of important price relationships and to benefit some countries. In the global context, two prices, other than those of oil, stood out as critical determinants of the state of economic balance; those of basic food stuffs and manufactured goods. Table 6-2 shows the export structures of India, Pakistan and Kenya, distinguishing between primary products and manufactured goods and, in the case of the former, between foods and raw material. Despite the fact that all the three countries are basically

Table 6-2

The Structures of the Exports of India, Pakistan and Kenya. The averages of the period 1970-75. (in percentage of total exports)

	Primary Products			Manufactured Goods (SITC 5-8)
	Foods and Beverage (SITC 0-1)	Raw Materials (SITC 2,4)	Total	
India	31.0	15.1	46.1	45.6
Pakistan	22.2	20.2	42.2	55.5
Kenya	45.5	13.2	58.7	23.7

Source: Calculated for each country, see footnote Table 6-1.

primary exporting countries, India and Pakistan have achieved a relatively high level of industrialisation as reflected in the share of manufactures in their exports.

The average share of primary products in India's exports amounts to 46 per cent, of which 31 per cent represents foods and beverages and the remaining 15 per cent is raw materials, while the share for Pakistan is 42 per cent, 22 per cent of which is food and beverage and 20 per cent raw materials. Kenya is relatively the largest exporter of primary products, the average share amounting to 59 per cent; of which 46 per cent represents food and beverages and the remainder is raw materials. Pakistan takes the lead in the export of manufactures, with a share in total exports amounting to 56 per cent, while those of India and Kenya amount to 46 and 24 per cent respectively.

In order to analyse the changes in exports by commodity group, the year-to-year changes in unit value and quantum indices as well as export earnings in current U.S. $ for six commodity groups - according to the "Standard International Trade Classification" of the U.N. - are calculated: Foods and live animals, crude materials, chemicals, basic manufactures, machinery and transport equipments and miscellaneous manufactured goods. Data are adjusted to calendar years, whenever the fiscal does not match the calendar year, and converted to U.S. $ by using the current exchange rates. Additionally, year-to-year percentage changes of unit values, volumes and values are calculated from data in national currencies for the major export items, covering the first, second and the fourth commodity group, whenever the value of the item exceeds 3 per cent of the export value of the corresponding group during the first half of the 1970s. In appendix 4, Tables (12), (13) and (14) show 13, 10 and 11 items for India, Pakistan and Kenya respectively.

The Exports of Foods and Live Animals

Table 6-3 shows the year-to-year changes in unit value and quantum indices as well as the changes in export earnings in current U.S. $ of the exports of food and live animals of India, Pakistan and Kenya during the period 1971-75. The Indian exports of foodstuffs, whose volume showed a momentum increase of 14 per cent in quantum in 1972, had a setback in the peak of the momentous commodity boom in 1973. In that year, export earnings from foods increased by $267 million which amounted to 40 per cent over the previous year. Such increases originated basically from the 30 per cent increases in unit value, since quantum declined by 1.5 per cent because of the adverse effects of the erratic behaviour of the monsoon, during "Kharif" season, on the supply of exportable crops. Despite the slowdown in the world income in 1974, exports rose by $324 million., amounting to 39 per cent over the previous year, which was induced by the further 45 per cent increase in unit value and the recovery of quantum by 11 per cent. In 1975, increases in export earnings decelerated at 24 per cent, recording $275 million, despite the 23 per cent increases in quantum since unit value slowed down by 14 per cent.

Tea, as the traditional source of foreign exchange for India, was among the least affected commodity in terms of swing in income and demand in the 1970s. World price of tea did not begin to advance until 1974, when most primary commodity prices were levelling out or receding from their peaks, recording its highest point before it decelerated by the second half of 1975.(1) Thus, during 1973 boom, the value of tea export declined by 1.6 per cent due to the decline of both unit value and volume

(1) U.N., World Economic Survey, 1975, op.cit., pp. 212-4.

Table 6-3

The Year-to-Year Changes in the Exports of Foods and Live Animals (SITC-0) of India, Pakistan and Kenya, 1971-75.

	Changes from the Preceding Year in the Index Numbers of: (1970=100)		Exports F.O.B.	
	Unit Value	Quantum	Millions of Current U.S.$	Changes from the Preceding Year
				%
India				
1971	- 4.3	+ 11.4	562.1	+ 34.2 + 6.5
1972	+ 6.5	+ 14.0	663.2	+101.1 + 18.0
1973	+ 30.2	- 1.5	828.8	+266.7 + 40.2
1974	+ 45.0	+ 11.1	1152.9	+324.1 + 39.1
1975	+ 14.1	+ 23.2	1427.5	+274.6 + 23.8
Pakistan				
1971	+ 13.7	+ 21.1	84.4	+ 22.6 + 36.6
1972	+ 80.9	+ 62.8	121.7	+ 36.9 + 43.7
1973	+109.7	+ 25.4	225.1	+103.7 + 85.5
1974	+111.3	- 26.9	279.1	+ 54.0 + 24.0
1975	+ 35.5	+ 52.7	294.3	+ 15.2 + 5.4
Kenya				
1971	- 7.6	- 6.9	132.8	- 12.9 - 8.9
1972	+ 5.5	+ 20.5	174.3	+ 41.5 + 31.3
1973	+ 14.8	+ 13.0	229.8	+ 55.5 + 31.8
1974	+ 18.5	- 14.9	233.4	+ 3.6 + 1.7
1975	+ 7.4	- 2.8	232.3	- 1.1 - 0.5

Source: See footnote Table 6-1.

by 0.1 and 1.5 per cent respectively. Due to the failure of the crop in East Africa and the poor output in Sri Lanka in 1974[1] the value of tea exports increased by 54.4 per cent, induced by 18 per cent increase in volume and 30 per cent rise in unit value. In 1975, export value of tea increased only by 5.8 per cent despite the 12 per cent increases in unit value, as quantum declined by 5.5 per cent.

Similarly, gains from boom commodity for most Indian exports of food stuffs were only motivated by the disruption in world supplies, so that such gains depended basically on the duration of the disruption of world supplies and the response of domestic supply. India took advantage of the spurt in the international price of sugar, because of the poor sugar cane crop in both Cuba and Brazil, to make the largest contribution to the increases in its export earnings, alleviating the impact of the recession in 1974 and 1975. Unit value of sugar increased by 29.4 per cent in 1973 and further by 189.0 per cent in 1974 before it declined by 7.0 per cent in 1975; and volume responded when it increased by 148, 174.7 and 24.1 per cent through 1973 to 1975. The value of sugar exports increased by 221 per cent in 1973 and further by 694 per cent in 1974 before it decelerated by 15 per cent in 1975. Unlike sugar exports, India's gains from the exports of oil cakes and fish were short-lived because of the quick recovery of world supply. Restrictions imposed by the U.S.A. on the exports of soyabean meal and the unavailability of fish meal from Peru helped India to boost its export of oil cakes, though it could not exploit the high unit value realisation because of constraints on domestic production. In 1973, the

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(1) Government of India, Economic Survey, 1975-76, Economic Division, Ministry of Finance, Government of India, New Delhi, 1976, p. 46.

value of exports increased by 128 per cent, attributable to 78 and 28 per cent increases in unit value and volume respectively. Due to good soyabean in the U.S.A. in 1974, larger Peruvian fish catches and better sunflower crops in the U.S.S.R.,(1) demand slackened further by the 1974 recession, as both unit value and volume declined by 17 and 35 per cent respectively; and the export value fell by 46 per cent below 1973 level. In 1975, export value declined further by 10 per cent, despite the slight recovery of unit value by 6 per cent, owing to the 15 per cent declines in volume. Export earning from fish made significant increases in 1973 when they increased by 64 per cent, attributable to the 19 per cent increases in unit value and 37 per cent increases in volume. In 1974, export value declined by 26 per cent owing to both the poor catch and the unsteady market conditions.(2) In 1975, value, volume and unit value recovered at 58, 30 and 22 per cent respectively.

Coffee prices, which had risen in 1970 in the wake of the poor crop in the world, dipped in 1971 before they began to increase in 1973 and reached their peak in mid-1974.(3) Indian gains from coffee had resulted from 35 per cent increases in unit value realisation, since quantum only rose by 4.0 per cent in 1973. In 1974, owing to the depressed coffee market, export value increased by 12 per cent which generated from the 18 per cent modest increases in unit value, since volume declined by 6 per cent. However, the decline of Brazilian crop in 1975 strengthened the demand for Indian coffee whose value increased by 30 per cent mainly because of the 18 per cent increases in quantum since unit value only increased by 11 per cent.

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(1) Ibid.,
(2) Government of India, Economic Survey, 1975-76, op.cit., p. 46.
(3) U.N., World Economic Survey, op.cit., pp. 208-10.

The increases of Pakistan's receipts from the exports of food stuffs reached the peak in 1973, amounting to $104 million , or by 86 per cent over the previous year. Such increases originated from a large rise in unit value of 110 per cent combined with modest increase of 25 per cent in quantum. Nevertheless, Pakistan could not exploit the large increases in price because of the constraints imposed on domestic supplies caused by floods and pest attacks. Hence, despite the further rise in unit value of 111 per cent in 1974, export earnings only increased by 24 per cent as quantum declined absolutely by 27 per cent below 1973 level. When the quantum recovered significantly at 53 per cent in 1975, the deceleration of unit value at 36 per cent resulted in small increases in export earnings of 5 per cent.

Pakistan's exports of rice, as the major food export item, gave a striking example of the effects of natural hazards on export volume and, in turn, export earnings. Rice production, which was growing at 8.0 per cent in 1972, slowed down to 2.5 per cent in 1973 and levelled off at 0.6 per cent in 1974 before it recovered in 1975 at 13.3 per cent.(1) In view of the difficulties of curbing domestic consumption, the deterioration of output levels was reflected in a steep fall in quantum exports. Therefore, Pakistan missed the opportunity of exploiting the large increase in unit value of rice by 63 per cent in 1973, as quantum only increased by 40 per cent, though the quantum increase in 1972 of 220 per cent was matched by a 1.5 per cent decline in unit value. In 1974, despite further increases in unit value of 76 per cent, export earnings rose only by 36 per cent owing to the 23 per cent decline in

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(1) Government of Pakistan, Pakistan Economic Survey, 1976-77, op.cit., Table 3.1, p. 19.

quantum. Moreover, the 17 per cent recovery in quantum in 1975 occurred when demand slackened and unit value declined by 7 per cent, leading to a slight increase in earnings of 9 per cent. Similarly, the combinations of domestic supply constraints and consumption had limited the gains from the exports of oil cakes and fish.

Kenya benefited least from the 1973 commodity price boom because of a combination of drought and dry weather and the inability of the major exports to fetch a high unit value realisation in the world markets. Increases in the earnings of food exports in 1973 stayed at the same level as the previous year at 32 per cent, as the slight increases in unit value of 15 per cent had made up for the deceleration ofquantum at 13 per cent. Export earnings in 1974 only increased by 2 per cent, as the 18 per cent increase in unit value were accompanied by 15 per cent declines in quantum. In 1975, export value absolutely declined by 0.5 per cent as quantum continued to decline at 3 per cent while unit value decelerated at 7 per cent.

Increases in the earnings from coffee exports reached the peak at 44 per cent when both unit value and volume registered the largest increases of 21 and 19 per cent, respectively in 1973. Severe drought[1] in 1974 affected quantum exports which declined by 5 per cent. In that year earnings increased by 7 per cent since unit value was still rising slowly at 13 per cent. Slackened demand in 1975 was reflected in the absolute decline of both unit value and volume by 3 and 6 per cent, respectively, resulting in an 8 per cent fall in earnings below the previous year.

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(1) Republic of Kenya, Kenya Statistical Digest, Vol. 12, No. 1 (March 1974), Ministry of Finance and Planning, Nairobi, p. 1.

Tea, as a second major Kenyan export of foodstuffs, after coffee, was by-passed by the 1973 boom. In that year, despite the 9 per cent increases in volume, earnings rose by only 3 per cent owing to the 6 per cent declines in unit value. In 1974, the 14 per cent increases in export earnings were attributed to the 19 per cent recovery of unit value as quantum declined by 4 per cent owing to the prolonged period of drought which had continued throughout 1973/4.(1) When the quantum recovered at 6 per cent in 1975, unit value increased by only 12 per cent, resulting in increases in export earnings of18 per cent.

Furthermore, severe drought had limited the benefits which could be realised from exploiting the high prices of other foodstuffs in the world market. The government ofKenya imposed a temporary ban on the exports of foods in 1974. Export earnings from meat declined by 24 per cent during the 1973 peak despite the 25 per cent rises in unit value due to the 40 per cent decline in volume. Though volume exports remained at that level in 1974, earnings increased by 18 per cent owing to further 16 per cent increases in unit value. When volume recovered at 22 per cent in 1975, value rose only by 12 per cent as the slackened demand induced 9 per cent declines in unit value below 1974 level. As this unfortunate example was repeated in other foodstuffs such as pineapple, beans, peas and butter, the country lost the benefit of the boom and incurred the burden of the recession.

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(1) Republic of Kenya, Kenya Statistical Digest, Vol. 13, No. 3 (September 1975), Ministry of Finance and Planning, Nairobi, p. 2.

The Exports of Crude Materials

Table 6-4 shows the year-to-year changes in unit value and quantum indices of exports as well as changes in export earnings in current U.S. $ of the exports of crude material of India, Pakistan and Kenya during the period 1971-75. In general, the factor advanced above which had governed the exports of foodstuffs of the three countries also influenced the export of raw materials produced in the agricultural sector. Furthermore, exports of raw materials tend to be more responsive than those of foodstuffs to variations in world economic activity, exhibiting higher income and price elasticities of demand.

India's export earnings from crude material increased by 32 per cent at their peak in 1973 which are equally attributed to unit value and quantum which rose by 15 and 14 per cent respectively. In 1974, export earnings decelerated at 19 per cent, attributable to the 24 per cent rises in unit value, since volume decelerated at 5 per cent. In 1975 the rise in earnings remained slightly higher than the year before owing to the 31 per cent rise in unit value as volume levelled off at 0.2 per cent.

India is a significant exporter of minerals particularly iron ore and manganese. The unit value realisation of iron ore is influenced more by contractual arrangements than by a volatile daily market. In 1973, unit value rose slightly by 6 per cent, while quantum increased by 14 per cent, resulting in 21 per cent increases in value of exports over the 1972 level. In 1974, the acceleration of unit value at 32 per cent was responsible for the 21 per cent increases in export value since quantum of exports declined by 8 per cent below 1973 level. In 1975, export earning increased by 33 per cent caused by the slight recovery of volume

Table 6-4

The Year-to-Year Changes in the Exports of Crude Materials (SITC-2) of India, Pakistan and Kenya, 1971-75

	Changes from the Preceding Year in the Index Numbers of: (1970 = 100)		Exports F.O.B.		
	Unit Value	Quantum	Millions of Current US $	Changes from the preceding year.	
					%
India					
1971	- 0.7	- 3.3	327.9	- 0.9	- 0.3
1972	+ 4.9	- 3.2	328.4	+ 0.5	+ 0.2
1973	+15.1	+13.6	432.1	+103.7	+31.6
1974	+23.6	+ 5.2	511.9	+79.8	+18.5
1975	+31.1	+ 0.2	615.7	+103.8	+20.3
Pakistan					
1971	+18.4	+64.0	159.3	+86.6	+119.1
1972	+62.6	+41.7	151.2	- 8.1	- 5.1
1973	+124.9	-25.4	121.6	-29.6	-19.6
1974	+58.8	+ 3.3	144.4	+22.8	+18.8
1975	-13.4	+20.9	175.4	+31.0	+21.5
Kenya					
1971	+11.8	+46.4	32.0	+ 5.2	+19.4
1972	+11.2	+14.6	40.4	+ 8.4	+26.3
1973	+52.5	+17.6	66.0	+25.6	+63.4
1974	+52.6	35.1	101.1	+35.1	+53.2
1975	-23.5	-27.8	79.5	-21.6	-21.4

Source: See footnote, Table 6-1.

at 4 per cent, though unit value started to decelerate at 29 per cent. The realised unit value of manganese ore rose slightly, in 1973, by 13 per cent, while quantum of exports declined by 5 per cent, leading to increases in value of 8 per cent. The significant increases in unit value of manganese of 41 per cent which occurred only in 1974 when the prices of other commodities slowed down, accompanied a large increase of 30 per cent in quantum of exports, resulting in 83 per cent increases in earnings. However, in 1975, owing to the slackened demand, export earnings increased slightly by 0.5 per cent since volume declined by 23 per cent and unit value decelerated at 31 per cent.

India did not benefit from the upsurge in cotton price which took place in 1973 as India is not only an insignificant exporter but also an importer of raw cotton. Export earnings increased by 50 per cent in 1973 which can be attributed to the 45 per cent increases in volume as unit value rose by only 4 per cent. In 1974, export earnings declined by 53 per cent owing to the 64 per cent decreases in volume, despite the 29 per cent rises in unit value. In 1975, the 163 per cent increases in export value originated from the 160 per cent increases in volume as unit value levelled off at 1.2 per cent.

Pakistan missed the opportunity of exploiting the upsurge of the prices of its exports of raw materials in the international market in 1973 because of the constraints on the supply of exportables. During that year, export earnings from crude materials declined by 20 per cent below the 1972 level, despite the 125 per cent rise in unit value, owing to the 25 per cent fall in export volume. In 1974, export earnings partly recovered by 19 per cent, an increase attributable to the 59 per cent rises in unit value and the very slight recovery of 3 per cent rise in

volume. Export earnings continued to increase by 22 per cent in 1975, despite the 13 per cent decline in unit value, owing to the 21 per cent rise in export volume.

In fact the size of the cotton crop in Pakistan determines not only the exports of cotton but also the economic activities related to cotton textile which account for 72 per cent of the large scale industry.(1) The upsurge in the international cotton market coincided with a period of continuous deterioration in the output caused by drought, flood, plant diseases and pest attacks. Production registered a small drop of 0.8 per cent in 1972 which was followed by a large decline of 6.2 per cent in 1973 and 3.7 per cent in 1974, and then ended in a drastic drop of 19 per cent in 1975.(2)

The value of cotton exports declined by 27 per cent in 1973 owing to the 39 per cent drop in volume, though unit value rose by 19 per cent. The continuous rise in unit value during 1974 induced the 24 per cent increases in export earnings, since volume continued its decline at 6 per cent below 1973 level. The recovery of export volume by 32 per cent during 1975 generated the 32 per cent rise in value since unit value slightly dropped. Exports of cotton waste followed in the same way.

In general raw wool entered the 1970s at a low price but greatly improved in 1972 and 1973 before it quickly lost ground in 1974 and reached its lowest level in 1975. Following the large increase of 1972, Pakistan's export earnings from raw wool increased by only 41 per cent in 1973, due to the 60 per cent increases in unit value, despite the 12 per cent

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(1) Government of Pakistan, Pakistan Basic Facts, 1975-76, op.cit., p.140.
(2) Government of Pakistan, Pakistan Economic Survey, 1967-77, op.cit., Table 3.4, p. 22.

decline in volume. As the demand weakened in 1974, unit value decelerated at 28 per cent and export value declined by 38 per cent attributable to the large fall in volume of 52 per cent. In 1975, the effect of the 26 per cent decline in unit value on export earnings was alleviated by the 34 per cent recovery in volume. Similarly, the small increase of 11 per cent in the earnings from the exports of hides and skins in 1973 came from the 29 per cent increases of unit value as quantum declined by 14 per cent. As the world demand slackened, Pakistan's unit value realisation from the exports of hides and skins declined by 26 per cent in 1974 and further 30 per cent in 1975, though the quantum rose by 133 and 56 per cent respectively. During these two years, earnings increased by 72 per cent in 1974 before they decelerated at 10 per cent in 1975.

Kenya's earnings from the exports of crude material increased by $ 26 million in 1973; or by 63 per cent over the previous year. Such increases basically originated from the rise in unit value which amounted to 53 per cent as quantum increased by 18 per cent only. In 1974, the increases of earnings amounted to $35 million , or by 53 per cent over the previous year. In the same year, while the increases of volume were as much as twice those of the previous year, unit value rose by 53 per cent. In 1975, slackened demand induced a fall in both unit value and volume by 24 and 29 respectively, and the exports earnings consequently declined by 21 per cent below the previous year.

Sisal gave the most outstanding performance among Kenya's exports of raw materials. In 1973, the 131 per cent increases in earning originated from the large rise in unit value of 99 per cent, since quantum increased by only 16 per cent over the previous year. In 1974, the combination of a large rise in both unit value and volume by 121 and 61 respectively added

225 per cent to export earnings of Sisal. By 1975's recession, export earnings declined by 57 per cent which can be attributed to the fall of both unit value and volume by 27 and 41 per cent respectively. However, the decline in volume during 1975 is not only caused by weak demand but also by the failure of output which dropped by more than one half the previous year's output owing to insufficient rainfall.

Pyrethrum, coming after sisal, represents the second source of foreign exchange among Kenya's exports of raw materials. Its prices were depressed during the 1973 commodity boom, declining by 13 per cent below the previous year. Hence, the slight increases in volume of 2 per cent could not prevent the deterioration in export earnings which declined by 20 per cent. In 1974, unit value could only have recovered by an amount equal to 1973's declines, while volume increased greatly by 33 per cent and earnings, therefore, increased by 54 per cent. In 1975, export earnings declined by 15 per cent despite the slight increases in both unit value and volume by 4 and 7 per cent respectively. The decline in export earnings was caused by the decline in price and volume of pyrethrum extracts rather than its flowers.

Hides and skins are the third important item among Kenya's exports of raw materials. Kenya could not benefit from the increases in unit value of hides and skins in 1973 which amounted to 76 per cent. During that year, the rise in export earnings amounted to only 37 per cent owing to the 22 per cent declines in volume attributed to the weather conditions. When the volume recovered slightly by 10 per cent, the slackened demand induced 22 per cent declines in unit value, resulting in a 14 per cent fall in export earnings. In 1975, earnings from hides and skins increased only by 22 per cent over 1974 level despite the 32 per cent rise in export volume since unit value declined by 7 per cent.

Finally, Kenya's export of cotton was by-passed by the boom prices since its unit value increased by less than 1 per cent in 1973. During that year, the 13 per cent increases in export earnings were only achieved by the equal rise in quantum. In 1974, despite the 19 per cent rise in unit value, export earnings declined by 17 per cent due to the 31 per cent declines in volume which was caused by the fall of both domestic output and external demand. In 1975, despite the decline of volume by 9 per cent, earnings increased by 13 per cent caused by the rise of unit value by 25 per cent.

The Exports of Chemicals

In general, despite the efforts of the three countries to increase quantum exports of chemicals, significant rises in unit values, mostly attributable to world inflation, happened only by 1974 when world demand levelled off and started to decline. Moreover, the slackened world demand for chemicals was reflected, unlike the primary products, more in declines ofquantum than of unit value. Table 6-5 shows the year-to-year changes in unit value and quantum indices as well as changes in export earnings in current U.S. $ of the exports of chemicals of India, Pakistan and Kenya during the period 1971-75.

India's export earnings from chemicals increased by $19 million, or 38 per cent over the previous year, during the 1973 boom. Such increases were basically generated from the 27 per cent rises in quantum since unit value rose insignificantly by 9 per cent. When world demand lost its strength in 1974, quantum increased by 5 per cent while unit value, rising by 70 per cent, largely contributed to the $45 million increases in export earnings. During the 1975 recession, export earnings absolutely declined

Table 6-5

The Year-to-Year Changes in the Exports of Chemicals (SITC-5) of India, Pakistan and Kenya, 1971-75.

	Changes from the Preceding Year in the index numbers of: (1970 = 100)		Exports F.O.B.		
	Unit Value	Quantum	Millions of Current U.S. $	Changes from the preceding year	
					%
India					
1971	- 6.0	- 6.2	44.2	- 2.3	- 4.9
1972	- 0.3	+11.4	50.3	+ 6.1	+13.8
1973	+ 8.6	+26.9	69.4	+19.1	+38.0
1974	+70.1	+ 5.4	114.4	+45.0	+64.8
1975	+15.6	-10.0	111.0	- 3.4	- 3.0
Pakistan					
1971	+20.8	-32.1	5.2	+ 1.1	+26.8
1972	+31.8	- 7.7	4.0	- 1.2	-23.1
1973	+54.3	+76.1	7.5	+ 3.5	+87.5
1974	+96.4	+107.1	11.7	+ 4.2	+56.0
1975	+38.9	- 2.8	13.3	+ 1.6	+13.7
Kenya					
1971	+17.3	- 3.2	26.2	+ 2.9	+12.4
1972	+38.7	-21.6	28.0	+ 1.8	+ 6.9
1973	+17.6	+15.5	37.5	+ 9.5	+ 33.9
1974	+55.1	-12.6	40.9	+ 3.4	+ 9.1
1975	+58.7	-26.1	33.4	- 7.5	-18.3

Source: See footnote Table 6-1.

by 3 per cent as unit value increases halted at 16 per cent and quantum declined by 10 per cent below the previous year.

The outstanding performance of chemical exports from Pakistan was enhanced by the rise in the productive capacity in 1973. During that year, export earnings increased by $4 million or 88 per cent over the previous year. These were generated from the rises in both unit value and volume by 54 and 76 per cent respectively. In 1974, export earnings increased by $4 million, or 56 per cent, which resulted from the rise of both unit value and volume by 96 and 108 per cent respectively. By 1975, export earnings decelerated at 14 per cent as the rise in unit value slowed down to 39 per cent, while quantum absolutely declined by 3 per cent.

During the 1973, peak, unit value of chemical exports from Kenya, rising by 18 per cent, did not record a significant increase. The 34 per cent increases in export earnings basically originated from the 16 per cent rises in quantum. In 1974, the small increase of 9 per cent in export earnings came from the 55 per cent increases in unit value as quantum declined by 13 per cent. In 1975, the 26 per cent fall in quantum caused a decline of 18 per cent in earnings, though unit value registered a further increase of 59 per cent.

The Exports of Basic Manufactures

Table 6-6 shows the year-to-year changes in unit valueand quantum indices as well as changes in export earnings in current U.S. $ of the exports of basic manufactures of India, Pakistan and Kenya during the

Table 6-6

The Year-to-Year Changes in the Exports of Basic Manufactures (STTC-6) of India, Pakistan and Kenya, 1971-75

	Changes from the Preceding Year in the Index Numbers of: (1970 = 100)		Exports F.O.B.		
	Unit Value	Quantum	Millions of Current US $	Changes from the preceding year	
					%
India					
1971	+ 6.3	- 4.8	864.9	+ 39.2	+ 4.7
1972	+13.9	+ 4.1	1021.2	+156.3	+18.1
1973	+20.6	+ 4.3	1230.5	+209.3	+20.4
1974	+39.5	- 7.5	1388.4	+157.9	+12.8
1975	+ 9.2	+ 9.2	1589.3	+200.9	+14.5
Pakistan					
1971	+11.8	+21.5	260.7	+64.2	+32.7
1972	+89.7	+35.6	329.5	+68.8	+26.4
1973	+163.3	+8.3	474.0	+144.5	+43.9
1974	+41.9	-22.1	460.4	-13.6	-2.9
1975	-43.6	+11.0	459.3	- 1.1	- 0.3
Kenya					
1971	+14.4	- 9.5	27.9	+ 2.7	+10.7
1972	+14.9	-19.0	24.3	- 3.6	-12.9
1973	+34.3	+ 6.3	33.5	+ 9.2	+37.9
1974	+30.9	+15.4	50.0	+16.5	+49.3
1975	+44.6	-19.0	47.4	- 2.6	- 5.2

Source: See footnotes Table 6-1.

period 1971-75. In general, domestic factors which affected the exports of primary products influenced the exports of basic manufactured goods which depend on agricultural raw materials as basic inputs.

Increases in India's export earnings from basic manufactures in 1973, amounted to $209 million , or 20 per cent above the previous year, generated basically from the 21 per cent rise in unit value since volume increased modestly by 4 per cent. In 1974, the increases in earnings which slowed down to 13 per cent were generated from the 40 per cent rises in unit value as volume fell absolutely by 8 per cent. During the 1975 recession, the 15 per cent increases of earnings resulted largely from the 9 per cent recovery of volume since unit value decelerated by 9 per cent.

The modest increases in quantum exports of India during 1973 are caused by the decline in the exports of jute and leather manufactures which are considered the major item in that group. Unit value of jute which did not benefit from the boom price, declined by 6 per cent while earnings declined by 9 per cent due to the 3 per cent declines in volume. Earnings increased in 1974 at30 per cent because of the small recovery of volume and the increase of unit value. During the 1975 recession, the earnings declined by 17 per cent because of the falls of both unit value and volume by 3 and 15 per cent respectively. In the case of leather manufactures, export earnings stagnated in 1973 as the effects of the 72 per cent rises in unit value were cancelled out by the 43 per cent decline in volume. Earnings declined by 16 per cent in 1974, mainly due to the 26 per cent declines in volume since the rise in unit value slowed down by 14 per cent. In 1975, earnings recovered at 39 per cent mainly because of the recovery of volume by 26 per cent. Earnings from

the exports of both mill-made and hand-loom cotton reached their peak in 1973, increasing by 93 and 96 respectively. Their earnings declined in 1974 by 20 and 10 per cent respectively because of the falls of their volumes by 43 and 27 respectively. During 1975, the slackened demand led to the decline of unit value of mill-made cotton by 14 per cent and the slow down of that of hand made cotton by 10 per cent which resulted in a fall of export earnings of the former by 3 per cent and a rise in the latter by 30 per cent.

Despite the high unit value that Pakistan could have realised for its exports of basic manufactures, variations in export earnings depend largely on the state of the supply of exports; particularly raw cotton whose production level is vulnerable to domestic conditions. Earnings from the exports of basic manufactures increased by $145 million , or by 44 per cent, in 1973, which came basically from the 163 per cent rises in unit value as volume increased by only 8 per cent. In 1974, earnings absolutely declined by 3 per cent because of the 22 per cent fall in volume assisted by the slow down of unit value at 42 per cent. Earnings declined further by 0.3 per cent in 1975, despite the partial recovery of volume, by 11 per cent, owing to the absolute decline in unit value by 44 below the previous year.

Owing to the decline in raw cotton output in 1973, Pakistan could not exploit the large increases in unit value of both cotton yarn and fabric by 65 and 69 per cent respectively. During that year, earnings from cotton yarn and fabric only increased by 48 and 63 per cent because of the falls of their volumes by 10 and 4 per cent respectively. The continuous declines in their volumes in 1974 by 38 and 14 per cent respectively, assisted by the deceleration of their unit values by 14 and

19 per cent, led to the decline of the export earnings of cotton yarn by 29 per cent and stagnation in cotton fabric earnings. In 1975, the earnings of both of them declined by 15 and 2 per cent, owing to the recession-induced declines in their unit value by 20 and 15 per cent, despite the partial recovery of their volume by 7 and 16 per cent. Additionally, earnings from the exports of leather manufacturers increased by only 34 per cent in 1973, in spite of the 48 per cent rise in unit value, owing to the 9 per cent decline in volume. Moreover, such earnings declined absolutely in 1974 by 18 per cent because of the 30 per cent decline in volume, though unit value realised small rises of 16 per cent. In 1975, earnings recovered by 23 per cent in 1975 owing to the increases in volume of 26 per cent, but at the time of slackened demand, unit value declined by 3 per cent.

The increases in Kenya's export earnings from basic manufactures in 1973 amounted to $9 million , or 38 per cent over the previous year. These were largely generated from the 34 percent rises in unit value, as quantum increased only by 6 per cent. Increases of earnings reached its peak in 1974 at 49 per cent when volume increased by 15 per cent and unit value by 31 per cent. During the 1975 recession, earnings absolutely declined by 5 per cent below 1974 level owing to the 19 per cent falls in quantum, though unit value rose further by 45 per cent.

Export earnings from the most important items of basic manufactures of Kenya stagnated or even declined during the 1973 peak. Export earnings from the exports of cement and metal containers stagnated during 1973, as their unit values rose slightly by 5 and 4 per cent over the previous year, while their volume declined by 4 and 3 per cent respectively, below the previous year. Demand for these items in 1974 was stronger than in 1973. This can be explained by the fact that Kenya's exports of manufactures

are directed to developing countries which came to use their import capacities in 1974 which were enhanced by foreign exchange accumulated during 1973 boom. Thus, in 1974 unit values of both cement and metal containers rose by 40 per cent and the volumes of their exports increased by 18 and 39 per cent respectively. During that year, export earnings from cement and metal containers rose by 66 and 93 per cent respectively, over the previous year. During 1975, the export volume of cement rose slightly by 3 per cent, whereas that of metal containers declined absolutely by 53 per cent. During that year, export earnings from cement decelerated at 32 per cent, while those from the exports of metal containers absolutely declined by 36 per cent below 1974 level.

The significant increases in export earnings during 1973 boom were only obtained from the export of base metals where earnings rose by 302 per cent over 1972 level owing to the rise in both unit value and volume by 86 and 116 per cent respectively. However during 1974, the rise in export earnings from the exports of base metal halted to 101 per cent, as the increases in both unit value and volume slowed down at 40 and 43 per cent respectively. During 1975 recession, export earnings declined absolutely by 59 per cent below 1974 level, despite the 17 per cent rise in unit value, when export volume declined by 66 per cent.

Export earnings from the exports of paper manufactures declined sharply by 41 per cent in 1973 below 1972 level. Earnings showed partial recovery during 1974 when they rose by 30 per cent. However, the rise in earnings slowed down in 1975 to 7 per cent.

The Exports of Machinery and Transport Equipment

Exports of machinery and transport equipments are relatively more important in India, accounting for about 5 per cent of total exports during the 1970s, than in both Pakistan and Kenya where such exports represented 0.7 and 1.5 per cent respectively of total exports. In general, variations of world demand were reflected more in changes of volume than of unit value. Table 6-7 shows the year-to-year changes in unit value and quantum indices as well as changes in export earnings in current U.S. $ of the exports of machinery and transport equipments of India, Pakistan and Kenya during the period 1971-75.

During the 1973 peak, the 30 per cent increases of earnings from the exports of machinery and equipments from India basically originated from the 19 per cent rises in quantum, as unit value only increased by 12 per cent. However, earnings peaked in 1974 when they increased by $94 million., or 67 per cent over the previous year. Such increases came from the 110 per cent rises in volume, as unit value declined by 6 per cent. In 1975, the increases of earnings slowed down to 26 per cent, which originated from the 30 per cent rises in unit value, since quantum only increased by 3 per cent.

The Exports of Miscellaneous Manufactured Goods

Such group of manufactured goods consists of consumer goods which have been developed within the context of export promotion policies through industrialisation. In general, such class of manufactured goods suffered less than primary products during world economic recession, since they are mostly exported to developing countries whose fluctuationswere less violent

Table 6-7

The Year-to-Year Changes in the Exports of Machinery and Transport Equipment (SITC-7) of India, Pakistan and Kenya, 1971-75.

	Changes from the Preceding Year in the Index Numbers of: (1970 = 100)		Exports F.O.B.		
	Unit Value	Quantum	Millions of Current US $	Changes from the Preceding Year	
					%
India					
1971	- 5.9	+ 1.9	95.8	+ 2.2	+ 2.4
1972	+ 3.3	+ 5.8	107.3	+11.5	+12.0
1973	+11.8	+19.0	139.9	+32.6	+30.4
1974	- 5.7	+110.1	233.4	+93.5	+66.8
1975	+30.1	+ 2.7	293.2	+59.8	+25.6
Pakistan					
1971	+ 3.7	+42.6	2.7	+ 0.5	+22.7
1972	+54.3	+ 8.4	2.8	+ 0.1	+ 3.7
1973	+55.5	-12.5	7.4	+ 4.6	+164.3
1974	+46.1	-31.0	8.7	+ 1.3	+17.6
1975	+51.5	-48.2	9.2	+ 0.5	+ 5.7
Kenya					
1971	+16.1	- 4.3	0.7	+ 0.2	+40.0
1972	+15.1	-23.0	0.6	- 0.1	-14.3
1973	+23.6	+24.9	1.1	+ 0.5	+83.3
1974	+27.5	+ 6.7	1.0	- 0.1	- 9.1
1975	+41.8	-20.1	2.5	+ 1.5	+150.0

Source: See footnotes Table 6-1.

than those originating in the industrial countries. Table 6-8 shows the year-to-year changes in unit value and quantum indices as well as changes in export earnings in current U.S. $ of the exports of miscellaneous manufactured goods of India, Pakistan and Kenya during the period 1971-75.

During the boom of 1973 increases of India's earnings from miscellaneous manufactured goods peaked at 51 per cent mainly because of the 43 per cent rises in volume since unit value increased by 14 per cent only. In 1974 the rise in earnings slowed down to 34 per cent which could be explained by the slight deceleration in volume at 42 per cent, though unit value rose by 17 per cent. During 1975, despite the further rises in volume by 46 per cent, the increases in earnings showed 27 per cent owing to the slow down of the rise in unit value by 12 per cent.

Increases of Pakistan's earnings peaked in 1973 by an increase of 59 per cent because of the significant increase of unit value of 163 per cent and also the 35 per cent rises in volume. Slackened demand, causing the rise in unit value to halt at 72 per cent, was the main reason for the slow-down of the earning increases to only 29 per cent in 1974. The further slowdown of unit value to only 27 per cent in 1975 led to the deceleration of export earning increases at 8 per cent, since volume rose to over 70 per cent.

The increases of Kenya's export earnings from miscellaneous manufactured goods in 1973, amounting to 46 per cent, originated from the 40 per cent rises in unit value caused by the world inflation, as quantum stagnated. In 1974, the increase in earnings decelerated by 15 per cent as quantum declined by 4 per cent and the rise in unit value slowed down at 17 per cent. The further decline of 18 per cent in quantum in 1974 led to an absolute decline of 21 per cent in earnings, despite the 41 per cent rises in unit value.

Table 6-8

The Year-to-Year Changes in the Exports Miscellaneous Manufactured Goods (SITC-8) of India, Pakistan and Kenya, 1971-75.

	Changes from the Preceding Year in the Index Numbers of: (1970 = 100)		Exports F.O.B.		
	Unit Value	Quantum	Millions of current US $	Changes from the Preceding Year	
					%
India					
1971	- 7.0	+ 14.0	107.4	+ 10.3	+ 10.6
1972	+ 3.9	+ 26.8	138.4	+ 31.0	+ 28.9
1973	+ 14.1	+ 42.8	209.6	+ 71.2	+ 51.4
1974	+ 17.1	+ 41.7	280.6	+ 71.0	+ 33.9
1975	+ 12.3	+ 45.8	355.8	+ 75.2	+ 26.8
Pakistan					
1971	+ 26.4	+ 15.5	37.0	+ 10.3	+ 38.6
1972	+101.9	+ 12.5	42.8	+ 5.8	+15.7
1973	+163.0	+ 34.8	68.1	+ 25.3	+ 59.1
1974	+ 72.0	+ 33.5	87.8	+ 19.7	+ 28.9
1975	+ 26.6	+ 72.0	94.6	+ 6.8	+ 7.7
Kenya					
1971	+ 9.8	+ 8.2	24.2	+ 2.7	+ 12.3
1972	+ 13.2	-42.2	18.3	- 6.3	- 25.6
1973	+ 39.5	+ 0.0	26.7	+ 8.4	+ 45.9
1974	+ 16.5	- 4.3	30.8	+ 4.1	+15.4
1975	+ 40.6	- 18.4	24.5	- 6.3	-20.5

Source: See footnotes Table 6-1.

Summing up, the analysis of the year-to-year changes in the exports of India, Pakistan and Kenya, by commodity groups and by items, during the first half of the 1970s has indicated that the three countries could not participate effectively in the gains from trade resulting from the 1973 commodity boom, especially in the case of India and Kenya, though their export earnings suffered the consequences of the slackened demand in 1974 and the recession of 1975. With few exceptions the benefits from the commodity boom were limited by both domestic and external factors. Firstly, India and Kenya and, to some extent, Pakistan are not exporters of food grains whose prices rose substantially in the world markets during 1973-1974. The major export items, particularly of India and Kenya, being by-passed by the commodity boom, did not fetch high prices in the world markets. Secondly, for export items which realised high prices, India, Pakistan and Kenya missed the opportunity of exploiting the upsurge in the world markets owing to domestic conditions. In the three countries, the supply of exports were constrained by unfavourable domestic factors imposed by natural hazards: the harmful consequences of the monsoon in India, floods and diseased plants in Pakistan, and dry weather and drought in Kenya. Thirdly, the good performances recorded by other export items, in terms of their unit value realisation and export volumes, as with the case of India, were only caused by occasional disruptions in world supplies so that the substantial gains from such items ceased when the traditional producing areas resumed their normal levels of outputs.

Moreover, the domestic factors, which constrained the supply of the exports of primary products, limited the benefits from the exports of basic manufactured goods whose production depended on the domestic raw materials

as principal inputs, particularly in the case of India and Pakistan. Except for Pakistan whose exports of basic manufactured goods realised a high unit value, increases in exports earnings from basic manufactures originated more from the increases in unit values which reflected rapid increases in world price levels. For other manufactured goods, the rise in export earnings resulted more from the increases in export volumes rather than from the rise in unit values.

The commodity boom came to an end in 1974 and the world economy moved simultaneously into recession in 1975. Export earnings of Pakistan decelerated faster than those of India, whereas Kenya's export earnings declined absolutely. The slackened world demand was reflected in the reductions of export earnings particularly from primary products. Export earnings from the exports of raw materials were more responsive to the decline in world economic activity than export earnings from foodstuffs during the world recession. In the case of basic manufactured goods, the decline in export earnings, in general, was generated from the effects on export volume which fell faster and larger than those in unit value. Only in the case of miscellaneous manufactured goods, could India and Pakistan maintain their export volumes, since such exports went to other developing countries, which were less vulnerable to economic fluctuations than industrial countries.

1.2 Changes of Export Earnings by Market

The theoretical analysis advanced in chapter 5 concluded that the effects of OECD's recession during 1974/75, induced partly by the deflationary impact of the oil price increases, were transmitted through reductions in their imports from LDCs which generated the largest

proportion of their export earnings from OECD market. Against such effects, the oil-induced rise in income of OPEC countries has boosted their imports from the rest of the world including the oil-importing developing countries. However, the expansion of developing countries' exports to the OPEC market is limited by the pattern and regional distribution of OPEC import expenditures. According to the Brookings Institution's estimates(1), about 85 per cent of the incremental expenditures of OPEC on imports, during 1974-77, would be made in the OECD countries, as the latter are normally the predominent source of supply, on the one hand, and the former concentrate heavily on their incremental expenditures on industrial and military equipment and technical services. Apart from OECD and OPEC markets, the exports of developing countries to other LDCs and centrally planned countries, though they were not affected directly by oil crisis, changed as a response to changes in the world economy as a whole.

To indicate the relative importance of each export market during 1971-75, Table 6-9 disaggregates export earnings of India, Pakistan and Kenya into the four markets which represent the economic areas of the world, namely, OECD, OPEC, LDCs and CPCs. Traditionally, OECD is considered the most important market for LDCs exports, generating about one-half of the export earnings of each of the three countries. The large dependence on OECD market has made the three countries vulnerable to economic fluctuation in the area. As a result of the 1973 boom, the share of the OECD market in the three countries' exports increased between 1972 and 1973 from 54 to 57 per cent for India and from 47 to 48 per cent for Kenya, while it declined from 50 to 47 per cent for Pakistan

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(1) Fried and Schultze, op.cit., Table 1-3, p. 13.

Table 6-9

Direction of Exports of India, Pakistan and Kenya, 1971-75

(in percentage of total exports)

Market Country	Industrial Countries	Oil-Exporting countries	Developing countries	Centrally Planned Countries
	OECD	OPEC	LDCs	CPCs
India				
1971	54.5	5.8	19.0	20.7
1972	53.8	5.6	17.7	22.9
1973	56.6	5.8	17.1	20.5
1974	52.4	12.7	15.9	19.0
1975	47.0	17.6	17.3	18.1
Pakistan (a)				
1971	50.7	10.1	24.8	14.4
1972	50.4	11.5	25.2	12.9
1973	47.0	19.3	28.5	11.2
1974	41.3	27.2	25.1	5.9
1975	37.7	23.5	31.3	7.5
Kenya (b)				
1971	40.1	2.0	47.2	2.5
1972	46.9	1.6	41.7	2.2
1973	48.1	1.7	42.3	2.3
1974	44.6	1.7	42.7	1.8
1975	41.5	2.0	44.4	1.4

Source: Calculated from International Monetary Fund, Direction of Trade, Annual, No. 12, IMF, Washington, D.C., 1977, India, pp. 145-6; Pakistan, pp.208-9; Kenya, p. 165.

Note: (a) Exports of West Pakistan for 1970 and 1971 are obtained from Government of Pakistan. Pakistan Basic Facts, op.cit. Table 15.7, pp. 150-1.

(b) Columns do not add up to 100 because of the undistributed and special categories of exports.

as the expansion of its exports was directed to other markets. As the level of economic activity slowed down in 1974 in OECD area, its share in the exports of the three countries declined to 52 per cent for India, 41 per cent for Pakistan and to 45 per cent for Kenya. During the 1975 recession, the share declined further to 47 per cent for India, 38 per cent for Pakistan and to 42 per cent for Kenya.

Against the decline in OECD shares in the three countries' exports, there was an expansion of their exports to OPEC, though it was limited to the exports of both India and Pakistan owing to their traditional accesses to the Middle Eastern OPEC countries. The share of OPEC market in Indian exports increased slightly to 6 per cent in 1973, but greatly to 13 per cent in 1974 and further to 18 per cent in 1975. For Pakistan, the share rose from 12 per cent in 1972 to 19 per cent in 1973, and increased further to 28 per cent in 1974, though it declined in 1975 to 24 per cent. Unlike India and Pakistan, OPEC is an insignificant market for Kenyan exporters, as its share remained at less than 2 per cent until 1974 and increased slightly in 1975.

Despite the impact of the shocks of higher oil costs and OECD recession on the oil-importing developing countries, their shares in the exports of the three countries had demonstrated more stability relative to those of OECD, and rose even more during 1975 recession. The share of LDC s in Indian exports declined slightly from 18 per cent in 1972 to 17 per cent in 1973 and to 16 per cent in 1974 before it increased again to 17 per cent in 1975. In the case of Pakistan, the share increased from 25 per cent in 1972 to 29 per cent in 1973 before it declined to 25 per cent in 1974 and rose again to 31 per cent in 1975.

Kenyan exports to LDCs are more important than those of India and Pakistan where the share increased to 42 per cent in 1973, to 43 per cent in 1974 and further to 44 per cent in 1975.

Whenever exports to CPCs constitute a considerable proportion of total export earnings of non-communist developing countries, they are always stimulated, on political grounds, by"agreements of trade and payments" which could be a part of a general "treaty of friendship and co-operation", and they usually vary independently from variations of economic activities in CPCs markets. For all the three countries, the shares of CPCs market in their exports declined continuously during the first half of the 1970s. Between 1971 and 1975 the share declined from 21 to 18 per cent for India, from 14 to 8 per cent for Pakistan and from 3 to 1 per cent for Kenya.

The Effects of Economic Fluctuations by Market

During a period of economic fluctuations, exports to a certain market depend, among other things, on the variations of income and economic activity in the market in question. The extent to which a country's exports to a certain market, being reflected in market share, are hit by a recession or expanded by a boom can be measured by the changes in their growth relative to the growth of the exports of the rest of the world to the same market. Whether a country experiences an increase, no change, or decrease in its share depends on whether its "relative growth factor",(1) R, exceeds, equals, or is less than unity: $R = \frac{(1+gk)}{(1+gw)}$, where gk is the proportional growth rate of a country's exports into a certain market and gw is the proportional growth rate of world exports to the same market.

Accordingly, Table 6-10 shows the relative growth factor of export earnings by markets calculated from data on the export earnings, in current U:S. $ of both the three countries and the rest of the world from the markets of

(1) S.P. Magee, "Prices, Incomes and Foreign Trade", in P.B. Kenen, (ed.), International Trade and Finance - Frontiers for Research, Cambridge University Press, London, 1975, Appendix B, p. 240.

Table 6-10

The Relative Growth Factors of Exports by Market for India, Pakistan and Kenya, 1971-75. (Change factor of market share in percentage)

	OECD	OPEC	LDCs	CPCs	Total
India					
1971	0.943	0.735	0.949	1.005	0.934
1972	0.955	0.904	0.968	0.997	0.973
1973	0.921	0.875	0.827	0.717	0.868
1974	0.854	1.581	0.772	0.850	0.896
1975	1.017	1.002	1.182	0.583	1.087
Pakistan					
1971	1.321	1.049	1.264	1.180	1.262
1972	0.956	1.057	1.048	0.800	0.967
1973	0.946	1.648	1.126	0.373	1.805
1974	0.721	0.928	0.648	0.935	0.799
1975	0.870	0.514	1.134	0.965	0.913
Kenya					
1971	0.856	1.276	0.964	1.307	0.924
1972	1.114	0.745	0.907	0.771	0.961
1973	0.981	0.972	0.949	0.932	0.947
1974	0.827	0.707	0.806	0.701	0.866
1975	0.939	0.732	1.003	0.633	0.967

Source: Calculated from IMF, Direction of Trade, op.cit., World and Regional Tables, pp.2-55.

OECD, OPEC, LDCs and CPCs during 1971-75. The relative growth factors of the exports of India, Pakistan and Kenya to OECD during 1973's boom, amounting to 0.921, 0.946 and 0.981 respectively, were less than unity, indicating that their exports were unable to keep pace with the growth of world exports to OECD and their shares, therefore, had declined. Moreover, their positions in 1973 were worse than those of 1972 where growth factors were larger, amounting to 0.955, 0.956 and 1.114 respectively. Furthermore, the performances of their exports were even worse during the slackened demand of 1974 as the growth factors of India, Pakistan and Kenya declined further to 0.854, 0.721 and 0.827, indicating that their export earnings from OECD were decelerating faster than those of the rest of the world from that market. During 1975 the relative growth factors of Pakistan and Kenya increased slightly, though they were still below unity, while those of India slightly exceeded unity which indicates that export earnings of India from OECD were decelerating slower than the world export to that market. In general, export earnings of Pakistan and Kenya did relatively better in the boom than India, which only did better in the recession.

India and,to some extent, Pakistan, participated in the expansion of the OPEC market, depending on their traditional access to the market. During 1973, export earning of India from the OPEC market lagged behind the world exports as its growth factor amounted to 0.875 while those of Pakistan were growing faster than world exports since its growth factor amounted to 1.648. In 1974, India's export earnings were growing 1.5 times as much as the growth of world exports to OPEC while those of Pakistan slightly lagged behind. During 1975, while Pakistan had lost a great deal of the OPEC market as its factor growth declined to 0.514, India's export earnings, though they were growing more slowly than in 1974, were still growing slightly faster than world exports as its factor growth amounted to 1.002. In the case of Kenya its exports did not benefit from the expansion of the OPEC market since the growth factor only amounted to 0.707 in 1974 and 0.732 in 1975.

The growth of export earnings of the three countries during 1973 from the LDCs market only exceeded that of the world in the case of Pakistan whose growth factor amounted to 1.126, whereas export earnings of Kenya were growing slightly slower than those of the world and India's earnings lagged behind. During 1974, despite the deceleration in world exports to LDCs, export earnings of the three countries from such market were reduced even more as their growth factors declined by 0.772 for India, 0.648 for Pakistan and 0.806 for Kenya. During 1975, while the world exports to LDCs were declining the exports of the three countries were only decelerating as their growth factors exceeded unity, amounting to 1.182, 1.134 and 1.003 respectively.

The relative growth factors of export earnings for CPCs maket have not resulted from the performance of exports of the three countries, rather they stem from the nature and flexibility of bilateral agreements with centrally planned countries. For example, CPCs keep off the exports of a developing country for quite long periods whereas during other periods they resort to relatively large purchases of certain commodities when they find good bargains or due to the assessment of the stock and demand position.(1) Therefore, the pattern of the growth of the export earnings relative to world exports to CPCs, market is different. While growth factors of Indian exports amounted to 0.717 in 1973, 0.850 in 1974 and to 0.583 in 1975, Pakistan growth factors amounted to 0.373, 0.935 and 0.965 respectively.

Kenya's export earnings from the boom in OECD increased more than Pakistan and India, though the latter suffered less during

(1) R.H. Patil, "Emerging Possibilities in India's Bilateral Trade", Economic and Political Weekly (March 5, 1977), p.433.

the recession. Unlike Kenya, India and Pakistan benefitted from the expansion of OPEC market, though India could maintain a consistent rise in its export earnings relative to Pakistan. The LDCs market played an important role in stabilising the export earnings of the three countries during a period of recession when their export earnings from the industrial countries slowed down or even declined. Finally export earnings from CPCs markets are governed by the bilateral trade more than by the state of the economic activity or market forces.

Table 6-11 shows the year-to-year changes in export earnings of the three countries by market in millions of current U.S. $ and the percentage changes from the proceeding year. The increases in export earnings of the three countries from OECD market peaked in the 1973 boom at 27 per cent for India, 31 per cent for Pakistan and 36 per cent for Kenya, amounting to $359, $105 and $60 million, respectively. The slowdown of OECD demand in 1974 led to the deceleration of the export earnings of the three countries at 22, 3 and 18 per cent and the increases in their export earnings only amounted to $365, $13 and 41 million. By 1975 recession, while earnings of India levelled off at 0.6 per cent, those of Pakistan and Kenya absolutely declined by 14 and 7 per cent respectively.

The expansion of Pakistan's exports to OPEC countries started early in 1973, helped by the devaluation of the Rupee, when export earnings rose by $106 million or 136 per cent. In that year, India's export earnings rose by $35 million, or by 26 per cent, while the 40 per cent rises in Kenyan export earnings added only $2 million. In 1974, India's earnings increased by $320 million owing to their acceleration at 186

Table 6-11

The Year-to-Year Changes in Export Earnings by Market for India, Pakistan and Kenya, 1971-75.

(in millions of current US $ and percentage change from the preceeding year)

	OECD		OPEC		LDCs		CPCs	
		%		%		%		%
India								
1971	+56.3	+5.2	-15.4	-11.2	+17.2	+4.5	+27.2	+6.6
1972	+166.0	+14.4	+14.5	+11.8	+31.3	+7.8	+121.4	+27.7
1973	+359.4	+27.3	+35.4	+25.8	+72.1	+16.7	+48.5	+8.7
1974	+365.3	+21.8	+320.3	+185.6	+116.1	+23.1	+132.1	+21.7
1975	+11.7	+0.6	+273.1	+55.8	+137.9	+22.3	+49.4	+6.7
Pakistan								
1971	+96.1	+47.3	+16.5	+38.3	+41.2	+39.1	+17.1	+25.1
1972	+43.2	+14.4	+18.2	+30.5	+24.5	+16.7	+2.6	+3.1
1973	+105.2	+30.7	+105.7	+136.1	+100.3	+58.7	+38.5	+43.8
1974	+12.6	+2.8	+125.7	+68.5	+8.9	+3.3	+16.5	+33.5
1975	-64.6	-14.0	-61.8	-20.0	+48.6	+17.3	+13.3	+20.2
Kenya								
1971	-6.0	-4.5	+2.2	+53.7	+8.6	+6.2	+2.2	+38.6
1972	+42.2	+33.4	-0.5	-7.9	+1.6	+1.1	-0.1	-1.3
1973	+59.8	+35.5	+2.3	+39.7	+50.6	+33.8	+3.1	+39.7
1974	+40.8	+17.9	+2.3	+28.4	+57.0	+28.4	+0.0	+0.0
1975	-19.3	-7.2	+1.4	+13.5	+18.7	+7.3	-2.3	-21.1

Source: Calculated from data for each country, see footnote Table 6-9.

per cent while those of Pakistan started to declerate at 69 per cent. During 1975, while India's export earnings decelerated by only 56 per cent, increasing by only $273 million, those of Pakistan absolutely declined by $62 million, or by 20 per cent. Kenyan exports to OPEC were insignificant in absolute terms as earnings increased by only $2 million in 1974 and by $1 million in 1975.

Although export earnings from LDCs market exhibited the common pattern of up- and downswing during the first half of the 1970s, they demonstrated more stability than those of OECD. During 1973, earnings from LDCs market rose significantly in Pakistan and Kenya by 59 and 34 per cent, amounting to $100 and $51 million, respectively. In that year, India's increases in its earnings, rising by 17 per cent, amounted to $72 million. During 1974, India's earnings accelerated at 23 per cent and Kenya's earnings slightly slowed down at 28 per cent while those of Pakistan decelerated strongly at 3 per cent. During the 1975 recession, the increases in India's earnings maintained their rise at 22 per cent and those of Pakistan recovered at 17 per cent while those of Kenya slowed down at 7 per cent.

India's export earnings from CPCs fluctuated widely and varied independently from the variations in income inside such a market. Export earnings slowed down at 9 per cent in 1973, accelerated at 22 per cent in 1974 before they decelerated again at 7 per cent in 1975. Pakistan's export earnings followed the same course of up- and downswings in the world economy, accelerating at 44 per cent in 1973, decelerating in 1974 and 1975 at 34 and 20 per cent, respectively. In the case of Kenya, the acceleration of earnings at 40 per cent in 1973 was followed

by a complete levelling off in 1974 and then declined absolutely by 21 per cent in 1975.

The Implications for Trade Balances by Market

Table 6-12 shows trade balances of the three countries in current U.S. $ during the period 1971-75 by export market. Clearly, changes in export earnings from the OECD market, growing slower than those of the world during a boom and decelerating faster during a recession, indicate that the three countries have exhibited export maximums which could rule out the possibility of achieving external balance when they are combined with import minimum. This seems inconsistent with the "theory of comparative advantage",(1) whose implications for external balance are based on an assumption whose main condition, in Linder's view, may not be met: "the general level of absolute productivity is high enough to allow the production of sufficient amount of goods which are, in effect, demanded abroad."(2) In his survey of the theory of comparative advantage, R.M.Stern (3) indicated that, apart from the exports of primary products which are determined by differences in factor endowments, LDCs exports of manufactured and semi-manufactured goods may be deterred by differences in technological advances and scale economies as well as market impediments and imperfections and demand influences.

In 1973, deficits of the trade balances of the three countries with OECD deteriorated by $301 million for India, $131 million for Pakistan and $15 million for Kenya, reaching $400, $221 and $226 million ,

(1) The comparative cost doctrine in the context of development economics has been surveyed by H.B. Chenery,"Comparative Advantage and Development Policies," American Economic Review, Vol.51, No.1 (March 1961) pp.18-51.
(2) Linder, op.cit., p.36
(3) See. R.M. Stern, "Testing Trade Theories", in P.B. Kenen(ed.), International Trade and Finance - Frontiers for Research, Cambridge University Press, London,1975,pp.3-49.

Table 6-12

Trade Balances by Export Market for India, Pakistan and Kenya, 1971-75

(in millions of current U.S.$)

	OECD	OPEC	LDCs	CPCs	Total
India (a)					
1971	-445.7	-105.0	+102.1	+161.4	-299.6
1972	-101.6	-114.9	+133.3	+301.1	+207.9
1973	-400.9	-250.4	+97.5	+283.2	-275.4
1974	-459.6	-817.3	+210.6	-97.0	-1175.1
1975	-1744.0	-525.4	+380.9	+63.4	-1833.7
Pakistan (b)					
1971	-170.8	+9.4	+108.2	+5.8	-47.5
1972	-89.1	+24.1	+58.3	+19.6	+12.9
1973	-220.5	+97.7	+155.2	-54.5	-22.2
1974	-692.7	+39.8	+98.3	-69.8	-624.3
1975	-890.8	-182.0	+84.8	-89.9	-1077.9
Kenya (a)					
1971	-279.2	-33.5	+53.0	-10.3	-246.1
1972	-210.7	-43.0	+66.0	-5.8	-175.8
1973	-225.8	-47.1	+112.4	-4.5	-142.1
1974	-387.6	-188.6	+135.0	-29.8	-423.4
1975	-346.1	-206.9	+164.3	-1.1	-336.8

Source: Calculated for each country, See footnote Table 6-9.

Note (a) Columns do not add up owing to the undistributed exports and imports which are excluded.

(b) Exports and imports of 1970 and 1971 for West Pakistan are taken from Government of Pakistan, Pakistan Basic Facts, op.cit., Table 15.7, pp.150-1.

respectively, Deficits in 1974 deteriorated further by $59, $472 and $162 million to reach $460 million for India, $693 million for Pakistan and $388 million for Kenya. In 1975, deficits of the three countries amounted to $1744, $891 and $346 million , deteriorating by $1284 and $198 million for India and Pakistan, respectively, and slightly improving by $42 million for Kenya.

The limits on the exports of LDCs to OECD, whether they are caused by structural factors or short-run variations, are not applicable to the three countries' exports to LDCs as well as the members of OPEC which are still part of the Third World by their basic characteristics despite the high levels of their per capita incomes. Taking into account the absence of import minimum from the trade pattern with these countries, the three countries, sustaining a relatively higher level of industrialisation, can progressively maintain surplusses on their balances of trade with other LDCs; and could achieve an external balance with OPEC if the latter's markets could be successfully penetrated, particularly, in the long-run, giving the similarity of demand structures between the three countries and both the rest of LDCs and OPEC in terms of factor contents. Basing his view on the "theory of representative demand," Linder(1) argued that trade in manufacturers between countries with similar per capita incomes and consumption pattern would be larger than between countries with dissimilar per capita incomes. According to this theory, the more the demand for particular products is typical of the economic structure of one particular country, the lower the relative price of this product is likely to be and the more advantageous

(1) Linder, op.cit., pp.122-39.

is its production function. Comparing the relative commodity composition of the exports and imports vectors of countries with different economic structures, as distinguished by GDP per capital, Hufbauer,(1) found that, as the poor countries get richer, their trade vectors can be expected to become more similar.

The magnitude of the deficits on trade balances with OPEC were too large to be eliminated, though they could be reduced substantially through the expansion of exports of both India and Pakistan. Deficits on trade balances with OPEC in 1973 amounted to $250 million for India and $47 million for Kenya, deteriorating by $136 and $ 4 million over the previous year. For Pakistan, its surplus with OPEC, improving by $74 million, amounted to $98 million in the same year. In 1974, while India and Kenya incurred deficits with OPEC amounted to $817 and $189 million respectively, Pakistan realised a surplus of $40 million. In that year, the deterioration of their trade balances amounted to $567, $38 and $142 million, respectively. In 1975, the combinations of the rise in exports to OPEC and slight decline in oil import reduced the deficit of India to $525 million . During the same year, the reduction in Pakistan exports to OPEC, combined with increased oil imports, resulted in a deficit of $182 million . In the case of Kenya, its deficit deteriorated further by $18 million reaching $207 million in 1975.

Trade balances with the rest of LDCs are always in surplus, improving progressively, particularly, those of India and Kenya. Surplus from

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(1) See. G.C. Hufbauer, "The Impact of National Characteristics and Technology on the Commodity Composition of Trade in Manufactured Goods" in R.Vernon(ed.) ,The Technology Factor in International Trade Columbia University Press, New York, 1970,pp.145-231.

trade with LDCs in 1973 amounted to $98 million for India, $155 million for Pakistan and $112 million for Kenya. During that year, while the trade balance of both Pakistan and Kenya improved by $97 and $46 million respectively, that of India deteriorated by $36 million. Throughout 1974 and 1975, the surplusses with LDCs amounted to $211 and $381 million for India, $98 and $85 million for Pakistan and $135 and $164 million for Kenya. During these two years, trade balance improved by $113 and $170 million for India and by $23 and $29 million for Kenya, while it deteriorated by $57 and $13 million for Pakistan.

The patterns of trade balance with CPCs differ among the three countries, depending on the scope and coverage of the bilateral agreements with U.S.S.R. and other East European countries. For example, Indian exports to U.S.S.R. are linked to the development plan so that they have not only been bartered for current imports but also used to service debts incurred to finance development projects and defence equipments.(1) Therefore, India's trade balance, with CPCs fluctuated from a surplus of $283 million in 1973 to a deficit of $97 million in 1974 and again to a surplus of $63 million in 1975. In the case of Pakistan, the deficit deteriorated from $55 million in 1973 to $70 million in 1974 and further to $90 million in 1975. The deficits on Kenya's balance of trade increased from $5 million in 1973 to $30 million in 1974 and then it decreased to $1 million in 1975.

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(1) M. Sebastian, Soviet Economic Aid to India, NV Publications, New Delhi, 1975, pp.145-50.

Summing up, the balances of trade of the three countries with the rest of the world sharply deteriorated during the period 1973-75. Large proportions of the resulting deficits were originated on the trade balances with the OECD countries because of the simultaneous existence of export maxima and import minima. Most of the remaining deficits, originating on the trade balances with OPEC, could be reduced, though not eliminated, when the country's exports have access to OPEC markets. Exports to LDCs were acting as a stabilising factor since the resulting surplusses mitigated, though not compensated, the large deficits on trade balance with OECD which were aggravated by the declines in export earnings during the 1975 recession. The increases of export earnings from CPCs and the changes of trade balances, being stimulated by political reasons, are significant in India and, to a lesser extent, in Pakistan.

1-3 The Capacity of Export Earnings for Financing Oil Payments

A country exports part of its national output to acquire means to pay for its requirements of the imported goods and services. The proportions of the export earnings that each of the three countries had to part with in order to finance the net oil import bills during the period 1970-75 are shown as follows:(1)

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(1) Calculated from Tables 4-2 and 6-1.

	1970	1971	1972	1973	1974	1975
India	7.5	16.8	10.3	13.1	37.0	30.4
Pakistan	15.1	11.4	6.2	8.9	22.6	31.7
Kenya	6.7	7.9	9.0	7.6	21.1	25.8

Oil payments, as percentages of export earnings, during 1970/72 were averaging 12, 11 and 8 per cent for India, Pakistan and Kenya respectively. Such proportions decreased in 1973, to about 9 and 8 per cent for both Pakistan and Kenya respectively owing to the relatively large rises in their export earnings, while they increased to 13 per cent for India owing to the insignificant increases in its export earnings during that year. In 1974, net oil import bills amounted to 37, 23 and 21 per cent of the total export earnings of India, Pakistan and Kenya respectively. Such proportions declined in 1975 to 30 per cent for India because of the small declines in oil imports and slow deceleration of its export earnings while those of Pakistan and Kenya rose to about 32 and 26 per cent respectively owing to the rise in oil imports and decline in their export earnings.

In fact, the threat to the external payments came not so much from the need to part with large proportions of the export earnings as from the unfavourable conditions of both domestic and international economy which deterred the capacities of the three countries to affect the transfer of oil payments. The capacity of the three countries to generate additional export earnings to meet the incremental oil payments were limited by both domestic constraints on the supply of exports and the slackened demand caused by the stagnation of the world economy during 1974/75.

Table 6-13 shows the capacity of exports of the three countries to meet the additional oil costs during 1974 and 1975 from the incremental export earnings. The negative sign in Column 3 indicates the portion of the additional oil costs which could not be met by the incremental earnings in the same year. Incremental export earnings of India during 1974 and 1975 fell short from covering its additional oil costs, leaving about one-fifth of such costs uncovered in both years. In Pakistan, about two-fifths of 1974's additional oil costs and three-quarters of those of 1975 were left uncovered by export earnings. This can be attributed to the rise in the costs of oil imports and the fast deceleration of its earnings. Kenya's export earnings in 1974 were able to cover twice as much as its additional oil bills. However, the absolute declines of its export earnings in 1975, left the additional oil bills without finance. As a result, despite the fact that the exports of all the three countries were hit by the stagnation of world economy during 1974/75, India, being able to finance four-fifths its additional oil costs from incremental export earnings, was still in a better position than both Pakistan and Kenya.

2 - The Effects on the International Liquidity

A country fails to attain its external balance when its current export earnings are not large enough to meet the full amount of oil import bills, assuming that net capital inflows fall short of meeting the current account deficit. However, balances of oil import bills uncovered by current exports can be paid for through foreign exchange holdings, i.e. assets previously accumulated and currently possessed, reflecting past surplusses and anticipated deficits. The country's

Table 6-13

The Capacities of the Exports of India, Pakistan and Kenya for Financing their Additional Oil Costs in 1974 and 1975.

(in millions of current U.S.$)

	Changes of Export Earnings from the Preceding Year(1) (1)	Additional Oil costs (2) (2)	The Export Capacity (1) - (2) / (2) (3)
India			
1974	+779.5	988.0	-21.1
1975	+743.3	945.5	-21.4
Pakistan			
1974	+96.0	158.0	-39.2
1975	+54.9	256.9	-78.6
Kenya			
1974	+130.6	63.3	+106.3
1975	-11.1	91.8	-112.1

Source: (1) Table 6-1
(2) Table 4-4.

international reserves are defined as "all those assets of its monetary authorities that can be used, directly or through assumed convertibility into other assets, to support its rate of exchange when its external payments are in deficits."(1) Thus, reserves are generally defined gross, rather than net, to include total central bank holdings of gold, convertible foreign exchange, special drowing rights and reserves position in the IMF.

The country's reserves holding determines its international liquidity which describes the capacity of the national monetary authorities to command the foreign exchange they need to finance the balance of payments deficit and to support the value of their currency relative to other currencies without resorting to undesirable adjustment measures. Thus, international liquidity can be described simply as a synonym for international reserves, as"the sum of owned reserves and unconditional drawing rights."(2)

2-1 The Role of Foreign Exchange Reserves in Developing Countries - A Theoretical Background

According to the theory, the higher the level of reserves, the more utility the reserves yield, the greater the ability to finance external deficits, and the larger the possibility to obviate the

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(1) Group of Ten, Report of the Study Group on the Creation of Reserves Assets, 1965, Communique of Ministers and Governors and Reports of Deputies, 1966,p.12.

(2) F. Machlup and B.G. Malkiel (eds.), International Monetary Arrangements The Problem of Choice, International Finance Section, Princeton University, Princeton, N.J., 1964, p.31. Quoted from B.J. Cohen, "International Reserves and Liquidity", in P.B. Kenen (ed.), International Trade and Finance - Frontiers for Research, Cambridge University Press, London, 1975,pp.412-3.

necessity of making adjustment in domestic expenditures in the face of short-term external disequilibrium. Salant pointed out that finance and adjustment are related in an opposite direction so that the larger are a country's liquid assets, the less is the pressure on it to eliminate the deficit.(1) However, the size of reserves holdings to finance external deficits depends not only on the size of the expected disturbances, but also on the availability of automatic mechanisms which can efficiently redress balance of payments without resorting to import control and expenditure cuts. The more effective and quick these adjustment mechanisms work, the smaller are the total imbalances resulting from disturbances and the smaller are the cumulative changes in reserves needed for finance. A satisfactory payment adjustment is generally thought, according to Salant, "to require that disequilibria be eliminated by means other than the imposition of control over international transactions for the specific purposes of influencing the balance of payments."(2)

Instead of using, intensively, their own reserves (unconditional liquidity) to finance external deficits, the advanced economies may be able to use borrowed reserves (conditional liquidity) or they may be able to use interest rate changes (financial corrections) to attract private short-term capital inflows. Also, they may prefer, instead of expenditure-reducing techniques, to use expenditure-switching techniques (devaluations or selective restrictions) which are less costly in terms of national income foregone than domestic expenditure reductions.

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(1) W.S. Salant, "International Reserves and Payments Adjustment", Banca Nazionale Del Lavoro, Vol.22, No.90 (September 1969), p.283.
(2) Ibid., p.282.

In contrast, the motive of developing countries to hold reserves is . . . stronger than that of developed countries. Evidence of the efficiency of an adjustment mechanism in developing countries, which was discussed in chapter IV, indicates that the authorities are confined to a difficult choice of either using owned reserves or deflating the economy. Therefore, the role of reserves in developing countries is to act as leverage effect on capacity utilization that would be changed by shifts in foreign exchange earnings. According to Linder's re-interpretation of the conventional theory of international trade, the reason for which a developing country holds reserves is "to avoid waste of capacity due to changes in foreign exchange earnings - a waste that cannot be avoided, even if the country tried to adjust its expenditure policies to changes in foreign exchange earnings."(1) Justifying the large participation of developing countries in any scheme for increasing the international liquidity, P. Streeten pointed out that "the social costs of the alternative to reserves will tend to be higher than in rich countries."(2)

The high costs of adjustment are further reinforced in developing countries by the small size of their reserves which, by themselves, tend to remain permanently at a low level since, as Linder (3) explained, "It is easy to spend existing reserves, but not create them when they are needed." In their study of the behaviour of reserves of both developed and developing countries, Kenen and Yudin (4) found

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(1) Linder, op.cit.,p.112.
(2) Streeten,"International Monetary Reform and the Less Developed Countries," op.cit., p.170.
(3) Linder, op.cit. p.113.
(4) P.B.Kenen and E.B. Yudin, "The Demand for International Reserves," in P.B. Kenen and R.Lawerence (eds.), The Open Economy - Essays on International Trade and Finance, Columbia University Press, New York, 1968. p.344.

that the reserves of thirteen developing countries are small and their changes are hearly random relative to the developed countries in their sample; and that any enduring payments disturbances are usually met by changes in direct control.

Summing up, over and above the small size of their reserves holding, the only alternative to usingreserves to finance balance of payments deficits in developing countries is to cut imports and reduce domestic expenditures because of the limited possibility of adjustment process.

2-2 The Changes in Reserves During 1970-75

The rise in oil prices created a sense of reserves stringency as the oil-importing countries manifested strong demand for additional reserves in order to finance their prospective oil deficits. The feeling that international reserves are inadequate was aggravated by the declines in the real value of reserves caused by the depreciation of the reserve currencies and the speed-up in world inflation.(1) Most oil-importers took action to restrict imports, increase official borrowings, maximize access to the "oil facility" and to mobilize gold reserves at the highest possible price.(2) Oil payments were almost made by drawing on foreign exchange reserves which were transferred to OPEC countries.

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(1) D.I. Fand,"World Reserves and World Inflation," Banca Nazionale Del Lavoro, Vol.28, No.115 (December 1975),pp.359-65.

(2) IMF, Development in World Liquidity,1974 Annual Report, 1975, pp.41-6.

However, the fear of the shortage of world liquidity did not materialise as the stock of global reserves has increased rapidly since the early 1970's. Rapid monetary growth during 1971-73 under the fixed exchange regime, the move toward floating exchange rates in 1973 and the revaluation of official gold holdings tended to increase the stock of reserves. Nevertheless, the uneveness of their distribution and the benefits from commodity boom had left some individual developing countries short of what they needed to finance their current accounts deficits. Table 6-14 shows the change of foreign reserves of the three countries during 1970-75 and calculates the drains of foreign exchange which equal variations in reserves excluding net drawings from and repayments to IMF.

While India's foreign exchange reserves reached their lowest level of $1142 million in 1973, declining by $38 million, those of Pakistan and Kenya recorded their highest levels of $480 and $233 million respectively, increasing by $199 and $31 million. Tight fiscal and monetary policy in India during 1974 and slight deceleration of export earnings in 1975 added $183 and $48 million to its reserves which amounted to $1325 and $1373 million in these two years, respectively. In contrast, reserves of both Pakistan and Kenya declined in 1974 to $461 and $193 million, respectively, and declined further in 1975 to reach $406 and $173 million, respectively, which are considered to be the lowest levels in the first half of the 1970s.

During 1974/75, the pressures on the balance of payments induced by reductions in exports earnings, on the one hand, and the inflated import values of oil and other non-oil imports, on the other, resulted

Table 6-14

The Changes in Foreign Reserves of India, Pakistan, Kenya 1970-75.

	Total(1) Reserves Holdings (1)	Variation in Reserves (2)	Accrual of[1] Fresh SDR s (3)	Net(1) Transactions with IMF(a) (4)	Variation of Reserves Gross of transaction with IMF (2-3+4)
India					
1970	1006.0	+80.0	126.0	+179.0	+133.0
1971	1206.0	+200.0	100.9	+65.2	+164.3
1972	1180.0	-20.0	108.1	-	-128.1
1973	1142.0	-38.0	-	-	-38.0
1974	1325.0	+183.0	-	-689.4	-506.4
1975	1373.0	+48.0	-	-244.4	-196.4
Pakistan					
1970	190.0	-142.0	31.6	+28.4	-145.2
1971	189.0	-1.0	25.2	+1.9	-24.3
1972	281.0	+92.0	27.0	-74.9	-9.9
1973	480.0	+199.0	-	-23.8	+175.2
1974	461.0	-19.0	-	-132.2	-151.2
1975	406.0	-55.0	-	-165.6	-220.6
Kenya					
1970	219.8	+50.1	5.4	-	+44.7
1971	170.9	-48.9	5.1	-	-54.0
1972	202.0	+31.1	5.5	-	+25.6
1973	233.0	+31.0	-	-	+31.0
1974	193.3	-39.7	-	-53.4	-93.1
1975	173.4	-19.1	-	-44.3	-64.2

Source: (1) IMF, International Financial Statistics, Vol.30, No.5 (May 1977).

Note: (a) (-) net drawings (+) net repayments.

not only in the drains of reserves accumulated from 1973, particularly, in Pakistan and Kenya, but also the resort of the three countries to draw heavily from the IMF. The losses in India's reserves, which amounted to only $38 million in 1973, increased to $506 and $196 million in 1974 and 1975 respectively. In 1974, the losses of reserves of $151 million in Pakistan exhausted the 1973s reserve gains and the drain in reserves of $93 million in Kenya accounted for three times the additions to reserves in 1973. Losses in reserves continued in 1975, amounting to $220 and $64 million in Pakistan and Kenya respectively.

Though drawings from IMF made up for the foreign exchange drains and partly replenished reserves, they reduced the three countries' creditworthiness, leaving fragile opportunities for mobilizing further reserves from either the Fund or capital markets when the need arose. Table 6-15 shows the positions of the three countries in IMF during the period 1971-75, emphasising the size of the indebtedness to the Fund and the developments in the unconditional liquidity.

The Fund's actual holdings of the national currencies of the three countries, measuring the size of their indebtedness, as percentages of quota, increased for all countries in 1974 and 1975 and exceeded the ordinary maximum indebtedness (200 per cent) in the case of both Pakistan and Kenya. Furthermore, the countries' positions in the Fund, which are considered parts of reserves holdings and sources of unconditional liquidity, ran out to zero for Kenya and turned out to be negative in the cases of India and Pakistan.

2-3 The Adequacy of the Reserves

Reserve holdings can provide some sort of cushion against the

Table 6-15

The Position of India, Pakistan and Kenya in the International Monetary Fund, 1971-75.

	1971	1972	1973	1974	1975
India					
Fund's holding of currency as % of quota (a)	92	92	92	153	174
Reserves position as % of gold tranche (b)	50	50	50	-	-
Pakistan					
Fund's holding of currency as % of quota (a)	118	151	155	202	259
Reserves position as % of gold tranche (b)	-	-	-	-	-
Kenya					
Fund's holding of currency as % of quota (a)	75	75	74	167	243
Reserves position as % of gold tranche (b)	101	101	103	-	-

Source: Calculated from IMF, International Financial Statistics, Vol.31, No.5(May 1978).

(a) The actual holdings of the national currencies which include net compensatory drawings.

(b) The practice of the Fund is to record the Reserves position in the Fund as zero when it runs out or when it turns out to be negative.

external disturbances when they are used to finance deficits on the balance of payments. The extent to which reserves can be run down is limited by their adequacy which is usually judged from the "country's point of view." A country cannot allow its reserves to fall below a certain level which must be appraised, according to Kenen and Yudin[1], "in relation to future disturbances and contingencies" which may be gauged quantitatively on the basis of past experiences. For a typically poor country, running down reserves involves high social costs, particularly, when they are"built up by borrowing" or are used as "backing for borrowing purposes" since declines of reserves would impair the country's credit-worthiness in the capital markets.[2] Reserves adequacy will be measured, in the form of ratios, by comparing reserves holdings of the three countries, during the period 1970-75, with three magnitudes: total import values, trade balances and net oil imports, as shown in Table 6-16.

The relevance of reserves/import ratio is based on the notion that a country's imports are supposed to determine its demand for foreign balances and that the size of imports, being linked with the probability of deficits in the balance of payments, is considered a faithful proxy for the payment disturbances.[3] Simply, the ratio shows how long a country could finance its imports if it is suddenly deprived of all foreign exchange earnings. For all the countries, the

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(1) Kenen and Yudin, op.cit., p.341.
(2) G.C. Abbott, "The Double-Bind of Oil and Aid - A Way Out", Banca Nazionale Del Lavoro, Vol.27, No.110 (September 1974), p.234.
(3) M.J. Flanders, The Demand for International Reserves, Studies in International Finance, No.27, Princeton University, Princeton N.J., 1971, p.47.

Table 6-16

The Reserve Adequacy of India, Pakistan and Kenya, 1970-75

	1970	1971	1972	1973	1974	1975
Reserves/Import Ratios						
India	0.48	0.50	0.53	0.35	0.26	0.22
Pakistan	0.25	0.30	0.42	0.49	0.26	0.19
Kenya	0.50	0.30	0.38	0.38	0.19	0.18
Reserves/Trade Balances Ratios						
India	14.30	4.03	5.68[a]	4.15	1.13	0.75
Pakistan	0.55	4.00	21.78[a]	21.62	0.74	0.38
Kenya	1.60	0.69	1.15	1.64	0.46	0.51
Reserves/Oil Imports Ratios						
India	6.71	4.75	4.66	2.85	0.93	0.98
Pakistan	3.33	3.29	6.83	5.75	1.98	1.80
Kenya	11.33	7.24	6.47	6.65	1.55	1.16

Source: Ratios are calculated from the following sources: data on reserves from Table 6-14, data on imports from IMF, International Financial Statistics, Vol.31, No.5 (May 1978); data on trade balances from Table 6-12 and data on oil import from Table 4- 2.

Note[a] The ratio is positive because of surplus on trade balances.

reserves/imports ratios reached their low level in 1974, amounting to 0.26, 0.26 and 0.19 for India, Pakistan and Kenya respectively. They declined further in 1975 to 0.22, 0.19 and 0.18, respectively. In comparison with 1971, the ratios of the three countries declined to about one-half.

In fact monetary reserves are not held for transactions, resulting from the payments for all goods and assets a country imports. Rather, they are held for financing transitional disturbances, which result, according to Heller(1), from all discrepancies between foreign payments and receipts. Therefore, a more plausible relation might be found between the need for holding reserves and variations in trade balances, particularly, of developing countries whose external balances are vulnerable to seasonal fluctuations, cyclical swings and irregular contingencies caused by the openness of their economies. Between 1970 and 1973 the reserves/trade balance ratio improved, significantly, from 0.55 to 21.62 for Pakistan and, slightly, from 1.60 to 1.64 for Kenya, but it declined from 14.30 to 4.15 for India. However, the ratio deteriorated sharply in 1974 to 1.13 for India, 0.74 for Pakistan and to 0.46 for Kenya, and further in 1975 to 0.75, 0.38 and 0.51, respectively.

Additionally, reserves are compared by the net oil import bills to indicate the extent to which reserves can meet oil payments. Between 1970 and 1973, the reserves /oil import ratio increased for Pakistan from 3.33 to 5.75, while it declined for India and Kenya from 6.71 to 2.85 and from 11.33 to 6.65 respectively. It declined in 1974 to 0.93

(1) H.R. Heller, "The Transactions Demand for International Means of Payments", Journal of Political Economy, Vol.76, No.1 (January / February 1968), p.141.

for India, 1.98 for Pakistan and 1.55 for Kenya and further, in 1975, to 0.98, 1.80 and 1.16 respectively.

As a result, for all the three countries, foreign exchange reserves declined during 1974 and 1975, in absolute and relative terms, and reached a very low level, indicating a worsening international liquidity position, though India was in a slightly better position than both Pakistan and Kenya.

2-4 The Capacity of Reserves for Financing Oil Payments

Table 6-17 shows the proportions of additional oil costs which were financed by running down reserves and the contributions of drawings on oil facility on such payments, assuming that all reserves losses were only used in financing oil payments during 1974 and 1975. While the reserves of India could cover one-half of the additional oil costs and those of Pakistan could finance almost all the costs in 1974, Kenya's reserves were sufficient to pay for 1.5 times as much as its additional oil costs. However, drawings on oil facility in that year contributed, proportionally, one-quarter, three-quarters, two-thirds of the additional payments of India, Pakistan and Kenya, respectively. In 1975, the capacities of the reserves of the three countries diminished to 0.21, 0.86 and 0.70, respectively, as did the contributions of the oil facility which decreased to 0.24, 0.45 and 0.35 respectively.

As a result, over and above the weakness of their reserves, additional oil costs wiped away reserves accumulated during the 1973 boom as well as the drawings on oil facility. Though the reserves of the three countries were insufficient to cover oil payments in 1974, 1975 was worse than 1974, and in both years Pakistan and Kenya were in a better position than India.

Table 6-17

The Capacity of Reserves for Financing Additional Oil Costs of India, Pakistan and Kenya in 1974 and 1975

(in millions of current U.S.$)

	Additional Oil Costs (1)	Net Declines in Reserves (2)	Drawings on oil Facility (3)	Oil Costs Financed by Drawing on Reserves (2) ÷ (1) (4)	Oil Costs Financed by Drawing on oil Facility (3) ÷ (1) (5)
India					
1974	988.0	506.4	245.0	0.51	0.25
1975	945.0	196.4	225.0	0.21	0.24
Pakistan					
1974	158.0	151.2	120.0	0.96	0.76
1975	256.9	220.6	116.0	0.86	0.45
Kenya					
1974	63.3	93.1	39.0	1.47	0.62
1975	91.8	64.2	32.0	0.70	0.35

Source: (1) Table 4-4.
(2) Table 6-14
(3) IMF, International Financial Statistics, op.cit.

3-Conclusion

The rise in oil prices came on the top of unfavourable conditions in the world economy during the first half of the 1970s. These conditions were detrimental to the capacity of India, Pakistan and Kenya to pay for the oil they imported. The analysis of the year-to-year changes in the exports of the three countries, by commodity group and by export item, during the first half of the 1970s indicated that these countries could not participate effectively in the gains from trade resulting from the 1973 commodity boom, especially in the case of India and Kenya, though their export earnings suffered the consequences of the slackened world demand in 1974 and during the recession of 1975. With few exceptions, the benefit of their exports from the commodity boom were limited by both domestic and external factors. Firstly, although the price of grains rose substantially in the world markets during 1973-1974, India, Kenya and, to some extent, Pakistan, being non-exporters of grains, did not benefit. The major export items, particularly, of India and Kenya, being by-passed by the commodity boom, did not fetch high prices in the world markets. Secondly, for export items which recorded high prices, India, Pakistan and Kenya missed the opportunity of exploiting the upsurge in the world markets, owing to domestic conditions. In the three countries, the supplies of exports of primary products was constrained by the effects of natural hazards: the harmful consequences of the monsoon in India, the floods and diseased plants in Pakistan, and dry weather and drought in Kenya. Thirdly, the good performances recorded by other export items, in terms of unit value realisation and export volume, as with

the case of India, were only caused by occasional disruption in the world supply so that the substantial gains from such items ceased when the traditional producing areas resumed their normal levels of output. Finally, the domestic factors, which affected the exports of primary products, constrained the supply of those exports of basic manufactured goods whose production depends on domestic raw materials , as principal inputs, particularly, in the case of India and Pakistan.

The commodity boom came to an end in 1974 and the world economy as a whole moved simultaneously into recession in 1975. Export earnings of Pakistan decelerated faster than those of India, whereas Kenya's export earnings declined absolutely. The slackened world demand was reflected in the reductions in the export earnings, particularly, from primary products. Export earnings from the exports of foodstuffs were less responsive to the decline in world economic activity, than the export earnings from raw materials whose unit value and volume fell faster during the world recession. In the case of basic manufactured goods, the reductions in export earnings, in general, were generated from the effects on export volume which fell faster and greater than unit value. Only in the case of miscellaneous manufactured goods, could India and Pakistan maintain their export volumes, since such exports went to other developing countries, which were less vulnerable to economic fluctuations than the industrial countries.

Market-share analysis reveals that the reductions in the export earnings of the three countries originated from the effect of the oil-related recession in the OECD area. During that recession, export earnings of both Pakistan and Kenya from the OECD market declined faster than the world exports to that market. In the case of India, export

earnings decreased but not as fast as world exports. Unlike Kenya, India and Pakistan could increase their export earnings through their traditional access to the Middle Eastern OPEC countries whose imports were boosted by the large and sudden increase in their oil revenue. Judging by the growth of world export to the OPEC market, the increase in export earnings of India and Pakistan exceeded the growth of world exports to that market in 1974. In 1975, while export earnings of India from OPEC kept pace with the growth of world exports to that market, Pakistan's export earnings lagged behind. The exports of the three countries to the markets of LDCs proved a stabilising factor during a period of world recession. The slowdown of export earnings, particularly, of India and Kenya, from LDCs market was less than the world exports to that market during the recession.

The sharp deterioration of the trade balances of India, Pakistan and Kenya with the rest of the world largely resulted from the rise in deficits on the trade balances with the OECD area because of the simultaneous existence of export maxima and import minima. Most of the remaining deficit, which originated on the trade balances with OPEC, could be reduced, though not eliminated, when the country's exports had access to OPEC markets. Consistent surpluses on the trade balances with LDCs could only mitigate against the large deficits with both OECD and OPEC areas.

The adverse conditions in the international economy left the foreign exchange reserves of India, Pakistan and Kenya inadequate for what was required to maintain the position of their international liqudity. Running down reserves, which were mostly accumulated from the 1973 boom

and the drawings from the IMF facilities, for financing balances of payments deficits, led to the decline in reserves holdings, in absolute and relative terms, to their lowest levels since 1970. These developments caused the worsening of the creditworthiness of the three countries in both the IMF and capital markets, though India's position was slightly better than both Pakistan and Kenya because of its over-cautious policy in managing foreign exchange reserves.

Assuming that the drawings on foreign exchanges reserves together with the increases in export earnings during 1974 and 1975 were only used to finance the additional oil costs of the three countries, the results suggest that the oil import bills could be barely financed, except for Kenya in 1975. However, this would leave India, Pakistan and Kenya facing the difficulty of financing the non-oil imports.

CHAPTER VII

CONCLUSIONS

This study has chosen India, Pakistan and Kenya as examples from the low-income group of the non-OPEC developing countries in order to assess the direct and indirect effects on the availability of foreign exchange and external balance in 1974 and 1975 of the four-fold increase of the world oil prices during 1973/74. Such effects were examined within the context of a more long-term analysis, covering the period 1960-75, in order to establish the relative importance of oil in the pattern of energy, consumption and its association with economic growth, and to identify the determinants of oil demand. Within the limitations of the accuracy and comparability of the available data, the study has reached the conclusions outlined below for India, Pakistan and Kenya which are also relevant to other countries of the low-income group.

The importance of oil in total energy consumption varied among India, Pakistan and Kenya, though it remained in line with the general trend in other low-income developing countries. During the period 1960-73, oil consumption increased by 2.5 times in the low-income countries, while in India, Pakistan and Kenya, it increased by 3.0, 1.5 and 1.6 times, respectively. But, during the same period while the share of oil declined in Pakistan, a gas-orientated economy, from 52 to 42 per cent, and remained rather stable in Kenya, an oil-orientated economy, around 92 per cent, it increased in India, a coal-orientated economy, from 15 to 25 per cent, reflecting

the general situation in the low-income countries whose oil share increased from 32 to 42 per cent during that period. In general, the patterns and trends of oil consumption in the three countries are dominated by those products which are related to the productive sectors rather than to the final consumers, indicating the close link between oil consumption and the level of economic activity.

The degree of dependence on petroleum imports, being dominated by crude oil, varies among India, Pakistan and Kenya, though it reflects the general heavy reliance on oil imports of the low-income countries. This dependence is governed by the level of domestic output of crude, whose growth is determined by the efforts to add new oil reserves by developing the existing fields and exploring new ones. While Kenya has to import all her oil requirements, the imports of crude oil and refined oil products during the period 1960-73, as percentages of oil consumption, increased from 86 to 90 per cent in Pakistan and decreased from 95 to 71 per cent in the case of India which was similar to the low-income countries whose imports also fell from 92 to 87 per cent during the same period.

With regard to the short-term, the availability of indigenous non-oil sources of energy in India and Pakistan helped in mitigating the immediate adjustment of oil consumption during 1973-75. While the absolute amount of energy consumption increased in the three countries, the share of oil in the total declined from 25 to 23 per cent in India and from 42 to 40 per cent in Pakistan, counter-balanced by a rise in coal consumption in the former and gas consumption in the latter country, whereas in Kenya the share of oil actually increased from 92 to 93 per cent, due to the absolute decline in imported coal. The efforts made to adjust oil consumption in the three countries were

generally directed on products related to household consumption in an attempt to maintain consumption levels of products which are used in productive sectors. By 1975, the share of oil imports in total oil consumption in India remained at 71 per cent because of the rise in domestic production of crude oil, whereas it increased to 91 per cent in Pakistan mainly because of the absolute decline in indigenous production of crude.

Despite the heavy reliance on oil imports in the three countries, oil consumption has grown faster than aggregate national output, particularly in India and Kenya - a phenomenon which has generally been observed in developing countries passing through periods of rapid industrialization involving structural changes which favours the energy-intensive sectors. Simple correlation and regression analyses showed a strong association between per capita oil consumption and per capita GDP, industrial production and transport activity for India and Pakistan, but not for Kenya whose results were found to be inconsistent. The results indicate that, for a given economic growth, oil requirements for the Indian economy are relatively higher than those for Pakistan, and that in both countries the requirements for the economy as a whole, unexpectedly, are higher than those for both the industrial and transport sectors.

The impact of the pattern of economic growth on oil use, expressed by the oil-intensity, and thus on the growth of oil consumption varies among India, Pakistan and Kenya. While the Indian economy, on the one extreme, is the lowest oil-intensive, the Kenyan economy, on the other extreme, is the highest; Pakistan is found between these two extremes. Nevertheless, during the period 1960-75, the large rise in India's oil-intensity, increasing by 117 per cent, was in common with the general

trend of the low-income developing countries whose oil-intensity increased by 111 per cent, whereas it increased by 57 per cent in Pakistan and fluctuated widely around 7 per cent in Kenya. During the period 1970-75, the rise in oil-intensity accounted for 74, 8 and 49 per cent of the increases of oil consumption of India, Pakistan and Kenya, respectively, during that period, while the rest was attributable to the rises in their GDPs.

The rapid increases in oil consumption has not only been induced by the pattern of economic growth but also fostered by the decline in the world prices of oil relative to the prices of other goods and services traded internationally. Government pricing policy, particularly in India, tended to fix the prices of the domestic production of crude oil below the world price in order to reduce the rise of the domestic prices of oil products, which were further declining relatively to the general price levels. Furthermore, since the prices of petroleum products consist of a sizeable proportion of taxes and duties, their changes reflect variations in tax levels rather than the movements of the price of crude oil, and thus they failed to dampen the domestic demand.

A dynamic model of the demand for oil is estimated only for India and Pakistan, while its equation could not be fitted for Kenya whose inconsistent results may be attributed to the inaccuracy of the data, the small number of observations, and time-series problems. The income variable proved, as one would expect on a priori reasons, to be predominant in determining the demand for oil in the low-income developing countries, as its elasticity is prominent, in both its size and statistical significance, amounting to 3.8 for India and 1.3 for Pakistan. Despite some experimentation, the model could not

unscramble any significant price elasticity, though it indicates the right sign, and thus it permits neither the acceptance nor the rejection of the price as a determinant of oil demand. Although the model demonstrated a high explanatory power in explaining a good deal of the variations in oil consumption, it could not answer the relevant question of what will happen in these countries if oil prices change.

The assessment of the immediate consequences of the rise in oil prices for India, Pakistan and Kenya showed that the direct effects in 1974 and 1975 on their oil import costs, terms of trade, income transfers and external balances were substantial. In comparison with 1973, the sudden and large rise in the unit values of petroleum imports, crude and products, led to massive increases in the net oil import bills which had risen, by 1975, three and half times for India, four times for Pakistan and four and quarter times for Kenya. It is estimated that, in 1974, about 69, 68 and 67 per cent of the payments for the net oil import bills of India, Pakistan and Kenya, respectively, represented excess expenditures over what would otherwise have been paid to OPEC members had the pre-October 1973 level of oil prices continued throughout 1974 after they were adjusted for the prevailing world inflation and transport costs, and in 1975, the additional oil costs would have fallen slightly to 68 for India, while they would have risen to 75 and 69 per cent for Pakistan and Kenya, respectively. Even if the 1973 economic growth had continued throughout 1974 and 1975, the resulting additional oil costs for both India and Pakistan would have accounted for between one-half and two-thirds of what was actually paid.

The deterioration of the commodity terms of trade was sharp, declining during 1973-75 from 107 to 70 for India, from 108 to 73 for

Pakistan, and from 86 to 72 for Kenya (with 1970 = 100). Much of the deterioration can be attributed to the large rise in unit value of petroleum imports as the commodity terms of trade of total exports versus petroleum imports alone declined from 99 to 37 for India, from 71 to 28 for Pakistan, and from 96 to 36 for Kenya. The magnitude of the rise in oil prices, combined with the slackened demand in export markets, made it difficult to improve the income terms of trade, which also sharply deteriorated.

The resulting income transfer was substantial, when it is viewed in relation to the performance of the economies of the three countries. It pre-empted a large proportion of the realized economic growth, especially in the case of Kenya, since the size of income transfer from India and, to some extent, Pakistan was contained since they are relatively smaller users and importers of oil as well as possessing non-oil indigenous fuels. The foregone economic growth for India, Pakistan and Kenya in 1974 amounted to 1.3, 2.4 and 2.6 per cent of their GNPs, respectively, and in 1975 accounted for 1.0, 3.0 and 3.3 per cent of the GNPs of the three countries, respectively, whereas the recorded average annual growth rate of GDP during 1973-75 amounted to 1.9 per cent for India, 2.3 per cent for Pakistan and 2.0 per cent for Kenya.

The implications of such transfers for the balance of payments can be seen in the light of the external balance of a typically poor country which is permanently exposed to a foreign exchange gap emerging from structural disequilibrium which stems from the simultaneous existence of export maximum and import minimum. Theoretical analysis, which illustrates diagrammatically the oil situation, concludes that

the weak and inefficient adjustment process and limited policy option available in the non-oil developing countries to attain external balance would leave import restriction policy and low economic growth as the only alternative for redressing external balances in the absence of sufficient external finance.

In fact, the deterioration in the current account of the balance of payments and the widening of the resource gap were larger than could be attributed solely to the additional oil costs in the three countries, where large non-oil deficits and changes in import control and domestic expenditure policies also played a crucial role. Oil consumption in India fell in 1974 due to the general demand restrained policy and heavy tax increase on petroleum products. Additionally, the over-cautious use of import controls and anti-inflationary policies, coupled with large unrequited transfers, counteracted a large deficit on India's current account, which showed a comfortable position in 1974 and led to a surplus on the overall balance of payments in 1975. Although Pakistan incurred a large current account deficit in 1974, it did not adopt radical adjustment measures, but rather maintained trade liberalisation policy which was initiated in the early 1970s. In 1975, Pakistan continued to finance her increased imports by large unrequited transfers and the increase of long-term capital inflows in order to maintain development programmes. With relaxed import restrictions in Kenya, the initial response to the price increases of imports in 1974 was to maintain the level of imports, relying on increased external borrowings and reserves drawings. In 1975, the growing shortage of foreign exchange necessitated the adoption of a range of balance of payments adjustment measures to reduce the pressures

on the current account. These measures led to a drastic cut in the import volume during that year.

Consequently, despite the large increases in the value of oil imports, the exclusion of the additional oil costs would not improve the position of the current account and resource gap, particularly in Pakistan and Kenya in 1974 and 1975, compared with 1973, unless all imports had been cut down drastically. Though they are adjusted for the additional oil costs, deficit on current account increased about 10-11 times in Pakistan and 1-2 times in Kenya, whereas India's current account improved and was in surplus. Also, while the resource gap widened about 20-26 times in Pakistan and 2-4 times in Kenya, India's resource gap was closed by 1975.

Nevertheless, the improved current account and closed resource gap in India hid a large deficit by cutting down oil imports. This was also followed in Pakistan in order to contain its large deficits. By using the oil demand model mentioned above, it was found that the current account deficit and the resource gap would have become larger had India and Pakistan imported petroleum in the quantities required to sustain the 1973 economic growth throughout 1974 and 1975.

Equally important to the direct effects of the additional oil costs on the external balances of India, Pakistan and Kenya are the indirect effects which basically originated from the impact of the rise in oil prices on the world economy through changes in variables which are exogeneous to developing countries. The transmission of such effects, through trade, to developing countries, which are

externally vulnerable to variations in the level of the world economic activities, affect their availability of foreign exchange and, in turn, the capacity to finance the additional payments for oil imports.

The strong upswing in world economic activity and international trade, which had started in the early 1970s and peaked during the 1973 boom, was ended with the advent of oil price increases. Though such fluctuations originated basically from the OECD area, the pattern was common in other economic regions, particularly, the LDCs. During 1974 and 1975, while the income of the oil-exporting countries was boosted by the sudden and large rise in oil revenue, which resulted from the large increase in oil prices, the world economy as a whole experienced a sharp decline in income and economic activities so that they indicated a sign of a deep and prolonged recession. The decline in income was partly caused by the inflationary and deflationary effects of the rise in oil prices, but it was partly attributable to the strong anti-inflationary policies adopted by the major industrial countries in the face of oil crisis. The estimates of three econometric studies, carried out by the Brookings Institution of the United States to isolate the impact of the rise in oil prices on the economies of the United States, Western Europe and Japan, indicated that the oil-induced declines in their GNPs were substantial.

The analysis of the year-to-year changes in the exports of the three countries, by commodity group and by export item, during the first half of the 1970s indicated that these countries could not participate effectively in the gains from trade resulting from the 1973 commodity boom, especially in the case of India and Kenya, though their export earnings suffered the consequences of the slackened demand

in 1974 and the recession of 1975. With few exceptions, the benefit of their exports from the commodity boom was limited by both domestic and external factors. Firstly, although the price of grains rose substantially in the world markets during 1973/74, India, Kenya and, to some extent, Pakistan, being not-exporters of grains, did not benefit. The major export items, particularly, of India and Kenya, being by-passed by the commodity boom, did not fetch high prices in the world markets. Secondly, for export items which recorded high prices, India, Pakistan and Kenya missed the opportunity of exploiting the upsurge in the world markets, owing to domestic conditions. In the three countries, the supplies of exports of primary products were constrained by the effects of natural hazards (the harmful consequences of the monsoon in India, the floods and diseased plants in Pakistan, and the dry weather and drought in Kenya) which further hindered the exports of manufactured goods which depend on the agricultural raw materials as basic inputs, especially in the case of Pakistan. Finally, the good performances recorded by other export items, in terms of unit value realisation and export volume, as with the case of India, were only caused by occasional disruption in the world supply so that the substantial gains from such items ceased when the traditional producing areas resumed their normal levels of output.

The recession in the OECD area during 1974 and1975 had a serious consequence for their exports. Export earnings of Pakistan decelerated faster than those of India, whereas Kenya's export earnings declined absolutely. The slackened world demand was reflected in the reduction in the export earnings, particularly, from primary products. Export earnings from the exports of foodstuffs were less responsive to the decline in world economic activity than the export earnings from raw materials whose unit value and volume fell faster during the world

recession. In the case of basic manufactured goods, the reductions in export earnings, in general, were generated from the effects on export volume which fell faster and greater than unit value. Only in the case of miscellaneous manufactured goods, could India and Pakistan maintain their export volumes, since such exports went to other developing countries, which were less vulnerable to economic fluctuations than the industrial countries.

Market-share analysis revealed that the decrease in export earnings of the three countries was totally due to the recession in the OECD area, affecting Pakistan and Kenya more than India,(1) whose export earnings exhibited less sensitivity to the downswings of world economic activity. During that recession, export earnings of both Pakistan and Kenya from the OECD market decreased faster than the world exports to that market, whereas the decrease in India's export earnings was slower. On the other hand, India and Pakistan, unlike Kenya, could increase their export earnings through their traditional access to the Middle Eastern OPEC countries whose imports were boosted by the large and sudden rise in their oil revenue. Judging by the growth of world exports to the OPEC market/India benefited more than Pakistan, whose export earnings lagged behind the growth of world exports slightly in 1974, and largely in 1975. In general, the increases of export earnings from OPEC market mitigated, but did not totally offset, the decline in export earnings from the OECD market. Export earnings of the three countries from LDCs markets proved to be a stabilizing factor during the recession in the industrial countries, since India's export earnings from

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(1) Khan, op.cit., p. 689 . Khan found that the income elasticity of the demand for India's export was small, amounting to 0.206, whereas the elasticity for Pakistan exports was 0.919.

such markets during 1974-75 accelerated, while those of Pakistan and Kenya decelerated slower than the world exports to LDCs markets. The significance of the share of LDCs market in the exports of India, Pakistan and Kenya is attributable to the high proportion of manufactures in the exports of the three countries and the high level of industrialization achieved relative to other developing countries.

A large proportion of the deficit of trade balances of India, Pakistan and Kenya with the rest of the world resulted from the sharp deterioration of trade balances with the OECD which by 1975, compared with 1973, increased four and a quarter times for India, four times for Pakistan, and one and a half times for Kenya. The remaining deficit, which largely originated on trade balance with OPEC, increased twice for India, and two and a half times for Kenya, whereas in the case of Pakistan the deficit only appeared in 1975. Such a deficit couldbe reduced, but not eliminated, when the country's exports have access to the OPEC market as in the case of India and Pakistan. Surplus on trade balances with LDCs in the three countries, which increased consistently for India and Kenya, alleviated the pressures on trade balances with other economic regions.

The decrease in export earnings and the deterioration of the terms of trade caused by the higher prices of imports left the foreign exchange reserves of India, Pakistan and Kenya inadequate relative to what was required to maintain the position of international liquidity. The three countries resorted to running down their reserves, which were mostly accumulated from the 1973 boom and drawn from the IMF facilities, for financing balance of payments deficits. This led to the decline in the reserves holding of the three countries to their lowest levels since 1970, in absolute terms and relative to the levels

of total imports, oil imports and trade balances. These developments caused the worsening of their overall creditworthiness in both the IMF and capital markets and thus reduced the opportunity for mobilizing further reserves in the future. The international liquidity of India was in a slightly better position than both Pakistan and Kenya owing to her over-cautious policy in managing foreign exchange reserves.

Although the post-1973 events in India, Pakistan and Kenya were different in some important respects, they do suggest that these countries had a very limited manoeuvrability in the face of oil crisis, because of the need to secure their minimum oil requirements on the one hand, and the underlying vulnerability of their internal and external balances on the other. Moreover, it can be suggested that such conclusions are also relevant to other low-income countries. Thus, policy implications are valid not only for the three countries, but for the low-income countries as a whole.

These countries are not larger importers of oil nor consumers of energy, but their economies are so small relative to their energy needs that the impact of oil price increases on them was substantial. On the other hand, the private uses of oil are so limited that any large reduction in oil consumption would have immediate adverse effects on the level of economic activities, given the inter-dependency of oil using sectors of these economies.

In 1974 and 1975, India, Pakistan and Kenya, relying on the short-term remedies for financing the oil-related deficits, drew heavily on their foreign exchange reserves and used the new lending facilities established by the International Monetary Fund and the

United Nations. Such sources of finance were extremely important as a means of averting severely immediate cut back in their imports, investments and economic growth.

However, large oil payments cannot be met indefinitely by loans, even on concessional terms, or by running down foreign exchanges reserves. Firstly, as far as oil payments are concerned, the special oil facility of the IMF is particularly designed to bridge an interim period until a lasting solution can be found; and foreign exchange reserves are intended to meet fluctuations in the balance of payments, while countries adjust to the new structure of oil prices, and thus not finance structural deficits. Secondly, prices of the non-oil essential imports are not likely to fall back to their previous levels, the price of oil will not only remain high but will rise even further in the future. Finally, developing countries should avoid taking on onerous debt merely to pay for high import costs, since debt burdens that are notbacked by corresponding increases in economic return or not specifically associated with investment reducing the dependence on imported petroleum will simply throw the problem forward to the years when debts become due.

These countries must look further to long-term policies and structural changes which permit them to lessen the increased reliance on oil imports and to increase their share in the expanding world trade to finance their import costs. The rise in the price of oil has made it necessary to develop alternative sources of energy which already exist in most of the low-income countries. The long-term prospects appear to be particularly promising for India which has vast coal deposits and for Pakistan which has large reserves of natural gas. In addition to the need to recover more reserves, the requirements of the low-income

countries are often subtle and indirect. For instance, the constraints on more rapid growth of coal production are mostly attributable to bottlenecks in the production and transportation of coal, whereas Pakistan needs investment to increase the transmission capacity of gas pipelines and the capacity of the purification plants. The rise in the production of non-oil indigenous sources of energy will speed the efforts underway in India to convert existing industries from oil to coal.

At the present oil prices, additional exploratory efforts for oil and the development of hitherto uneconomic areas became worthwhile. India, Pakistan and Kenya are among countries which have made strenuous efforts to discover oil within their borders. Indeed, the most outstanding example of success so far has been the discovery of oil in the Gulf of Bombay, offshore India's west coast.(1) The Ministry of Petroleum and Chemicals projected that the eventual capacity of 8-10 million tons of crude from the new discovery will make up the forecast of India's requirements by the end of the decade.(2) In Pakistan, a "seven-year" master plan, started by 1974, involving investment of approximately $250 million in oil development has been approved by the government;(3) and exploration rights over vast areas of the country were awarded to various oil companies.(4) Similar efforts have taken place in Kenya.(5)

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(1) Petroleum Economist, Vol. 42, No. 2 (February 1975), p. 225
(2) Petroleum Economist, Vol. 43, No. 3 (March 1976), p. 106
(3) Petroleum Economist, Vol. 41, No. 12 (December 1974), p.475.
(4) Petroleum Economist, Vol. 41, No. 10 (October 1974), p. 394.
(5) Petroleum Economist, Vol. 41, No. 9 (September 1974), p. 353.

The changes in the relative real prices of oil and energy dictate a variety of long-term adjustment in the pattern of economic activities in order to reduce the energy-intensity and, in particular, the oil-intensity of the output mix. There should be a review of economic plan as well as existing energy uses in order to discover how much scope can be created for economising in the use of oil without causing serious economic disallocation. This is particularly important for countries which have established significant industrial and public transport sectors.

In these areas of the long-term structural adjustment, the industrial countries can take more active role in identifying and encouraging the development of new channels for transfer of technology to the low-income developing countries.(1) In view of the limited resources in the low-income countries, the development of alternative sources of energy will need large investment funds which could be financed through external resources from multilateral aid agencies and industrial countries as well as capital flows of the private foreign investment. In recognition of the effects of the oil crisis on the low-income countries, the World Bank, relaxing its previous ban on loans for oil explorations, agreed to advance India $200 million toward the costs of piping gas, associated with the new oil discovery in the Gulf of Bombay, to the shore.(2)

In addition to the long-term adjustment in the production and consumption of energy, India, Pakistan and Kenya need to adopt measures

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(1) For suggestions on the transfer of technology for developing indigenous sources of energy in the poor countries, see The British Government, The Oil Crisis and Third World Development: Implications for United Kingdom Policy, Report from the Select Committee on Overseas Development, Vol. I, Session 1974, HMSO, London, 1974, pp. xxvi-vii.

(2) Petroleum Economist, Vol. 43, No. 7 (July 1976), p. 279.

which will permit them to raise their export shares in the expanding world trade in order to redress the structural disequilibria of their balances of payments. To a large extent, export earnings depend on the condition in the international markets which, in turn, are determined by economic activities and trade policies of the industrial countries. It was apparent, however, that the three countries, with their promising human and natural resource endowments, were less oriented to the stimulus and potential benefit of exports during the 1973 commodity boom. Meanwhile, the economic growth in the industrial countries was a powerful incentive to the expansion of the exports of the rapidly-growing, middle-income developing countries (like Brazil, Mexico, Korea (Rep. of), and Turkey) whose gains from trade were almost entirely due to the economic expansion of the industrial countries rather than to any notable relaxation of trade barriers. Such beneficiaries were those countries which were prepared to allocate increased investment resources to the export sector, and their export base was more diversified and their economies were more supply-responsive to the growing world demand.(1)

Nevertheless, relatively high levels of tariff and non-tariff restrictions have reduced the export potential of developing countries for products in which they have both a supply potential and clear competitive advantage.(2) The World Bank has estimated that liberalization of trade by the OECD countries might yield an additional $6-12 billion in

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(1) M.J. Williams, Development Co-operation, 1974 Review, op.cit., p. 19
(2) See W.P. Travis, "Production, Trade and Protection when There are Many Commodities and Two Factors", American Economic Review, Vol. 62, No. 1 (March 1972), pp. 100-4; R.E. Baldwin,"Determinants of the Commodity Structure of the U.S. Trade", American Economic Review, Vol. 61, No. 1 (March 1971), pp. 141-4.

earnings for developing countries by 1980, mainly by expanding volume rather than increasing price.(1) Hans Singer(2) considered that giving aid to developing countries in the form of opportunities for trade expansion is more important than in traditional forms of aid, particularly during balance of payment crisis because of higher oil costs.

By adapting the production and quality to changing market conditions, there is a considerable scope for expanding the exports of India, Pakistan and Kenya to the market of the OPEC countries which showed a great future expansion and the markets of other developing countries which contributed to the stability of export earnings and acted as a mitigating factor for the external imbalance. India, Pakistan and Kenya will have to mobilize more investments for diversifying and expanding their exports of manufactured goods; which will fully permit the use of the advantages of their economies as being more industrialised than other developing countries belonging to the same low-income group or stage of economic development. This is particularly important in the case of Kenya whose exports of manufactured goods to the East African community had grown slowly before they virtually stagnated in the early 1970s,(3) despite Kenya's head start in many industries and the quite high proportion of manufactured goods in its exports relative to the other neighbouring African countries.

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(1) M.J. Williams, Development Co-operation, 1975 Review, op.cit., p. 29.
(2) The British Government, The Oil Crisis and Third World Development, op.cit., p. 55.
(3) Government of Kenya, Kenya Statistical Digest, Vol. 12, No. 1 (March 1974), p. 4.

R.C. Hammond[1] explained Kenya's loss of export market by the sharp fall in the exports of simple products which have been almost exactly offset by increases in the exports of new products. In the case of Pakistan, measures are needed to reduce the disruptions in the exports of manufactured goods, caused by the effects of natural hazards on the agricultural output.

In general, the recent trends in the world economy worked to the disadvantage of the low-income developing countries whose sharply deteriorated current accounts placed additional balance of payments adjustment burdens on their economies which were already facing enormous development tasks. The response to these additional problems by the low-income countries, in the short-run, staved off severe hardship. In the long-run, the oil crisis will mainly serve to underline the problems of structural adjustment and basic development.

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(1) R.C. Hammond,"Manufactured Exports of the EAC partner states," Economic and Statistical Review, The East African Community, No. 44/45 (September/December 1972), pp.XLi-ii

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APPENDICES

APPENDIX 1

A DYNAMIC MODEL OF THE DEMAND FOR OIL

Sources of the Data and Some other Results

Sources of the Data

Data sources used in this estimation, which are obtained from the publications of India, Pakistan and Kenya as well as those of the international institutions, are: production, consumption and trade of petroleum crude and products from United Nations , World Energy Supplies, 1950-1974, Series J, No.19, U.N., New York, 1976; United Nations, World Energy Supplies, 1972-1976, Series J, No. 21, U.N., New York, 1977; GDP, industrial production and transport and communications from United Nations, Yearbook of National Accounts Statistics, selected issues; Implicit price deflator index numbers of GDP by kind of economic activity from United Nations, Yearbook of National Accounts Statistics 1977, Vol.2, U.N., New York, 1978; posted prices of crude oil, exchange rates and population from International Monetary Fund, International Financial Statistics, Vol.31, No.5, May 1978; unit values of imported crude oil for India and Pakistan are calculated from United Nations, Yearbook of International Trade Statistics, selected issues; unit value of imported crude oil for Kenya is calculated from Republic of Kenya, Statistical Abstract, selected issues; wholesale prices of petroleum products, wholesale prices of coal and the general wholesale price index of India from Government of India, Statistical Abstract, selected issues; P.D. Henderson, India - The Energy Sector, Oxford University Press, London 1975; Government of India, Monthly Abstract of Statistics, issues: Vol.25, No.10, October 1972, Vol.29, No.10, October 1977; for Pakistan,

Government of Pakistan, 25 Years of Pakistan in Statistics, 1947-72, Ministry of Finance, Karachi, 1972; Government of Pakistan, Pakistan Statistical Yearbook, 1975-76, Ministry of Finance, Karachi, 1976; unit value of imported coal and retail price of petrol in Kenya from Republic of Kenya, Statistical Abstract, selected issues; consumer price index of Kenya from International Monetary Fund, International Financial Statistics; Conversion factors between crude oil and oil products from OECD, Energy Prospects to 1985, OECD, Paris, 1974.

The data of the specified variables for India', Pakistan and Kenya are shown in Table 1 of this Appendix.

Some Other Results

In addition to the basic application of the model whose results were presented in Chapter III, a fair amount of experimentation was carried out, in view of the insensitivity of unit value of imported crude oil to variations in oil consumption, in an attempt to capture meaningful price elasticities. When the unit value of imported crude oil was replaced by posted prices , the application of the model resulted in the following equations:

India

$$\ln Ct = 0.9772 + 3.1920 \ln Yt + 0.5571 \ln P_o$$
$$(0.5138)\ (4.1245)\qquad (1.5635)$$
$$- 0.5309 \ln Pc - 0.0484 \ln C_{t-1} \qquad (6a)$$
$$(1.0718)\qquad (0.6451)$$

$R^2 = 0.8718$ $\quad F = 13.6055$ $\quad D.W. = 2.4496$

S.E.= 0.1266 $\quad$ No. of observations = 13

Pakistan

$$\ln Ct = -5.5866 + 1.3423 \ln Yt - 0.2601 \ln P_o$$
$$(11.5001)\quad (5.1497)\quad (1.0190)$$
$$+ 0.3474 \ln P_c - 0.1058 \hat{\ln} C_{t-1} \qquad (6b)$$
$$(9.5843)\quad (1.1803)$$

$R^2 = 0.9764$ F = 93.1682 DW = 1.7332

S.E.= 0.0874 No. of observations = 14

Kenya

$$\ln Ct = 0.1944 - 0.2376 \ln Yt + 0.2224 \ln P_o$$
$$(0.1667)\quad (0.8298)\quad (2.4378)$$
$$+ 0.2424 \ln Pc - 0.1640 \hat{\ln} C_{t-1} \qquad (6c)$$
$$(5.0873)\quad (1.1542)$$

$R^2 = 0.9214$ F = 17.5772 D.W. = 2.2088

S.E. = 0.0919 No. of observations = 11

The above-mentioned equations indicate that the inclusion of posted prices does not achieve any improvement in the results concerned with oil price elasticity. R^2 increased slightly to 87 per cent in the case of India and to 98 per cent for Pakistan. The statistical significance of the overall equations, as indicated by F-values, increased for all countries. Income variable (Yt) still dominated the estimates in terms of the size of the elasticities and their statistical significance, in the case of both India and Pakistan, assuming the right sign. In the case of Kenya, it was still not different from zero and held the wrong sign. Price variable was not different from zero in all countries, assuming the opposite sign in the case of India and Kenya.

When the average wholesale price of petroleum /products was introduced, the application of the model for India and Pakistan (there is no wholesale price of petroleum products in the case of Kenya) gave the following results:

India

$$\ln Ct = 7.1364 + 3.6812 \ln Yt - 0.7394 \ln P\bullet$$
$$(2.1089) \quad (5.1608) \qquad (1.3857)$$
$$-0.7303 \ln Pc + 0.0049 \overset{\ln}{\wedge} Ct-1 \qquad (7a)$$
$$(1.5789) \qquad (0.0695)$$

$R^2 = 0.8651$ F = 12.8220 D.W. = 2.7527

S.E. = 0.1399 No. of observations = 13

Pakistan

$$\ln Ct = 5.7065 + 1.6938 \ln Yt + 0.1913 \ln P_o$$
$$(16.3553) \quad (7.6050) \qquad (3.1884)$$
$$-0.0050 \ln Pc + 0.021 \ln Ct-1 \qquad (7b)$$
$$(0.0446) \qquad (0.2894)$$

$R^2 = 0.9876$ F=179.927 D.W. = 2.5395

S.E. = 0.06128 No. of observations = 14

As far as price elasticity is concerned, the inclusion of wholesale prices does not produce meaningful elasticity. Price variable is still not different from zero, but assumes the right sign. In the case of Pakistan, it is statistically significant at 5% level, but assumes the opposite sign, contradictory to economic theory. Moreover, the

elasticity of coal price with respect to oil demand turned negative (the opposite sign) and is not different from zero. The coefficient of the lagged variable in both India and Pakistan assumes the right sign (positive), though it is not only statistically insignificant but also very small.

In further attempts to improve the estimates, per capita GDP is replaced by both per capita industrial production and per capita transportation activity, and per capita consumption of fuel oils is substituted for per capita gross inland oil consumption. The model takes the following form:

$$\ln Ct = \ln \lambda a_1 + \lambda a_2 \ln Yt_1 + \lambda a_3 \ln Yt_2 + \lambda a_4 \ln P_o + \lambda a_5 \ln Pc + (1-\lambda) \ln Ct-1 \qquad (8)$$

where: Ct = per capita consumption of fuel oils in barrels of crude oil equivalent.

Yt_1 = per capita industrial production in national currency at 1970 prices.

Yt_2 = per capita transport activity in national currency at 1970 prices.

P_o = price per ton of imported crude in national currency at 1970 prices.

Pc = price per ton of coal in national currency at 1970 prices.

The application of such model for the data of the three countries gave the following results:

India

$$\ln Ct = 14.8098 - 0.6098 \ln Yt_1 + 4.5596 \ln Yt_2$$
$$(8.2301) \quad (0.55791) \quad (5.3047)$$
$$+ 0.1480 \ln P_o - 0.9383 \ln P_c - 0.0305 \ln C_{t-1} \qquad (8a)$$
$$(0.9565) \quad (1.9191) \quad (0.6845)$$

$R^2 = 0.9686$ F = 43.1558 D.W. = 3.4635

S.E. = 0.0990 No. of observations = 13.

Pakistan

$$\ln Ct = -4.1010 + 0.6290 \ln Yt_1 - 0.3687 \ln Yt_2$$
$$(3.7681) \quad (1.0089) \quad (0.2648)$$
$$+ 0.1031 \ln P_o + 0.3059 \ln Pc - 0.0557 \ln C_{t-1} \qquad (8b)$$
$$(1.0965) \quad (4.8561) \quad (0.3333)$$

$R^2 = 0.9723$ F = 56.1331 D.W. = 2.6676

S.E. = 0.0931 No. of observations = 14

Kenya

$$\ln Ct = -0.4714 + 0.1748 \ln Yt_1 - 1.3304 \ln Yt_2$$
$$(1.0017) \quad (0.5737) \quad (3.4866)$$
$$+ 0.1864 \ln P_o + 0.6991 \ln Pc - 0.4025 \ln C_{t-1} \qquad (8c)$$
$$(1.8197) \quad (0.5564) \quad (3.3935)$$

$R^2 = 0.9608$ F = 24.5247 D.W. = 2.971

S.E. = 0.0890 No. of observations = 11.

The inclusion of per capita industrial production and transport activity in the model, though it has enhanced its explanatory power (R^2) and the overall significance of the equation (F-value), resulted in inconsistent estimates of the various parameters. Industrial production is not different from zero in all countries, assuming the opposite sign in the case of India. The elasticity of transport variable of India is, as expected, significantly positive and relatively large in size. However, it assumes the wrong sign in the cases of both Pakistan and Kenya, though it is statistically significant in the latter.

Additionally, such a model does not result in any improvement in the estimates of the elasticity of oil price variables. In all countries, it is not different from zero, assuming the opposite sign. Elasticity of coal price with respect to oil consumption is statistically significant and holds the right sign only in the case of Pakistan. It is statistically not different from zero in the case of India and Kenya, assuming the wrong sign in the former. The elasticity of the lagged variable assumes the opposite sign (negative) in all cases and is only statistically significant in the case of Kenya. Thus, the inclusion of the industrial production and transport activity does not result in more consistent estimates of the parameters.

In the final attempt, wholesale prices of oil products are substituted for the price of imported crude. An application of equation (8) for India and Pakistan gave the following results:

India

$$\ln Ct = 12.8015 - 1.5698 \ln Yt_1 + 5.6278 \ln Yt_2$$
$$(5.0534) \quad (1.0806) \quad (4.3255)$$
$$+ 0.7935 \ln P_o - 1.2168 \ln Pc - 0.0219 \ln C_{t-1} \qquad (9a)$$
$$(1.2469) \quad (2.1744) \quad (0.5415)$$

$R^2 = 0.9709$ F = 46.7586 D.W. = 3.2400

S.E. = 0.0952 No. of observations = 13.

Pakistan

$$\ln Ct = -2.1683 - 0.0420 \ln Yt_1 + 1.4994 \ln Yt_2$$
$$(1.9508) \quad (0.0936) \quad (1.3833)$$
$$+ 0.1291 \ln P_o + 0.1053 \ln Pc - 0.1863 \ln C_{t-1} \qquad (9b)$$
$$(1.2488) \quad (0.5087) \quad (1.5198)$$

$R^2 = 0.9733$ F = 58.3737 D.W. = 2.7827

S.E. = 0.0914 No. of observations = 14.

Hence, the substitution of the wholesale price of oil products for the unit value of imported crude oil, though it sustains the explanatory power of the equation and its overall significance, does not add to both the strength and the significance of the estimated parameters.

Table 1

The Variables used in Estimating Oil Demand for India, Pakistan and Kenya.

Year	Gross oil consumption (1)	Consumption of fuel oils (1)	GDP (2)	Industrial production (2)	Transport activity (2)	Unit value of oil imports (3)	posted price (4)	Average wholesale price of oil products (5)	Average wholesale price of coal (6)	Population (7)
India										
1961	7.613	3.268	281.3	39.0	11.8	105.73	1.81	741.5	37.4	439.00
1962	8.748	4.667	290.8	42.5	12.8	107.04	1.76	718.5	37.3	449.46
1963	9.349	5.247	308.2	45.8	13.7	93.48	1.65	813.7	37.6	460.49
1964	10.022	6.173	331.0	49.9	14.2	90.69	1.61	761.0	34.5	472.13
1965	11.058	7.363	319.8	50.5	15.1	84.97	1.54	682.5	32.3	482.53
1966	13.031	8.992	320.9	50.2	15.5	58.88	1.85	660.7	31.2	493.21
1967	12.239	8.102	345.8	53.3	16.5	79.15	2.07	614.6	31.9	504.35
1968	15.566	10.822	358.8	51.8	17.3	102.96	2.02	646.1	38.3	515.60
1969	16.599	11.492	382.2	59.3	18.3	92.55	1.91	658.7	35.0	527.18
1970	18.433	13.315	403.0	61.3	18.8	84.53	1.80	673.4	34.3	539.08
1971	20.585	14.547	414.4	63.6	19.7	104.57	2.07	712.2	33.0	551.02
1972	22.465	15.813	411.1	66.3	19.7	104.20	2.15	691.7	30.4	562.67
1973	23.393	17.248	427.3	68.0	20.0	145.06	2.74	705.7	28.3	574.42
1974	23.019	18.036	416.2	69.2	20.7	413.77	8.03	895.6	26.3	586.27

Table 1

The Variables used in Estimating Oil Demand for India, Pakistan and Kenya (continued)

Year	Gross oil consumption (1)	Consumption of fuel oil (1)	GDP (2)	Industrial production (2)	Transport activity (2)	Unit value of oil imports (3)	posted price (4)	Average wholesale price of oil products (5)	Average wholesale price of coal (6)	Population (7)
Pakistan										
1960	2.258	1.682	500.2	47.6	31.1	73.77	2.67	662.5	93.1	100.17
1961	2.333	1.692	529.9	52.8	30.5	73.28	2.41	623.2	100.6	102.77
1962	2.350	1.672	550.5	58.4	33.8	71.56	2.13	636.3	94.7	105.44
1973	3.020	2.108	600.0	64.3	35.4	46.83	2.08	655.0	99.2	108.18
1964	3.155	2.008	632.3	70.7	40.3	52.29	2.07	613.5	101.7	110.99
1965	3.499	2.222	665.5	78.0	42.2	50.05	1.97	627.1	139.5	113.93
1966	3.513	2.247	676.1	81.4	43.0	53.34	1.93	656.3	128.3	117.00
1967	3.863	2.501	729.9	87.1	45.4	70.88	1.89	680.1	161.5	120.16
1968	4.437	3.054	763.0	93.0	47.9	58.70	1.88	663.8	176.9	123.41
1969	4.004	2.488	813.0	103.2	51.4	51.63	1.82	673.5	178.4	126.74
1970	3.353	1.922	503.0	85.2	30.1	54.81	1.80	689.5	191.9	60 .61
1971	3.297	1.725	505.1	82.4	30.8	49.41	2.00	766.3	201.5	62. 23
1972	3.642	2.416	539.0	90.9	36.0	235.76	2.15	709.0	241.9	64.30
1973	3.583	2.448	554.8	91.4	37.5	233.88	2.49	726.4	331.2	66.23
1974	3.782	2.653	564.2	96.5	40.2	377.57	6.45	621.6	337.7	68.21

Table 1

The Variable used in Estimating Oil Demand for India, Pakistan and Kenya (continued)

Year	Gross Oil consumption (1)	Consumption of fuel oils (1)	GDP (2)	Industrial production (2)	Transport activity (2)	Unit value of imported oil (3)	posted price (4)	Average wholesale price of oil products (5)	Average wholesale price of oil products (5)	Population (6)
Kenya										
1963	1.000	0.743	280.4	45.5	24.8	5.71	1.92	-	6.4	8.85
1964	0.889	0.591	390.3	49.6	25.1	5.76	1.92	-	6.1	9.31
1965	0.735	0.509	396.8	52.6	27.7	5.64	1.86	-	5.9	9.60
1966	0.818	0.525	445.3	44.7	31.6	5.38	1.78	-	5.9	9.78
1967	0.821	0.523	468.2	59.8	35.0	5.20	1.71	-	5.2	10.12
1968	0.824	0.481	505.4	64.8	37.8	5.15	1.69	-	5.2	10.48
1969	1.046	0.639	533.6	70.2	38.3	4.94	1.68	-	6.4	10.88
1970	0.915	0.496	572.7	76.6	40.8	4.99	1.80	-	4.6	11.23
1971	0.921	0.565	608.9	85.5	42.8	4.94	1.95	-	5.3	11.67
1972	1.034	0.647	640.1	91.6	42.1	5.35	1.79	-	6.2	12.07
1973	1.029	0.550	682.5	101.7	44.9	5.65	2.19	-	5.2	12.48
1974	1.313	0.735	706.9	108.7	47.7	18.86	6.70	-	5.5	12.91

Source and Note: (1) Gross oil consumption of fuel oil in million metric tons of crude oil equivalent are calculated from Tables (2) and (3) of Appendix 4 for India, from Tables (2) and (4) of Appendix 4 for Pakistan and from Tables (2) and (5) of Appendix 4, for Kenya by using conversion factors between oil crude and oil products shown in Table (15).

(2) GDP, industrial production and transport activities, at 1970 prices, are in billion Rupees for India, in hundred million Rupees for Pakistan and million pounds for Kenya. They are calculated from data at current prices in Table (6) of Appendix 4, after they are deflated by the deflators of Table (8) Appendix 4.

(3) Unit value of oil imports at 1970 prices in Rupees / ton for India, Rupees / ton for Pakistan and Pounds / ton for Kenya. Unit value of imported petroleum at current prices in Table (7) of Appendix (4) is deflated by the implicit price deflator index of industrial production of Table (8), Appendix 4.

(4) Posted price of crude oil at 1970 prices in U.S.$ 1 barrel. Posted price at current prices in Table (7) Appendix (4) is deflated by the implicit price deflator index of industrial production of Table (8), Appendix 4.

(5) Average wholesale price of petroleum products at 1970 prices in Rupees/ ton for India and Rupees / ton for Pakistan. Average wholesale price of petroleum products in current prices in Table (7) Appendix 4 is deflated by the general wholesale price index in Table (9) Appendix 4.

(6) Average wholesale price of coal at 1970 prices in Rupees / ton for India, Rupees/ ton for Pakistan and Pounds/ ton for Kenya. Average wholesale price of coal at current prices in Table (7) Appendix 4 is deflated by the General Wholesale Price Index in the case of India and Pakistan in Table (9) Appendix 4 and by the implicit prices deflator index of industrial production of Table (8) Appendix 4 in the case of Kenya.

(7) Population in millions are obtained from IMF, International Financial Statistics, Vol.31, No.5, (May 1978) India, pp.196-7, Pakistan, pp.302-3, Kenya, pp.234-5.

APPENDIX 2

NOTES ON COMPILING AND COMPUTING TABLES 4-1 AND 4-2.

Imports of Crude Oil

Kenya's pattern of international trade in petroleum is different from those of India and Pakistan in the sense that crude oil is imported not only to satisfy the domestic market of Kenya for petroleum products but also to meet the demand of Uganda, Tanzania and other neighboring African countries and the Islands of the Indian Ocean. Therefore, net imports of crude oil into Kenya are defined as being equal to the total imports of crude oil minus product exports, in terms of crude oil equivalent, to Uganda. Tanzania and the rest of the world. Data on exports of products in litres are converted into tons on the basis that a ton of all product is equivalent to 1291 which is calculated from the East African Community, Economic and Statistical Review, op.cit., p. xviii. Exports of products are converted into crude oil equivalent on the basis that a ton of all products is equivalent to 1.08433 tons of crude oil which is calculated from OECD, Energy prospect to 1985, op.cit. In the case of Pakistan, data on crude imports, being compiled on the basis of the financial year, are adjusted to the calender year.

The Value of Net Import of Petroleum Crude and Products

Net imports of petroleum products of India and Pakistan, in physical and money terms, are defined as the differences between exports and imports of energy petroleum products. In the case of Kenya product exports are already deducted from imports of crude oil. The value of

crude and products of Pakistan and Kenya are converted from national currencies to U.S. dollars by using the current exchange rates taken from IMF, International Financial Statistic, Table (9), Appendix 4.

Quantum and Unit Value Index Numbers of Oil Imports

The indices of India and Pakistan are adjusted for the calender years. The base years of indices of the three countries are moved to 1970.

Unit Value of Imported Petroleum Crude

The unit value of crude imports is calculated per barrel which is usually used in the world market of oil. Tons are converted into barrels on the basis that a ton of crude oil is equivalent to 7.3 barrels.

APPENDIX 3

THE CALCULATION OF THE ADDITIONAL OIL COSTS IN 1974 and 1975 FOR INDIA, PAKISTAN AND KENYA

This appendix will explain the method of calculating the actually paid additional costs for India, Pakistan and Kenya and the additional oil costs compatible with internal equilibrium for India and Pakistan only.

The Actually Paid Additional Oil Costs

For calculating the actually paid additional oil costs as defined in Chapter IV (p. 140), the actual quantities of the net petroleum imports, crude oil and refined products in 1974 and 1975, Table 4-1, are priced by the corresponding prices calculated in p. 141, which assume the continuation of pre-October 1973's prices of crude oil, gasolines, kerosenes and distillates and residuals throughout 1974 and 1975. The resulting estimates indicate the net import bills in 1974 and 1975 had OPEC not increased the prices of oil, unilaterally, as shown in Table (1). The differences between such estimates and the actual payments for petroleum imports in 1974 and 1975, as shown in Chapter IV, Table 4-2, are the actually paid additional oil costs which are shown in Chapter IV, Table 4-4.

The Additional Oil Costs Compatible with Internal Equilibrium

Additional oil costs compatible with internal equilibrium, as defined in pp. 144-5, Chapter IV, are estimated on the basis of certain assumptions which are discussed in p. 145, Chapter IV, and are calculated in Table 2 of this Appendix. Per Capita GDP at 1970 prices is assumed to grow during 1974-1975 in India and Pakistan at 1973's growth rates, namely, 3.0 and 3.7 per cent per

Table (1) The Net Oil Import Bills of India, Pakistan and Kenya in 1974 and 1975 on the basis of the pre-October 1973's prices of Petroleum (in millions of current U.S. $)

	(1) Petroleum Crude	Petroleum Products (2) Gasolines	(3) Kerosenes	(4) Distillates & Fuel Oils	(5) Total (2+3+4)	(6) Net Oil Import Bills (1+5)
India						
1974	328.918	0.471	46.139	61.964	108.574	437.492
1975	345.136	1.033	74.448	31.397	106.878	452.014
Pakistan						
1974	56.156	1.912	3.343	13.086	18.341	74.497
1975	68.112	1.806	3.664	13.675	19.145	87.257
Kenya						
1974	29.712	2.488	5.257	2.515	10.260	39.972
1975	39.043	1.288	0.576	0.735	2.599	41.642

Source: Based on Table 4-1 and petroleum prices shown in p. 141, Ch. IV.

Table (2) Assumptions about Economic Growth, Prices of Crude Oil and Prices of Coal during 1974 and 1975 at 1970 prices for India and Pakistan.

	INDIA		PAKISTAN	
	1974	1975	1974	1975
Average annual growth rate of per capita GDP	(1) 3.0	(1) 3.0	(2) 3.7	(2) 3.7
Price of Crude Oil per ton in national currency (3)	127.62	126.43	128.11	116.31
Price of Coal per ton in national currency (4)	28.26	28.26	331.15	331.15

Source: (1) U.N., Yearbook of National Accounts Statistics, 1977, Vol.2, op.cit., Table 4A.
(2) Calculated from Government of Pakistan, Pakistan Economic Survey, 1976-77 op.cit., Statistical Tables, Table 5, pp. 9-13, GDP at 1959-60 prices.
(3) Based on prices of crude oil shown in p. 141, Chapter IV.
(4) Table (1), Appendix 1.

annum, respectively. Prices of crude oil of India and Pakistan are converted from U.S. $ to their national currencies at the exchange rate prevailing in 1973[1] and then deflated by the implicit price deflator index numbers of industrial production which it is assumed to be increasing during 1974 and 1975 at the same rate as for 1973[2], namely, 10.6 and 20.7 per cent per annum for India and Pakistan respectively. Finally, it is assumed that 1973's prices of coal in India and Pakistan remain unchanged.

Data of Table (2) are used in equation (5a) for India and (5b) for Pakistan to calculate their inland consumption of petroleum during 1974 and 1975, in million tons of crude oil equivalent. Petroleum imports are then calculated as residuals after deducting the actual domestic production of crude during these two years from the estimated total consumption, taking no account for changes in stocks. Petroleum imports are disaggregated into both crude and products on the basis of the actual patterns of petroleum imports of India and Pakistan in 1974 and 1975. Then, imports of products in million ton of crude oil equivalent are proportioned into gasolines, kerosenes and distillates and residuals on the basis of the pattern of the net actual imports of petroleum products of India and Pakistan in 1974 and 1975 after they were converted into crude oil equivalent as follows:

	INDIA				PAKISTAN			
	1974		1975		1974		1975	
Gasolines	0.008	0.3 %	0.015	0.7 %	0.032	5.8 %	0.027	5.3 %
Kerosenes	0.889	29.9	1.308	57.3	0.066	12.0	0.066	12.6
Fuel Oils	1.954	69.9	0.912	42.0	0.425	82.2	0.405	82.1
	2.851	100	2.235	100	0.523	100	0.498	100

(1) IMF, International Financial Statistics, Vol. 31, No. 5 (May 1977), p. 179 and p. 303

(2) U.N., Yearbook of National Accounts Statistics, 1977, Vol. 2, op.cit., Table 8B.

Finally, the estimated imports of products are converted to their equivalent in gasolines, kerosenes and distillates and residuals. Table (3) shows the estimated consumption, production and imports of crude oil, gasolines, kerosenes, distillates and residuals of India and Pakistan in 1974 and 1975 in million metric tons.

Table (3) The Estimates of Consumption, Production, Imports of Petroleum Crude and Refined Products in India and Pakistan in 1974 and 1975 (in million metric tons)

	INDIA		PAKISTAN	
	1974	1975	1974	1975
In crude oil equivalent				
Total inland consumption	26.725	30.471	4.392	4.699
Domestic crude production	7.490	8.283	0.432	0.385
Net imports	19.235	22.188	3.960	4.314
Imports of crude	16.100	19.126	3.287	3.667
Imports of products	3.135	3.062	0.673	0.647
Imports of products				
Gasolines	0.008	0.019	0.036	0.031
Kerosenes	0.854	1.602	0.074	0.075
Distillates and fuel oils	2.107	1.237	0.532	0.511

Such level of petroleum imports represent the requirements which are needed to sustain economic growth during 1974 and 1975 at the level which were prevailing during 1973, given the oil prices remained unchanged. The corresponding net oil import bills to such level of imports are calculated in Table (4) by multiplying imports of crude oil, gasoline, kerosenes, and distillates and residuals, shown in Table (3),

by the corresponding prices indicated in p. 141, Chapter IV. The additional oil costs compatible with internal equilibriums, computed in Table 4-6, Chapter IV are the differences between the estimates of Table 4 of this Appendix and the actual payments for petroleum imports in Table 4-2 of Chapter IV.

Table (4) Net Oil Import Bills Compatible with Internal Equilibrium in India and Pakistan on the Basis of Pre-October 1973's prices of Petroleum (in millions of current U.S. $)

	(1) Petroleum Crude	Petroleum Products (2) Gasolines	(3) Kerosenes	(4) Distillates & Fuel Oils	(5) Total (2+3+4)	(6) Net Oil Import Bills (1+5)
India						
1974	361.992	0.538	48.585	68.823	117.946	479.938
1975	471.303	1.402	99.888	44.285	145.575	616.878
Pakistan						
1974	72.386	2.373	4.123	17.021	23.517	95.903
1975	88.507	2.240	4.580	17.918	24.738	113.245

Source: Based on Table (3) and prices of petroleum indicated in p. 141, Chapter IV.

APPENDIX 4

BACKGROUND TABLES

13 Pakistan: The Year-to-Year Changes in the Major Export Items, 1971-75

14 Kenya: The Year-to-Year Changes in the Major Export Items, 1971-75

15 Conversion Factors of oil products.

Table (1)

Consumption of Commercial Energy in India, Pakistan and Kenya, 1960-75. Quantities in million metric tons of coal equivalent.

	INDIA				PAKISTAN				KENYA			
	Solid Fuels	Liquid Fuels	Natural Gas	Primary Electr-icity	Solid Fuels	Liquid Fuels	Natural Gas	Primary Electr-icity	Solid Fuels	Liquid Fuels	Natural Gas	Primary Electr-icity
1960	51.252	9.313	0.000	0.965	1.985	3.208	0.843	0.048	0.043	1.075	-	0.041
1961	55.319	10.217	0.004	1.208	1.925	3.365	1.026	0.116	0.037	1.092	-	0.043
1962	60.172	11.837	0.007	1.454	2.051	3.445	1.264	0.172	0.045	1.227	-	0.046
1963	64.169	23.869	0.008	1.718	2.161	3.961	1.585	0.182	0.043	1.334	-	0.046
1964	61.416	13.333	0.016	1.822	2.134	4.278	1.991	0.215	0.035	1.288	-	0.048
1965	67.387	14.349	0.196	1.874	1.970	4.802	2.356	0.270	0.055	1.101	-	0.048
1966	67.636	16.089	0.217	2.069	1.663	5.153	2.663	0.270	0.049	1.128	-	0.051
1967	68.783	14.518	0.338	2.296	1.597	5.616	3.106	0.331	0.050	1.097	-	0.054
1968	71.273	19.041	0.522	2.550	1.758	6.474	3.486	0.385	0.041	1.240	-	0.058
1969	70.988	20.402	0.693	3.001	1.583	5.744	4.294	0.406	0.032	1.642	-	0.062
1970	71.865	21.570	0.650	3.405	1.433	4.926	3.816	0.369	0.083	1.367	-	0.069
1971	73.509	24.732	0.761	3.594	0.810	4.366	3.228	0.439	0.082	1.506	-	0.078
1972	76.392	26.622	0.847	3.486	0.964	5.115	4.705	0.494	0.040	1.494	-	0.084
1973	77.846	27.789	0.819	3.859	0.865	4.941	5.454	0.569	0.071	1.694	-	0.087
1974	84.522	27.379	0.955	3.701	0.848	5.125	5.702	0.664	0.067	2.044	-	0.097
1975	96.383	30.042	1.216	4.413	0.844	5.118	6.198	0.664	0.064	2.167	-	0.112

Source: Data for the period 1960-73 is taken from United Nations, World Energy Supplies, 1950-1974, No. 19, op.cit. Table 2, pp. 12-123. For the period 1974-75, United Nations, World Energy Supplies, 1972-1976, No. 21, op. cit., Table 2, pp. 6-35.

Table (2)

Production, Imports and Apparent Supply of Petroleum Crude in India, Pakistan and Kenya, 1960-75
(Quantities in million metric tons)

	Domestic Production			Imports			Apparent Supply		
	India	Pakistan	Kenya	India	Pakistan	Kenya	India	Pakistan	Kenya
1960	0.454	0.361	-	5.723	-	-	6.091	0.361	-
1961	0.513	0.387	-	5.968	-	-	6.440	0.387	-
1962	1.078	0.457	-	6.021	0.332	-	7.003	0.789	-
1963	1.652	0.477	-	6.519	1.761	0.221	8.138	2.238	0.134
1964	2.212	0.547	-	6.791	2.105	1.500	8.932	2.652	1.517
1965	3.022	0.535	-	6.811	2.430	1.844	9.754	2.962	1.823
1966	4.647	0.517	-	7.457	2.545	1.849	12.030	3.062	1.823
1967	5.667	0.502	-	8.704	2.683	1.923	14.430	3.185	1.972
1968	5.835	0.518	-	10.450	3.292	1.963	16.096	3.810	1.939
1969	6.723	0.533	-	10.702	4.229	2.067	17.495	4.762	2.159
1970	6.809	0.501	-	11.665	3.111	2.206	18.459	3.612	2.151
1971	7.185	0.462	-	12.688	2.741	2.541	19.588	3.203	2.551
1972	7.373	0.455	-	12.310	3.455	2.499	19.672	3.910	2.516
1973	7,198	0.409	-	13.443	3.161	2.716	20.518	3.570	2.639
1974	7.490	0.432	-	14.629	3.100	2.808	20.783	3.532	2.803
1975	8.283	0.358	-	14.550	3.200	2.826	21.835	3.585	2.877

Source: Data for the period 1960-73 is taken from United Nations, World Energy Supplies, 1950-1974, No. 19, op.cit., Table 6, pp. 192-227. For the period 1974-75, United Nations, World Energy Supplies, 1972-1976, No. 21, op.cit., Table 6, pp. 58-67.

Table (3)

India: Trade and Apparent Consumption of Energy Petroleum products, 1960-75. (Quantities in thousand metric tons)

	Imports			Exports			Bunkers				Consumption		
	Gs	Ks	FOs	Gs	Ks	FOs	Gs	Ks	FOs	LPGs	Gs	Ks	FOs
1960	111	989	395	239	-	-	40	-	451	-	879	1918	3232
1961	115	1093	502	165	-	-	41	-	432	11	949	2108	3546
1962	84	1456	606	64	-	-	41	-	440	16	1109	2620	3906
1963	80	1321	726	394	-	-	35	130	450	21	993	2755	4570
1964	80	1010	913	362	11	17	33	134	429	30	1034	2483	5113
1965	64	838	1176	260	12	24	30	146	377	44	1134	2243	5922
1966	40	1045	613	227	-	-	30	207	411	57	1034	2657	6736
1967	40	483	28	355	-	1585	28	220	468	105	983	2797	5541
1968	41	453	55	312	-	49	25	259	410	123	1083	3253	7947
1969	24	311	18	390	-	135	13	330	285	145	1005	3569	8577
1970	60	608	415	376	28	85	20	350	244	178	1165	3602	9112
1971	37	608	1157	187	16	45	20	350	230	195	1481	4036	10402
1972	31	1256	1952	23	42	41	20	300	176	227	1569	4508	11031
1973	35	914	2596	25	63	86	20	350	170	259	1637	3983	12389
1974	37	850	1926	30	39	29	15	400	160	278	1282	3271	13098
1975	39	1229	902	25	35	25	15	350	160	320	1217	4040	14081

Source: Data for the period 1960-73 is taken from United Nations, World Energy Supplies, 1950-1974, No. 19 op.cit.,Liquid Petroleum Gases, Table 11, pp. 336-74; gasolines, Table 12, pp. 375-429; kerosenes Table 13, pp. 430-84; fuel oils Table 14, pp. 485-540. For the period 1974-75, United Nations, World Energy Supplies, 1972-1976, No. 21, op.cit., liquid petroleum gases, Table 11, pp. 101-9; gasolines Table 12, pp. 110-21; kerosenes Table 13, pp. 122-33; fuel oils Table 14, pp. 134-47.

Note: LPGs = Liquified petroleum gases, Gs = gasolines, Ks = kerosenes, FOs = fuel oils.

Pakistan: Trade and Apparent Consumption of Energy Petroleum Products, 1960-75. (Quantities in thousand metric tons)

	Imports			Exports			Bunkers				Consumption		
	Gs	Ks	FOs	Gs	Ks	FOs	Gs	Ks	FOs	LPGs	G	Ks	FOs
1960	195	336	1555	10	3	10	49	59	151	-	232	295	1577
1961	185	421	1570	6	2	10	37	94	162	-	236	350	1619
1962	160	476	1393	5	2	100	34	124	288	-	242	378	1636
1963	67	350	688	3	-	-	5	104	257	-	269	565	1753
1964	82	409	508	4	-	186	4	116	225	-	314	734	1737
1965	100	439	351	5	-	160	4	120	106	-	332	835	1960
1966	65	361	453	6	-	154	4	95	203	-	310	847	2205
1967	85	431	588	4	2	156	4	100	206	-	340	906	2419
1968	61	506	619	6	-	197	4	110	290	-	364	90	2770
1969	4	136	108	11	-	429	5	130	229	-	403	982	2389
1970	5	90	308	3	-	333	5	140	168	-	385	710	2157
1971	10	442	458	1	1	487	5	160	181	3	434	924	1650
1972	7	67	502	1	-	592	5	130	102	-	409	712	2216
1973	22	100	529	-	-	395	4	110	130	3	320	717	2186
1974	29	60	666	-	-	257	3	100	153	3	326	705	2316
1975	25	60	665	-	-	275	3	100	155	3	327	715	2300

Source: See Table 3, Appendix 4.

Note: See Table 3, Appendix 4.

Table (5)

Kenya: Trade and Apparent Consumption of Energy Petroleum Products, 1960-75 (Quantities in thousand metric tons)

	Imports			Exports				Bunkers			Consumption			
	Gs	Ks	FOs	LPGs	Gs	Ks	FOs	Gs	Ks	FOs	LGPs	Gs	Ks	FOs
1960	141	69	628	-	6	4	4	14	-	107	1	121	65	517
1961	135	80	675	-	10	4	5	8	-	149	1	117	76	521
1962	145	102	716	-	9	3	5	4	-	141	1	132	99	570
1963	132	95	697	-	13	4	25	5	-	132	2	134	101	636
1964	40	40	63	2	78	38	507	3	-	130	2	151	119	568
1965	7	6	20	5	168	83	670	2	-	139	2	101	106	511
1966	27	87	16	4	177	93	634	2	-	177	4	104	164	462
1967	15	33	96	3	168	92	439	1	-	536	3	115	158	437
1968	50	83	43	4	170	142	362	-	-	560	2	144	170	490
1969	20	83	37	3	166	140	447	1	-	443	5	151	221	573
1970	51	62	67	3	174	156	617	-	-	407	6	170	214	492
1971	41	32	47	3	180	157	647	-	170	476	9	187	139	649
1972	78	64	65	3	191	156	622	-	188	451	10	211	143	607
1973	56	60	8	4	191	130	740	1	131	458	11	197	241	650
1974	45	85	73	3	152	138	811	1	96	421	14	261	267	784
1975	43	7	200	3	151	127	807	-	119	340	15	255	241	899

Source: See Table 3, Appendix 4.
Note: See Table 3, Appendix 4.

Table (3)

Gross Domestic Product, Industrial Production and Transport and Communication Activities of India, Pakistan and Kenya, 1960-74 (at current prices)

	India (in 000's million rupees)			Pakistan (in million rupees)			Kenya (in million pounds)		
	Industrial Production	Transport and comm-unication	GDP	Industrial Production	Transport and comm-unication	GDP	Industrial Production	Transport and Comm-unication	GDP
1960	22.2	6.9	150.2	3524	2094	36717	-	-	-
1961	24.7	7.6	159.8	3937	2156	38630	-	-	-
1962	27.7	8.6	171.0	4459	2335	41011	-	-	-
1963	31.7	9.4	196.6	4985	2568	44161	-	-	-
1964	35.4	10.1	230.4	5520	3092	49317	42.1	25.3	356.7
1965	37.6	11.1	241.1	6362	3307	54042	45.9	27.0	358.7
1966	41.3	12.3	276.9	6923	3735	61318	40.9	30.8	416.8
1967	44.5	13.8	323.3	7701	4068	65257	56.5	32.9	440.1
1968	48.0	15.9	334.0	8703	4326	71338	61.9	36.2	483.3
1969	55.9	17.2	370.0	9795	4907	77395	69.6	37.8	520.8
1970	61.4	18.8	403.0	8524	3011	50297	76.6	40.8	572.7
1971	67.2	20.2	431.8	8706	3248	53845	87.3	43.5	635.1
1972	74.4	20.6	469.9	10738	4275	66515	100.0	47.0	711.8
1973	84.2	22.6	576.8	13048	5585	85724	116.4	53.7	814.9
1974	107.9	26.6	684.6	17869	7224	109592	137.6	63.1	952.2

Source: United Nations, Yearbook of National Accounts Statistics, issues: 1963, 1965, 1970 and 1975.

Posted Prices and Unit Values of Imported Petroleum Crude, the Average Wholesale prices of Petroleum Products and the Average Wholesale Prices of Coal of India, Pakistan and Kenya, 1960-74 (at current prices)

	Saudi Crude	Unit Value of Imported (a) crude petroleum			The Average Wholesale Price of Petroleum Products (b)			The Average Wholesale Price of Coal (c)		
	U.S. $/ barrel	India Rupee/ton	Pakistan Rupees/ton	Kenya K£/ton	India Rupees/ton	Pakistan Rupees/ton	Kenya K£/galon	India Rupees/ton	Pakistan Rupees/ton	Kenya K£/ton
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1960	1.870	-	54.67	-	-	474.90	-	-	71.03	-
1961	1.800	67.03	54.67	-	409.24	474.90	0.189	20.64	76.65	-
1962	1.800	69.68	54.67	-	411.58	476.63	0.209	21.39	70.96	-
1963	1.800	64.69	36.29	4.844	494.91	507.26	0.171	22.87	76.86	5.444
1964	1.800	64.39	40.84	4.886	513.57	507.26	0.176	23.31	84.10	5.165
1965	1.800	63.22	40.84	4.919	516.14	511.57	0.186	24.44	113.77	5.109
1966	1.800	48.40	45.39	4.920	546.62	546.62	0.195	25.83	116.18	5.378
1967	1.800	68.62	62.67	4.917	573.61	624.22	0.195	29.80	148.99	4.890
1968	1.800	91.84	54.94	4.920	589.79	626.15	0.195	35.00	166.85	4.940
1969	1.800	87.18	49.00	4.900	623.77	648.26	0.195	33.14	171.70	6.308
1970	1.800	84.53	54.81	4.997	673.37	689.53	0.195	34.26	191.93	4.602
1971	2.194	110.53	52.18	5.037	740.52	838.80	0.207	34.26	220.54	5.429
1972	2.382	116.91	278.67	5.837	790.58	928.05	0.207	34.69	316.65	6.741
1973	3.284	179.59	333.74	6.464	988.00	1212.00	0.243	39.65	552.39	5.952
1974	11.584	645.07	698.89	23.872	1547.00	1307.24	0.993	45.48	710.38	6.987

Source ..../

(1) IMF, International Financial Statistics, Vol. 21, No. 9, Supplement (September 1968,)pp. 28-9; IMF, International Financial Statistics, Vol. 28, No. 9 (September 1975) p. 31.
(2) Calculated from U.N., Yearbook of International Trade Statistics, issues: 1963, 1966, 1970 and 1975.
(3) Ibid.
(4) Calculated from Republic of Kenya, Statistical Abstract, issues: 1965, 1970 and 1975
(5) Data for the period 1961-72 is taken from Gover ment of India, Statistical Abstract,issues: 1965, 1968, 1969 and 1972. Data for the years 1973 and 1974 is taken from Henderson, op.cit., Table 30, pp. 66.
(6) Data for the period 1960-72 is taken from Government of Pakistan, 25 Years of Pakistan in Statistics, 1947-72, op.cit., Table 17.09, p. 347; Table 17.11, p. 365. Data for years 1973 and 1974 is taken from Government of Pakistan, Statistical Yearbook, 1975-76 op. cit., Table 16.5, p. 202; Table16.7, p. 203.
(7) Republic of Kenya, Statistical Abstract, issues: 1965, 1970 and 1975.
(8) Data for the period 1961-72 is taken from Government of India, Statistical Abstract, issues: 1965, 1968, 1969 and 1972. Data for the years 1973 and 1974 is taken from Henderson, op. cit.Table 20, p. 40.
(9) Data for the period 1960-72 is taken from Government of Pakistan, 25 Years of Pakistan in Statistics, op. cit., Table 17.09, p. 347; Table 17.11, p. 365. Data for the years 1973 and 1974 is taken from Government of Pakistan, Pakistan Statistical Year book, 1975-76, op.cit., Table 16.7, p. 202; Table 16.5, p. 203.
(10) Calculated from Republic of Kenya, Statistical Abstract, issues: 1965, 1970 and 1975,

Note:

(a) Unit value of imported crude oil of India and Pakistan is converted from U.S. $ to national currency by using exchange rates shown in Table (9), Appendix 4.
(b) Wholesale prices of petroleum products of India and Pakistan are the averages of three and four products, respectively, whereas in the case of Kenya, the retail price of petrol is used after it was converted from shillings/litre to K£/galon
(c) Wholesale price of coal of India represents the price of Kajora (Gd.1), whereas the wholesale price of coal of Pakistan represents the average of the prices of seven kinds of coal. In the case of Kenya, the unit value of imported coal is used owing to the absence of wholesale prices.

Table (8)

Implicit Price Deflator Indices of Gross Domestic Product, Industrial Production, and Transport and Communication of India, Pakistan and Kenya, 1960-75.

(indices from data in National Currencies) 1970=100

Year	India			Pakistan			Kenya		
	Industrial Production	Transport and Communication	GDP	Industrial Production	Transport and Communication	GDP	Industrial Production	Transport and Communication	GDP
1960	63.4	61.4	55.7	74.1	67.4	73.4	-	-	-
1961	63.4	64.2	56.8	74.6	70.6	72.9	-	-	-
1962	65.1	67.2	58.8	76.4	69.0	74.5	-	-	-
1963	69.2	68.5	63.8	77.5	72.5	73.5	-	-	-
1964	71.0	71.3	69.6	78.1	76.7	78.0	84.8	100.8	91.4
1965	74.4	73.5	75.4	81.6	78.4	81.2	68.2	97.4	90.9
1966	82.2	79.1	86.3	85.1	86.9	90.7	91.5	97.3	93.6
1967	86.7	83.8	93.5	88.4	89.6	89.4	94.5	93.9	94.0
1968	89.2	91.8	93.1	93.6	90.3	93.5	95.5	95.8	96.2
1969	94.2	94.2	96.8	94.9	95.5	95.2	99.1	98.8	97.6
1970	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1971	105.7	102.9	104.4	105.6	105.5	106.6	102.0	100.7	104.3
1972	111.6	106.1	115.1	118.2	118.9	123.4	109.2	111.7	111.2
1973	123.4	116.3	135.5	142.7	149.0	153.3	114.4	119.7	119.4
1974	156.9	132.6	154.6	193.9	189.1	194.1	126.6	132.4	134.7
1975	173.6	151.6	157.9	221.8	210.4	216.5	133.6	153.0	153.7

Source: Data for the period 1960-74 is taken from U.N., Yearbook of National Accounts Statistics, 1976, Vol. 2, op.cit., Table 8B, pp.349-77.
Data for 1975 is taken from U.N., Yearbook of National Accounts Statistics, 1977, Vol.2, op.cit., Table 8B, pp.367-99.

Table(9)

General Wholesale Price Indices and Exchange Rates of India, Pakistan and Kenya, 1960-75.

	General Wholesale Price Index 1970= 100			Exchange Rate (4)(b) Units of national currency per U.S.$		
	India(1)	Pakistan(2)	Kenya(3)(a)	India Rupees/ U.S.$	Pakistan Rupees/ U.S.$	Kenya shillings/ U.S.$
1960	-	65.7	83.3	4.762	4.762	7.1429
1961	55.2	65.7	85.2	4.762	4.762	7.1429
1962	57.3	66.0	88.4	4.762	4.762	7.1429
1963	60.8	72.4	83.4	4.762	4.762	7.1429
1964	67.5	72.4	88.4	4.762	4.762	7.1429
1965	75.6	75.3	88.4	4.762	4.762	7.1429
1966	82.7	90.9	96.1	6.359	4.762	7.1429
1967	93.3	91.9	97.8	7.500	4.762	7.1429
1968	91.3	93.0	99.0	7.500	4.762	7.1429
1969	94.7	94.6	98.0	7.500	4.762	7.1429
1970	100.0	100.0	100.0	7.500	4.762	7.1429
1971	103.9	116.2	103.9	7.501	4.762	7.1429
1972	114.3	116.7	109.8	7.594	8.941	7.1429
1973	140.3	153.3	120.1	7.742	10.023	7.0012
1974	172.7	210.8	141.5	8.102	9.931	7.1429
1975	-	-	168.6	8.396	9.931	7.4113

Source: (1) Government of India, Monthly Abstract of Statistics, issues: Vol. 25, No.10, (October 1972); Vol. 29, No.10, (October 1976).

(2) Data for the period 1960-72 is taken from Government of Pakistan, 25 Years of Pakistan in Statistics, op.cit., Table 1701, p.314; Table 1702, p.324. Data for the years 1973 and 1974 is taken from Government of Pakistan, Pakistan Statistical Yearbook 1975-76, op.cit., Table 16.1, p.176; Table 16.2, p.179.

Source (3) IMF, International Financial Statistics, Vol. 31 (May 1978), pp.234-5.

(4) Ibid., India, pp.196-7; Pakistan, pp.302-3; Kenya, pp.234-5.

Note: (a) Consumer price index.

(b) Par rate/Market Rate

Exports by Commodity Group of India, Pakistan and Kenya 1970-75

	Food and Live Animals	Beverages and Tobacco	Crude Materials	Mineral Fuels	Oils and Fats	Chemicals	Basic Manufactured Goods	Machinery and Transport Equipments	Miscellaneous Manf. Goods	Unspecified Transactions	Total
India(1)(a) (in million Rupees)											
1969/70	3455.7	333.6	2314.2	94.9	50.7	303.3	6299.6	553.6	630.9	50.6	14087.
1970/71	4126.7	325.7	2516.6	125.8	71.2	363.6	6157.2	751.1	760.3	45.6	15243.9
1971/72	4244.6	451.1	2440.8	199.2	193.2	320.7	6597.6	708.2	820.7	53.5	16030.8
1972/73	5300.4	640.8	2511.2	319.2	295.2	403.2	8140.8	850.8	1128.0	54.0	19644.0
1973/74	6788.4	709.2	3622.8	153.6	321.6	582.0	9988.8	1160.4	1788.0	68.4	25183.2
1974/75	10191.6	823.2	4322.4	204.0	344.4	1041.6	11668.8	2134.8	2434.8	67.2	33232.8
1975/76	12544.8	985.2	5434.8	370.8	372.0	892.8	13860.0	2563.0	3162.0	73.2	40258.8
Pakistan(2)(b) (in million Rupees)											
1969/70	252.4	18.7	308.2	52.9		20.3	826.5	9.1	117.4	2.4	1608.6
1970/71	335.6	17.7	384.5	45.2		19.0	1045.2	11.8	136.8	3.0	1998.4
1971/72	467.8	26.6	1132.8	41.5	0.1	30.7	1437.3	14.4	215.1	5.1	3371.4
1972/73	1708.2	49.5	1571.6	128.9	0.5	41.6	4455.2	36.2	549.4	10.1	8551.2
1973/74	2804.6	110.8	866.8	175.7	0.4	108.9	5046.5	111.6	816.1	119.9	10161.2
1974/75	2738.2	133.7	2000.6	138.9	0.5	123.2	4098.1	61.3	927.3	64.5	10286.3
1975/76	3107.1	161.6	1482.8	192.1	0.3	141.5	5024.6	121.9	951.9	68.9	11252.9
Kenya(3) (c) (In million Pounds)											
1970	52.020	0.593	9.580	14.120	1.198	8.373	9.015	0.180	7.839	0.128	103.056
1971	47.440	0.584	11.436	17.744	1.372	9.362	9.951	0.252	8.788	0.149	107.078
1972	62.254	0.594	14.436	19.409	1.074	9.997	8.671	0.211	6.548	0.190	123.383

Table (10)

Exports by Commodity Group of India, Pakistan and Kenya, 1970-75 (continued.)

	Food and Live Animals	Beverages and Tobacco	Crude Materials	Mineral Fuels	Oils and Fats	Chemicals	Basic Manuf-acturing used Goods	Mach-inery and Trans-port Equipments	Miscellan-eous Manuf. Goods	Unspec-ified Trans-actions	Total
1973	80.446	0.722	23.089	21.302	1.091	13.140	11.734	0.377	9.335	0.152	161.388
1974	83.362	0.421	36.114	45.614	1.748	14.596	17.873	0.341	10.994	0.218	211.282
1975	86.093	0.241	29.475	58.552	0.585	12.377	17.577	0.929	9.095	0.200	215.125

Source: (1) Data for the years 1969 and 1970 is taken from Government of India, Statistical Abstract, 1972, op.cit., Table 77, pp.199-209. Data for the period 1971-75 is taken from Government of India, Monthly Abstract of Statistics , Vol.30, No.10 (December 1977),Table 30,pp.65-8.

(2) Data for the years 1969 and 1970 are taken from Government of Pakistan,Pakistan Economic Survey, 1976-77, op.cit.,Statistics, Table 31, pp.86-7. Data for the period 1971-75 is taken from Government of Pakistan, Pakistan Statistical Yearbook, 1975-76, op.cit., Table 17.5, pp.222-33.

(3) Republic of Kenya, Statistical Abstract, 1976, op.cit., export to Tanzania, Table 62(a), p.68; exports to Uganda, Table 63 (a), p.70; exports to the rest of the World(Domestic exports),Table 59(a), p.63

Note: (a) Fiscal year - April 1 to March 31.

(b) Fiscal year - July 1 to June 30.

(c) Fiscal year - January 1 to December 31.

Table (11)

Unit Value and Quantum Indices of the Exports of India, Pakistan and Kenya, 1971-75.[a] 1970 = 100

	Food and Live Animals	Beverages and Tobacco	Crude Materials	Oils and Fats	Chemicals	Basic Manuf-actured Goods	Machinery and Transport Equipments	Miscellaneous Manufactured Goods	Total Export
Unit value index									
India[1]									
1971	95.7	105.9	99.3	121.0	94.0	106.3	94.1	93.0	102.2
1972	102.2	96.2	104.2	172.1	93.7	120.2	97.4	96.9	111.2
1973	132.4	113.2	119.3	280.4	102.3	140.8	109.2	111.0	132.5
1974	177.4	144.6	142.9	289.1	172.4	180.3	103.5	128.1	165.1
1975	191.5	171.8	174.0	230.0	188.0	189.5	133.6	140.4	183.8
Pakistan[2]									
1971	113.7	95.0	118.4	-	120.8	111.8	103.7	126.4	114.1
1972	194.6	111.6	181.0	-	152.6	201.5	158.0	228.3	194.2
1973	304.3	177.2	305.9	-	206.9	364.8	213.5	391.3	344.0
1974	415.6	202.5	364.7	-	303.3	406.7	259.6	463.3	410.3
1975	451.1	186.4	351.3	-	342.2	363.1	311.1	489.9	396.7
Kenya[3]									
1971	92.4	177.0	111.8	147.0	117.3	114.4	116.1	109.8	96.2
1972	97.9	187.6	123.0	147.0	156.0	129.3	131.2	123.0	106.8
1973	112.7	178.8	175.5	167.6	173.6	163.6	154.8	162.5	121.2
1974	131.2	162.8	228.1	253.8	228.7	194.5	182.3	179.0	164.5
1975	138.6	233.6	204.6	330.8	287.4	239.1	224.1	219.6	188.6

Table (11)

Unit Value and Quantum Indices of the Exports of India, Pakistan and Kenya, 1971-75 (Continued.) 1970 = 100

	Food and Live Animals	Beverages and Tobacco	Crude Materials	Oils and Fats	Chemicals	Basic Manufactured Goods	Machinery and Transport Equipments.	Miscellaneous Manufactured Goods.	Total Exports
Quantum Index									
India(1)									
1971	111.4	116.7	96.7	99.6	93.8	95.2	101.9	114.0	101.4
1972	125.4	184.1	93.5	198.6	105.2	99.3	107.7	140.8	110.2
1973	123.9	178.1	107.1	185.7	132.1	103.6	126.7	183.6	116.8
1974	135.0	163.2	112.3	198.6	137.5	96.1	236.8	225.3	123.7
1975	158.2	162.0	112.5	261.4	127.5	105.3	239.5	271.1	135.5
Pakistan(2)									
1971	121.1	135.9	164.0	-	67.9	121.5	142.6	115.5	129.4
1972	183.9	203.3	205.7	-	60.2	157.1	151.0	128.0	169.3
1973	209.3	267.2	180.3	-	136.3	165.4	138.5	162.8	176.5
1974	182.4	700.1	183.6	-	244.0	143.3	107.5	196.3	164.0
1975	235.1	1024.1	210.0	-	241.2	154.3	59.7	268.3	177.5
Kenya(3)									
1971	93.1	93.1	146.4	147.8	96.8	90.5	95.7	108.2	97.5
1972	113.6	86.6	161.0	181.8	78.4	71.5	72.7	66.0	100.4
1973	126.6	111.7	178.6	199.5	93.9	77.8	97.6	66.0	115.1
1974	111.7	85.7	213.7	245.3	81.3	93.2	104.3	61.7	111.2
1975	108.9	50.3	185.9	190.7	55.2	74.2	84.2	43.3	98.5

Source: (1) Data for the years 1969 and 1970 is taken from Government of India, Statistical Abstract, 1972, op.cit, Table 86, pp.225. Data for the period 1971-75 is taken from Government of India, Monthly Abstract of Statistics, Vol.30, No.10 (October 1977), Table 26, p.53; Table 27, p.55.

(2) Government of Pakistan, Pakistan Statistical Yearbook, 1975-76, op.cit., Table 17.7, pp.239-4; Table 17.8, pp.241-2.

(3) Republic of Kenya, Statistical Abstract, 1974, op.cit, Table 10(b), p.81; Statistical Abstract, 1975, op.cit, Table 73, p.91; Table 74,p.92.

Note: Data of India and Pakistan is adjusted for the calender year and the base years for the three countries are moved to 1970.

Table (12)

dia: The Year-to-Year Changes in the Major Export Items 1971-75. (percentage hanges from the preceding year)

	1971	1972	1973	1974	1975
Tea					
Unit value	+ 4.6	+ 1.9	- 0.1	+ 30.0	+11.9
Volume	+19.9	- 7.4	- 1.5	+ 18.1	- 5.5
Value	+25.5	- 5.8	- 1.6	+ 54.4	+ 5.8
Oil Cakes					
Unit value	- 8.0	+37.9	+78.1	- 17.3	+ 5.5
Volume	+ 5.2	+34.9	+28.1	- 35.1	-14.8
Value	- 3.1	+86.1	+128.1	- 46.3	-10.1
Cashew					
Unit value	+ 8.6	+ 2.0	+37.3	+ 27.0	+ 1.3
Volume	- 1.6	+10.0	-21.2	+25.0	-19.7
Value	+ 6.8	+12.2	+ 8.1	+ 58.7	-18.7
Coffee					
Unit value	+ 0.2	- 5.0	+34.6	+ 18.4	+10.6
Volume	+12.5	+41.7	+ 3.9	- 5.7	+17.8
Value	+12.8	+48.9	+39.8	+ 11.7	+30.4
Sugar					
Unit value	- 9.2	+36.7	+29.4	+189.0	- 7.0
Volume	+286.6	-67.8	+148.0	+174.7	+ 24.1
Value	+251.2	-56.0	+221.0	+693.9	+ 15 .4
Fish and fish preparation					
Unit value	+23 .9	+22.3	+19.3	- 8.7	+21.8
Volume	+ 10.0	+ 6.1	+37.1	-18.7	+29.7
Value	+ 36.4	+29.8	+63.7	-25.8	+58.1
Iron ore					
Unit value	- 11.5	- 0.1	+ 5.9	+31.7	+28.7
Volume	+25.0	+ 5.0	+14.3	- 8.3	+ 3.6
Value	+10.7	+ 4.9	+21.0	+20.7	+33.4
Manganese ore					
Unit value	+ 5.8	+ 3.3	+13.2	+40.9	+30.7
Volume	- 9.7	-20.5	- 4.6	+29.8	-23.2
Value	- 4.5	17.9	+ 8.0	+83.0	+ 0.5

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	1971	1972	1973	1974	1975
Raw Cotton					
Unit Value	+24.7	+11.6	+ 3.6	+29.0	+ 1.2
Volume	-11.1	+18.8	+44.7	-63.6	+160.0
Value	+10.9	+32.5	+50.	-53.1	+163.2
Jute Manufactures					
Unit Value	+ 9.2	+ 8.8	- 6.1	+24.9	- 3.0
Volume	+17.5	-13.4	- 3.1	+ 4.1	-14.7
Value	+28.4	- 5.8	- 9.0	+30.0	-17.1
Mill-made cotton					
Unit value	+52.6	-20.0	+32.4	+40.6	-14.3
Volume	-30.3	+58.7	+45.4	-43.3	+12.9
Value	+ 6.7	+26.7	+92.7	-20.3	- 3.1
Handloom cotton					
Unit value	+29.3	+ 0.3	+36.9	+22.9	+10.0
Volume	+ 6.2	+64.5	+43.4	-27.0	+17.8
Value	+37.0	+65.0	+96.4	-10.2	+29.6
Leather					
Unit value	+ 7.2	+10.0	+72.4	+13.9	+10.3
Volume	+ 4.0	+74.6	-42.8	-26.1	+26.0
Value	+11.4	+92.2	+ 1.3	-15.9	+39.1

Source: Calculated from Government of India, Economic Survey, 1974-75, op.cit., Table 6.7; pp. 107-8; Economic Survey, 1975-76, op.cit., Table 6.7, pp. 107-8.

Table (13)

Pakistan: The Year-to-Year Changes in the Major Export Items, 1971-75
(percentage changes from the preceding year)

	1971	1972	1973	1974	1975
Rice					
Unit value	+ 9.3	- 1.5	+63.3	+75.5	- 7.3
Volume	+53.3	+220.3	+40.4	-22.5	+17.2
Value	+67.3	+215.4	+129.4	+36.1	+ 8.6
Oil Cakes					
Unit value	+84.0	+16.2	+ 2.1	- 0.3	- 6.3
Volume	-12.6	+119.4	-22.2	-86.6	-93.3
Value	+61.7	+155.4	-20.6	-86.7	-93.7
Fish and fish preparation					
Unit value	+23.4	+83.1	+68.5	+ 3.6	+25.1
Volume	- 3.4	+ 9.2	-12.3	-18.1	-17.9
value	+19.2	+100.0	+47.8	-15.1	+ 2.7
Raw Cotton					
Unit value	+59.0	+24.6	+18.5	+32.5	- 0.7
Volume	+60.6	+39.1	-38.6	- 6.1	+32.4
Value	+155.3	+73.2	-27.3	+24.4	+31.5
Cotton Waste					
Unit value	-13.4	+75.0	+45.7	+24.4	+24.0
Volume	+30.4	+ 4.4	-22.5	-35.1	-56.4
Value	+13.0	+82.6	+12.9	-19.3	-45.9
Raw Wool					
Unit value	+23.2	+82.9	+60.2	+28.4	-26.3
Volume	-21.7	+15.5	-12.3	-51.7	+33.9
Value	- 3.6	+111.4	+40.5	-37.9	- 1.3
Hides and Skins					
Unit value	+48.7	- 0.5	+28.9	-26.0	-29.7
Volume	-28.8	+ 1.0	-14.2	+132.7	+56.2
Value	+ 5.8	+ 0.6	+10.7	+72.3	+ 9.8

contd... /

	1971	1972	1973	1974	1975
Cotton yarns					
Unit value	+18.2	+100.2	+64.5	+14.4	-20.2
Volume	+32.4	-35.1	-10.0	-38.0	+ 7.0
Value	+56.6	+170.5	+48.1	-29.0	-14.6
Cotton fabric					
Unit value	+ 8.2	+86.2	+69.2	+18.9	-15.3
Volume	+13.4	+25.7	- 3.8	-13.8	+15.6
Value	+22.7	+134.0	+63.0	+2.5	- 2.1
Leather					
Unit value	+15.5	+82.0	+47.9	+16.3	- 2.9
Volume	+12.3	+40.6	- 9.3	-29.9	+26.3
Value	+29.7	+156.0	+34.1	-18.4	+22.6

Source: Calculated from Government of Pakistan, Pakistan Economic Survey, 1976-77, op. cit., Statistics, Table 31, pp. 86-7.

Table (14)

Kenya: The Year-to-Year Changes in the Major Export Items, 1971-75
(percentage changes from the preceding year)

	1971	1972	1973	1974	1975
Coffee					
Unit value	-16.5	+13.3	+21.2	+12.7	- 2.8
Volume	+ 5.0	+11.9	+19.2	- 4.8	- 5.7
Value	-12.2	+26.8	+44.4	+ 7.3	- 8.3
Tea					
Unit Value	- 2.7	- 1.8	- 5.5	+18.7	+11.6
Volume	- 5.0	+38.0	+ 8.8	- 3.7	+ 5.9
Value	- 7.7	+35.4	+ 2.9	+14.3	+18.2
Meat and meat preparations					
Unit Value	+18.8	- 4.4	+25.1	+16.3	- 8.7
Volume	+ 4.5	+37.2	-39.5	+ 1.7	+22.1
Value	+24.1	+31.2	-24.4	+18.4	+11.5
Sisal					
Unit value	+ 3.6	+23.0	+99.1	+121.1	-27.0
Volume	-21.6	+11.7	+15.6	+60.9	-40.7
Value	-18.8	+36.5	+131.0	+225.0	-56.7
Pyrethrum					
Unit value	-11.4	+12.1	-13.3	+13.1	+ 3.7
Volume	+52.6	+25.5	+ 2.4	+32.8	+ 7.4
Value	+54.1	+37.2	-19.9	+54.3	-15.2
Hides and skins					
Unit value	+ 6.9	+21.7	+75.6	-22.4	- 7.3
Volume	+38.2	+27.2	-21.8	+10.4	+31.5
Value	+47.4	+54.7	+37.3	-14.4	+21.9
Cotton raw					
Unit value	+ 6.4	+11.1	+ 0.7	+19.3	+24.5
Volume	- 9.4	- 7.4	+12.0	-30.6	- 9.3
Value	- 3.6	+ 2.9	+12.9	-17.3	+12.9

Contd.... /

	1971	1972	1973	1974	1975
Cement					
Unit value	- 4.2	+ 2.0	+ 4.5	+40.3	+27.8
Volume	- 6.3	- 2.5	- 4.2	+18.1	+ 3.4
Value	-10.3	- 0.4	+ 0.1	+65.6	+32.3
Metal Containers					
Unit Value	+18.9	+ 2.8	+ 3.5	+39.6	+35.3
Volume	+ 6.2	-24.9	- 3.3	+38.5	-53.0
Value	+26.3	-22.8	+ 0.2	+93.4	-36.4
Base metal					
Unit value	- 8.1	-19.2	+85.9	+40.3	+16.9
Volume	+106.7	-51.0	+116.2	+43.0	-65.8
Value	+89.9	60.5	+301.8	+100.6	-58.9
Paper manufactures					
Value	+15.6	- 3.3	-41.2	+30.4	+ 7.1

Source: Calculated from Republic of Kenya, Statistical Abstract, 1976, op.cit., Table 59(a), p. 63; Table 59(b), p. 64; Table 62(a), p. 68; Table 62(b), p. 69; Table 63(a), p. 70; Table 63(b), p.71; Table 75(a), p. 93.

Table (15)

Conversion factors of Oil Products

Fuel	bbls/metric ton	tons of oil equivalent/ metric ton	10^6BTU/ bbl
Crude oil	7.30	1.034	5.62
LGP	11.80	1.195	4.01
Gasoline	8.53	1.128	5.25
Jet Fuel	7.93	1.133	5.67
Distillates - Fuel Oil	7.46	1.095	5.83
Residual fuel oil	6.66	1.055	6.29

Source: OECD, Energy prospects to 1985, OECD, Paris, 1974, Table 2A-2, p.4.